ZONING AS A RESPONSE TO HYDRAULIC FRACTURING: A COMPARISON OF NEW YORK AND PENNSYLVANIA

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ABSTRACT

LOCAL ZONING AS A RESPONSE TO HYDRAULIC FRACTURING: A COMPARISON OF NEW YORK AND PENNSYLVANIA

STEPHANIE E. NEWELL

Regardless of what side of the line we find ourselves on, the topic of unconventional natural gas extraction using the process of hydraulic fracturing in order to supplement the American energy market stirs strong emotions that have divided the national consensus. Natural gas is advertised as a cleaner and cheaper alternative to coal and oil by the oil and gas industry, and other proponents, but these deposits are located in shale beds and are currently being accessed with the controversial hydraulic fracturing horizontal drilling method. Despite the positive reasons given for the continued use of hydraulic fracturing in order to expand natural gas extraction operations, local governments in New York and Pennsylvania are passing zoning ordinances to ban, to enact moratoria or to restrict the location of natural gas drilling sites within their boundaries.

Even though hydraulic fracturing started over 100 years ago, it was the invention of the horizontal technology added to the original vertical process that drastically opened and increased the possibilities of extracting natural gas for our market. This new technique was first experimented with in 2004 in the State of Pennsylvania without much fanfare, but over the past 10 years it has drastically expanded into populated areas and residents who live near drill sites have been sharing their stories of the negative impacts they have felt as a result. These details and accusations have generated distrust in the oil and gas industries claims that hydraulic fracturing is safe and distrust in the state's ability to regulate it properly in order to protect public welfare. Therefore, municipalities in Pennsylvania are using their home rule powers to pass zoning ordinances to decide where hydraulic fracturing can safely take place within their districts.

The distrust in the hydraulic fracturing process from Pennsylvanians has crossed the state line into New York where there is a state wide moratorium on hydraulic

fracturing. As a result of the moratorium, a growing number of municipalities are taking this time to use their zoning powers to pass ordinances banning it or to place their own moratoria in case the Governor of New York decides to allow the permitting of its use. The passing of zoning ordinances in both states has generated a series of court cases where the oil and gas companies are taking municipalities to court claiming state law preempts local law when regulating a mineral extraction activity. As a result, the courts have become the defining factor through the use of jurisprudence in determining who possesses the regulatory authority over what, when it comes to extracting natural gas using hydraulic fracturing.

As this research shows, hydraulic fracturing's exemption from federal regulations and its high impact land use has proven that zoning is a legal and logical option available to local communities to protect themselves from the expectation to extract as much natural gas as possible, where ever that may be. Therefore, the information in this paper will support zoning ordinances passed by municipalities in New York and Pennsylvania with the motivation to protect the health, safety and welfare of their communities from an industrial activity for the following reasons: the scientific community does not have the data to say hydraulic fracturing is safe, the regulatory structure overseeing the industry is weak, the courts have ruled municipalities have the legal right to regulate land use and to keep residential and industrial activities separate.

These findings were additionally tested using the application of Regulatory Theory as a conceptual framework in order to validate the outcome from the literature review. Regulatory Theory asserts that when within an environment of deregulation a crisis will occur between a private enterprise that is profit motivated and those affected by it. In order to balance this crisis, moral consequences must be added to the equation of regulations which must be issued and enforced by a legal governmental body that seeks to protect public welfare and economic activities at the same time. Zoning ordinances, issued by local governments, will fit Regulatory Theories criteria to insert public welfare back into hydraulic fracturing's regulatory framework to regularize the crisis that exists within the context of this paper.

Keywords

Hydraulic fracturing, fracking, zoning, New York, Pennsylvania, Marcellus Shale, natural gas extraction, regulations, case law, Local Government, Municipalities, preemption, ordinances, Regulatory Theory

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CHAPTER 1

INTRODUCTION

"I've often thought that if our zoning boards could be put in charge of botanists, of zoologists and geologists, and people who know about the earth, we would have much more wisdom in such planning than we have when we leave it to the engineers." - *William Orville Douglas* (Bartleby 1989)

This thesis will be discussing some of the issues that have established the context for the appropriate use of zoning to regulate hydraulic fracturing by local governments in the States of New York and Pennsylvania. For the purpose of this thesis, I will be using the term hydraulic fracturing (HF) and or "fracking" to represent the newest technique of horizontal drilling, added to the original vertical process also called hydraulic fracturing, which uses pressurized chemical laced water and sand to fracture shale rock in order to extract an unconventional natural gas.

Being a resident of New York, I recognize that my state is at difficult crossroad in deciding whether to frack its portion of the Marcellus Shale basin. The economic possibilities from the amount of natural gas said to be embedded in the Marcellus Shale basin, estimated at a 30 to 100 year supply, is immense and would help to secure an important domestic energy source for New Yorkers and the rest of the continental US (Dresselhaus & Thomas 2001). With these projections, it could be assumed that the American consumer would benefit from a significant price drop when purchasing natural gas for heating their homes, a welcomed site in the North East region. Furthermore, natural gas also has many other uses that are vital to our lifestyles and to our overall market as a developed country, which include:

> "… raw material for fertilizers and a component in the manufacture of pharmaceuticals, cosmetics, medical implants, sports equipment, electronics, plastic toys and paints" and for "A heat source for generating steam used in numerous industrial and commercial applications, including the steel, plastics, automotive and pulp and paper industries as well as schools, hospitals and military bases." (American Natural Gas Association 2013:1)

Since we depend on natural gas for these uses, the horizontal hydraulic fracturing technology and the discovery of unconventional shale gas saved the American public from the higher cost of having to import it since conventional reserves were at the point of depletion. In fact, not only do we have enough to supply our own market, but there exists a surplus large enough for overseas exports that would yield even more profits (American Natural Gas Association 2013). Since hydraulic fracturing began, the price of natural gas has gone as low as "… $2 per 1,000 cubic feet for the first time since 2002" and utility companies are starting to switch from coal and nuclear power in favor of natural gas (Goho 2012:1). Additionally, because of the added horizontal technology, hydraulic fracturing has reduced the environmental impacts and disturbances that traditional vertical drilling would have created at this scale of extraction because of its ability to support multiple drillings in one location.

Regardless of the positive results, in 2010 the then governor of New York, Governor Paterson, placed a moratorium on permitting new hydraulic fracturing activity on its portion of the Marcellus Shale. Paterson called for a draft Supplemental Generic Environmental Impact Statement (dSGEIS) from the New York State Department of Environmental Conservation (NYSDEC) in order to assess hydraulic fracturing impacts and to develop strict regulations to mitigate them before the moratorium could be lifted (Associated Press 2010). Since invocation of the moratorium, residents in New York have begun voicing their opinions on whether the residing state Governor, Andrew Cuomo, should allow it to expire. In fact, polling shows that opposition to fracking is growing, particularly in the New York City area where "The Wall Street Journal/NBC 4 New York/Marist College survey found 47 percent of New York adults "generally oppose" fracking in the Marcellus Shale, up eight percentage points from the last time Marist polled the issue in March (2013). A total of 37 percent support it, which was unchanged from March" (Campbell 2013a:1).

One possible reason for the increased concern with hydraulic fracturing from the New York City area, which is not located over the Marcellus Shale Basin, is most likely connected to the fact that the over 8 million people who reside there get their drinking water from an unfiltered watershed that is located upstate and is within the Marcellus basin (NYCDEP 2009). This concern is highlighted by the fact that if the watershed were

to become contaminated, New Yorkers would have to pay billions in order to install a water treatment facility for the City, not to mention the potential disruptions in access to clean water if this were to occur (DePalma 2006). Even so, while Governor Cuomo is waiting for the NYSDEC to finish its dSGEIS local residents are determining for themselves whether or not they want to allow hydraulic fracturing to take place within their communities by passing zoning ordinances in order to exclude its use.

In contrast, Pennsylvania has been actively drilling since 2004 and in 2013 polling found that 2 out of 3 Pennsylvanians are for a statewide moratorium (Halliburton 2013; Phillips 2013). However, since 2004, the State of Pennsylvania's Governors have been in favor of welcoming hydraulic fracturing, particularly the current Governor, Governor Corbett. In order to make Pennsylvania industry friendly and attract the oil and gas companies, Corbett has continuously tried to weaken state environmental regulations and municipality home rule powers in favor of unified laws that serve to minimalize the interruption and restriction on hydraulic fracturing (The Council of State Governments 2012). These policies by the state have left Pennsylvanians to deal with some painful consequences and municipalities have therefore turned to zoning in order to protect the health, safety and welfare of their citizens and their environment while serving as an example to New Yorkers of what they might expect.

1.1 Problem Statement

In 2005 the federal Energy Policy Act added provisions that specifically exempted hydraulic fracturing from the underground injection control program that would have required the oil and gas companies to adhere to the regulations in the Safe Drinking Water Act. Further exemption from federal oversight has put the states in charge of regulating hydraulic fracturing therefore allowing local governments in Pennsylvania and New York to apply land use regulations given to them through their home rule powers to regulate where hydraulic fracturing can take place. This has resulted in tensions between the oil and gas companies and local governments producing legal disputes. These tensions are a result of the risks at both ends of the spectrum since hydraulic fracturing has the ability to negatively impact the environment, the health of humans and animals and also the ability to provide a cheap domestic energy source for

the American public and profits for the industry. Therefore, the aim of this paper is to look into the circumstances that prompt the use of, and the challenge to, zonings ability to regulate land use in relation to hydraulic fracturing. In order to do this, the literature applied within this context will serve to define the problem statement of the thesis: whether zoning is the appropriate response to hydraulic fracturing by local communities, using the comparison of situations and circumstances that exist in New York and Pennsylvania.

1.2 Conceptual Framework

Methodology

An exploratory research method was employed by the use of existing literature from various internet resources consisting of news articles, case law, historical data, scientific studies, industry reports, environmental group reports, political commentaries and academic studies. This type of qualitative paradigm allowed for the collection and the analysis of the data to take place simultaneously in order to reveal the answer to the problem statement. In order to develop the theory, I organized the chapters so that the information on the hydraulic fracturing process and its regulatory framework were provided first, followed by its impacts. It was important to take this approach in order to understand why local municipalities were using their zoning powers to exclude hydraulic fracturing. The court cases were then discussed towards the end to highlight the challenge to zoning ordinances and to see how the justices in both states defined local government regulatory authority over a mineral extraction activity already regulated by the state. A theory based conceptual framework was also applied in order to help define and validate the findings found in the literature review.

Regulatory Theory

What is Regulatory Theory? Regulatory Theory evolved from the Regulatory School of thought that was formed in France in the 1970's by economic writers experiencing an era of economic instability (Wikipedia 2013o:1). This instability was theorized by the writers to have arisen from contradictions within the Marxist model of

production based on capital, resulting in a crisis of tensions that created the opportunity to present new social and economic reforms (Joskow & Noll 1981). As this paper presents there is a crisis of tensions occurring here, between the production of a profitable energy source that impacts natural resources and the breakdown of the citizenry in trusting the current regulatory environment to factor in its wellbeing.

In the book *Government and Markets Towards a New Theory of Regulation* by Edward Balleisen and David Moss, Balleisen and Moss discuss the need for new models of regulation in an increasing atmosphere of deregulation where "the invisible hand of the market fails to optimize social welfare" (Balleisen & Moss 2009:1). Their book is a collection of essays by important scholars meant to start the debate and to discuss the long neglected idea of regulation. Balleisen and Moss reveal important information on regulation that parallel to the regulatory environment New York and Pennsylvania are dealing with in regards to the oil and gas industries use of hydraulic fracturing. They discovered that regulation has been long associated by capitalists with terms such as "heavy handed" and that when left to their own devices, "political actors at all levels often aim to maximize their own self-interest, rather than the public interest, in their public decision-making" (Balleisen & Moss 2009:3, See also Stigler 1971). This highlights the importance of information through "the press to inform and mobilize a broad electorate" in order to curb "the capacity of special interests to dictate policy formulation" (Balleisen & Moss 2009:3). This needed connection between "regulatory politics" and social welfare is important because it gives the process the needed "social legitimacy" to succeed (Balleisen & Moss 2009:4). However, the current regulatory system that exists for the hydraulic fracturing process is deregulated and ineffective and therefore does not have social legitimacy. This very factor is why local areas are using their zoning powers to form systems that work for them.

Michael Adler wrote a research paper on Regulatory Theory for *Penn State Law* and described the theory as a connection of economic thought with ethical actions, where without this connection, regulatory structures will be questioned. In order to explain why this is so, Adler discusses the evaluation of regulation by using a moral criterion in the form of welfarist and consequentialist economic thought. Consequentialism see's

morality as an action or an in action that would create favorable results whereas welfarism, also being a form of consequentialism, "sees well-being as the sole intrinsically morally relevant feature of outcomes" (Adler 2009:592). However, he also points out that even when these two are used together to formulate a regulatory structure, it can still become controversial because when factoring the cost benefit analysis used by economic welfarism, it can be used to associate citizens as utility functions instead of what it is supposed to be about, the moral consequences of affecting people, animals and the environment (Adler 2009; Fromm 1981).

Adler also discusses another contrast to welfarism used within cost benefit analysis structures that aim only to figure out if the benefits outweigh the monetary costs of the factored activity which is referred to as *deontology.* Deontology follows a "rule based ethics" where something is either right or wrong regardless of the intent or consequence (Wikipedia 2013p:1). The deontological view as Adler further explains is a "cost-benefit analysis [that] would license environmental, health and safety regulation that violates individuals' moral rights not to be put at risk of death or physical harm." (Adler 2009:594). This aspect of Regulatory Theory is important in understanding the context of this paper because the oil and gas industry, the federal government and some politicians, have taken the deontological position leaving local governments in New York and Pennsylvania to use their zoning authority in order to keep, or return, the welfarist ideals within hydraulic fracturing's regulatory framework (Fromm 1981).

This push to use zoning has been even more reactionary because of the additional lack of information and data on hydraulic fracturing and its impacts, which is an integral piece to the success of welfarism because it must assume that people are informed and rational. When these pieces are missing, such as is the situation in New York and Pennsylvania, then the "system of competitive prices can sometimes produce a morally problematic outcome" where even "economic scholarship recognizes imperfect information as a kind of market failure potentially justifying regulation" (Adler 2009:603).

The consensus of Regulatory Theorists is that the methodological framework on regulation and due process is lacking because we have been focusing on deregulation for

so long (Hertog 1999; Adler 2009; Balleisen & Moss 2009). Therefore, the information within this paper is supported by Regulatory Theory philosophy in that the economic market side to natural gas extraction using hydraulic fracturing does not want zoning or any other entity besides itself to regulate its process since they see it as "unwarranted paternalism" that affects their bottom line (Adler 2009:602).

Local communities on the other hand feel they are justified in using zoning since zoning seeks to further the health, safety, and welfare of the public and the environment which is a recognized part of Regulatory Theories welfarism since it up holds the element of well-being at its core. (Legal-dictionary 2013a). This then sets up the test of the modality of zoning as a useful legal structure to regulate hydraulic fracturing through land use regulations as the court cases will demonstrate. Therefore, as Adler describes, local government regulation by this school of thought is solidified because zoning has the ability to right the wrongs of the economics placed on land markets by enforcing its own welfarist principles locally and in the court room (Hertog 1999; Adler 2009).

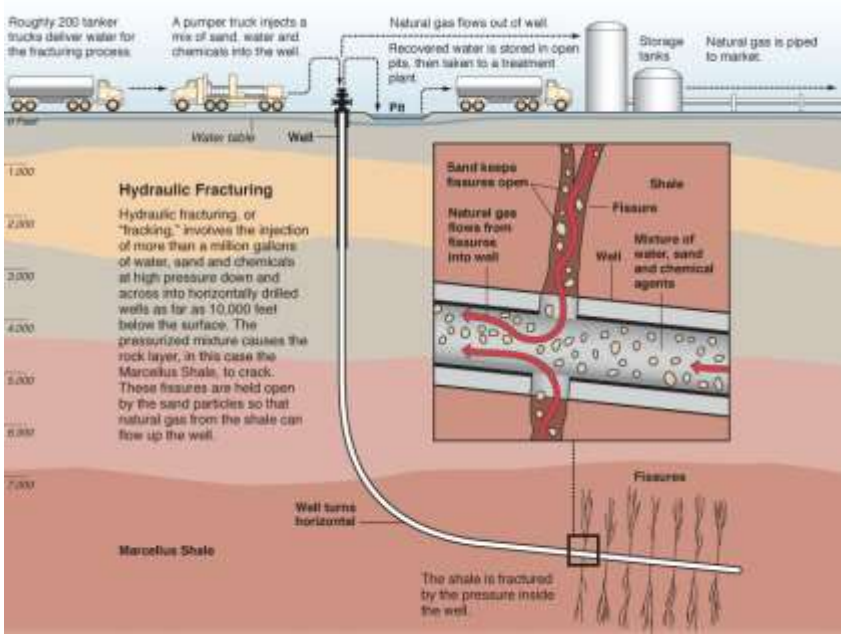
Literature Review

CHAPTER 2

The Hydraulic Fracturing Process

In order to understand the tensions that exist between local governments, the oil and gas companies and the states which have led to a redefining of zonings power in the court room, it is important for the process of hydraulic fracturing and its impacts to be explained. Before horizontal drilling technology was invented allowing for the extraction of unconventional natural gas reserves (called so because it is extracting a fossil fuel that is trapped in rock), shale beds were out of reach due to the time and energy it would have taken to extract the gas with the conventional technology that was available (Hammer 2012:12; Halliburton 2013). The unconventional method of hydraulic fracturing uses the same type of vertical drilling as conventional extraction does, but it adds a horizontal element where the well bore reaches a certain depth, about 8000ft depending on the geology, and then is turned 90 degrees to horizontally reach out up to 13,000 feet into shale rock as Figure 1 demonstrates (Messeder 2012; Nearpass & Brenner 2012:5).

Figure 1: Diagram of the Hydraulic Fracturing Process – (Source: ProPublica 2013)



Prior to the invention of the horizontal method, the United States was projecting future low natural gas reserves and started developing the facilities to import it for our market (Udall 2013). These steps were necessary because conventional natural gas (gas that is trapped *below* rock layers in pockets) had been depleted to the point that the United States needed another source to keep up with the market demand because according to the Energy Information Administration, natural gas "…accounts for 24 percent of total energy consumed in the United States, making it a vital component of the nation's energy supply" (Natural Gas 2011:1). However, the horizontal method was perfected in time and was added to the original hydraulic fracturing process averting the need for imports (Hammer 2012:12).

So what exactly is hydraulic fracturing? Halliburton describes this process as:

> "Well, it starts with a good bit of water and a lot of sand. Mix those two together, apply a couple thousand pounds of pressure, and introduce them to a reservoir several thousand feet below, often with the help of a small percentage of additives that aid in delivering that solution down the hatch. Then physics takes over. The force of the water creates a network of tiny fissures in the impermeable rock. The flow of water acts as a delivery mechanism for the sand, which finds its way into those newly created cracks and holds them open. This creates passageways through which the previously trapped natural gas can travel to get to the wellbore. The fracturing process is now finished; on average, it takes 3 to 10 days to complete." (Halliburton 2013: 1)

This description by Halliburton is a general one that has left out some important details and concerns with a process that is being used in 9 out of 10 natural gas wells drilled in the United States where there are more "… than 493,000 active natural-gas wells across 31 states in the U.S." where "Around 90 percent have used fracking, according to the drilling industry" (Sourcewatch 2014:1; ProPublica 2013).

Some of the concerns consist of: (1) the use of silica sand as a propant because at the fracturing point; (2) plumes of silica sand dust can usually be seen in the air raising concerns for workers and anyone or anything downwind because when breathed in; (3)

and silica dust can cause “debilitating and deadly diseases such as silicosis and lung cancer” (Peeples 2012:1). Another major concern involves the storage and the treatment of the waste water that comes back to the surface, since it will contain: Salt or brine that can measure up to “32,300 mg per liter of sodium. For comparison, EPA guidelines call for a maximum of 20 mg/L in drinking water”, added industrial chemicals consisting of “high concentrations of magnesium, iron, barium, strontium, manganese, methanol, chloride, sulfate and other substances”, hydrocarbons released from shale “including the toxics benzene, toluene, ethylbenzene, and xylene” and naturally occurring radioactive materials (NORMS) found in shale (Sunshine 2013:2; See also Griswold 2011).

Therefore, handling of the flow back water has local residents and environmental groups in both New York and Pennsylvania worried because of the potential for spills and leaks that have contaminated surface and ground water (Marcellus-Shale 2013). Pennsylvanians know firsthand about the potential of wastewater contamination to their natural resources from trucks accidents while carrying it from the drill sites to water treatment centers, from illegal dumping, from it leaking through the temporary pipes carrying it to holding pits, from the flooding and leaking of the holding pits themselves (As figures 2 through 4 depict) and from well blowouts or infrastructure breakdowns (NRDC 2012). Given these concerns, an even more detailed overview of some of the after effects of hydraulic fracturing will be further discussed in order to explain the “many public health and environmental issues of concern to municipalities and planners, both urban and rural” have with hydraulic fracturing (Goho 2012:1).

Figure 2: Temporary Piping Carrying Flow back Water to a Holding Pit in Pennsylvania – (Source: Marcellus-Shale 2013).

Figure 3: More Temporary Piping Carrying Flow back Water to a Holding Pit along a Rural Residential Road in Pennsylvania – (Source: Marcellus-Shale 2013).

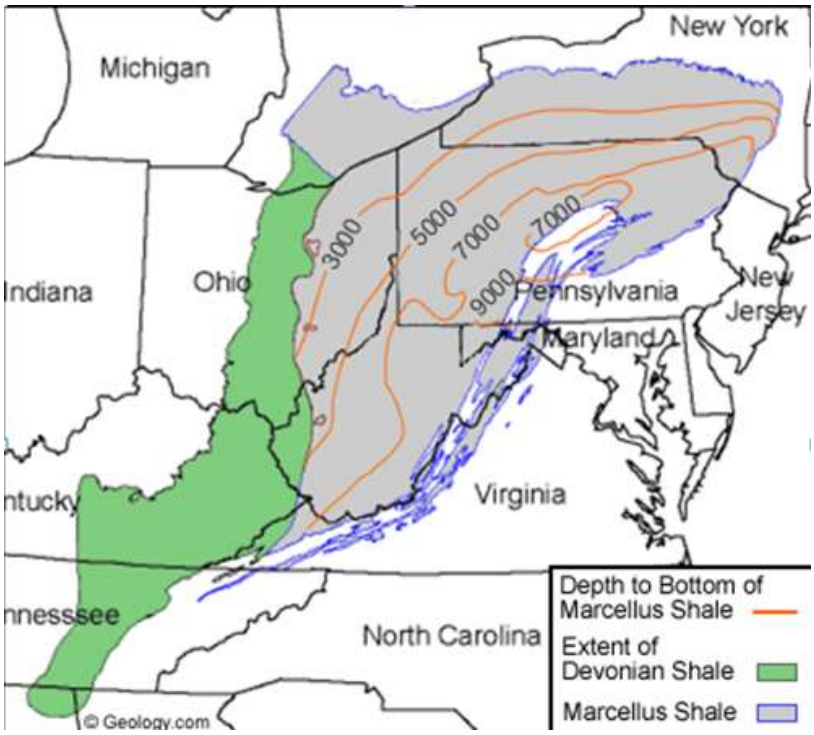
Figure 4: Example of a Flow Back Water Holding Pit in Pennsylvania – (Source: Kennedy 2013).

2.1 Water Issues

Because of New York and Pennsylvania's geographic location and climate, water resources are plentiful and the issue then becomes one of not water accessibility but one of water contamination, treatment and disposal (Clark 2012:19). It is claimed by the Groundwater Protection Council, which concluded a study in 2012 for the US Department of Energy that "[t]he amount of water needed to drill and fracture a horizontal shale gas well generally ranges from about 2 million to 4 million gallons, depending on the basin and formation characteristics" with some wells needing to be fracked more than once (Northrup 2012:1).

An organization called SkyTruth decided to find out how much water was being used for hydraulic fracturing over a 20 month period by accessing information found on FracFocus.org, a voluntarily industry-reported data site. What they discovered through analyzing this data was that water usage varied from state to state because of the varying depths of each shale basin with the Marcellus Shale being the deepest.

Figure 5: Map of the Marcellus Shale Region – (Source: Geology.com:1)



(In Meters)

SkyTruth also found, from a likely conservative estimate of freely given data from the industry, that over a 20 month period 65.9 Billion gallons of water was used for hydraulic fracturing purposes (Northrup 2012). The Oil and Gas Industry reacted to these numbers and assured their critics that they are working with water planning agencies to make sure local water needs are not disrupted by not extracting from" just one source but from various sources such as surface water, groundwater, municipal water suppliers, treated wastewater, power plant cooling water and/or recycled flow back water" (Energy From

Shale 2012:1; Messeder 2012:1; US Dept. of Energy 2009). What happens with the large volume of chemically polluted waste water after a well has been fracked?

Figure 6: Water Usage by State for Fracking According to FracFocus.org's Industry Data - (Source: Northrup 2012)

Rank*	State	Fracks Reported	Average (in gallons)	Total Used	% of Total Water Use
1	Texas	11,922	2,573,701	30,683,667,301	47%
2	Colorado	4,205	1,242,158	5,223,274,238	8%
3	Pennsylvania	1,884	4,328,886	8,155,620,871	12%
4	North Dakota	1,353	2,010,931	2,720,789,835	4%
5	Arkansas	1,305	5,223,972	6,817,283,249	10%
6	Wyoming	1,131	761,048	860,745,353	1%
7	Oklahoma	1,113	3,756,270	4,180,728,158	6%
8	Louisiana	930	5,341,088	4,967,211,610	8%
9	New Mexico	789	663,868	523,791,968	0.8%
10	Utah	783	352,288	275,841,828	0.4%
11	California	314	167,507	52,597,101	0.1%
12	West Virginia	178	4,720,082	840,174,633	1.3%
N/A	*All Other States*	*432*	*1,383,994*	*597,885,252*	*0.9%*
*by # of fracks	**TOTAL**	**26,339**	**2,501,984**	**65,899,611,396**	**100%**

Waste Water

Wastewater, or flow back water, is the approximate 20 percent of the millions of gallons of water that was pumped down the well bore which returns to the surface after fracturing (Ohiodnr 2013). This flow back water consists of the originally added chemicals and sand as well as other compounds that have been trapped within the shale for millions of years as it was formed under heat and pressure such as "salts (often expressed as total dissolved solids, or TDS), organic hydrocarbons (sometimes referred to as "oil and grease"), metals… and naturally occurring radioactive material (NORM)" (Hammer et al 2012:13). In Pennsylvania, the treatment of the flow back water mostly

takes place at sewage treatment plants and is re-released to surface waters. However, these treatment plants are not equipped to remove NORMs and TDS and other chemicals used in hydraulic fracturing which can end up in water intake plants that collect surface water to be treated for drinking and who do not test for NORMs because there are no federal regulations in place to do so (Urbina 2011) This was confirmed by the New York Times whom received "documents … from the Environmental Protection Agency, state regulators and drillers [that] show that the dangers to the environment and health are greater than previously understood" with the release of improperly treated flow back water happening in Pennsylvania (Urbina 2011:1). Even though New York is not currently producing hydraulic fracturing waste water, it is treating some of Pennsylvania's due to the volume that is overwhelming treatment centers there. Plant operators in New York say they "cannot remove enough of the radioactive material to meet federal drinking-water standards before discharging the wastewater into rivers, sometimes just miles upstream from drinking-water intake plants" (Urbina 2011:1).

The release and use of this water has the potential to affect human health particularly with addition of chlorine that is used to treat surface water for drinking purposes. This is because chlorine reacts with the TDS creating Trihalomethanes that puts people at risk for cancer, birth defects and miscarriages (NJ Dept. of Health 2012). The EPA has also acknowledged the issue with this process by admitting there are "no comprehensive set of national standards [that] exists at this time for the disposal of wastewater discharged from natural gas extraction activities. As a result, some shale gas wastewater is transported to treatment plants (publicly owned treatment works (POTWs) or private centralized waste treatment facilities (CWTs)), many of which are not properly equipped to treat this type of wastewater" (EPA 2014a:1).

Figure: 7 Photo of Treatment-plant discharge headed for Black Lick Creek in Indiana County, Pa. – (Source: Griswold 2011)

Underground Injection of Waste Water

In addition to treating and releasing flow back water, another disposable method that has been used for years within other industries that produce toxic byproducts is that of Underground Injection (UI). UI of contaminated fracking fluids is common in areas that have the right type of geology able to "entomb the waste for millennia" by drilling and injecting this waste into rock formations (Lustgarten 2012:1). It has been calculated that there are roughly over 680,000 underground injection sites within the United States from these various industries (ProPublica 2010). However, the Marcellus Shale's geology is such that underground injection is not viable and therefore, Pennsylvania has been sending it to Ohio because it's close and does have the right geology.

The oil and gas industry is allowed to use UI as a disposal method without the federal oversight other industries are subjected to because hydraulic fracturing is exempt from the Safe Drinking Water Act (SDWA) which regulates underground industrial activities. The exemption of hydraulic fracturing from the SDWA was written into the Energy Policy Act in 2005, specifically allowing "the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities." § 300h(d)(1)(B)(ii)"

(Environmental Defense Center 2011). This exemption is referred to as the Halliburton Loop Hole because it is thought that the provisions written in the Energy Policy Act of 2005 resulted from then Vice President Cheney's Energy Task Force and Cheney was CEO of Halliburton before he became Vice President (Earthworks 2013:1).

The growing number of UI sites is raising concerns and has prompted scientists to study how well these fluids are being contained within the geology over time. What they are finding is that some of these sites are in fact leaking and some have leaked into aquifers that supply drinking water (Lustgarten 2012). Mario Salazar, an engineer who worked for 25 years as a technical expert with the EPA's underground injection program in Washington, explained that "A lot of people are going to get sick, and a lot of people may die" as a result from the geology changes made by underground injections and hydraulic fracturing that could lead to the contamination of water resources (Lustgarten 2012:1). Salazar and other scientists are concerned because hydraulic fracturing and the practice of UI create extra fractures within shale that will allow for the eventual migration of the trapped waste water to flow to the surface and into aquifers (Lustgarten 2012:1). Stefan Finsterle, a leading hydro geologist at Lawrence Berkeley National Laboratory who specializes in understanding the properties of rock layers and modeling fluid flows through them, explained the situation like this: "You have changed the system with pressure and temperature and fracturing, so you don't know how it will behave" and therefore the safety over time from contamination cannot be guaranteed (Lustgarten 2012:1).

If scientists are concerned and feel that ground water contamination has and will happen from UI sites and hydraulic fracturing, then why haven't we heard about it and how do we know it's actually happening? Scientists have explained that the absence of documented contamination from UI is because no one has been looking for it and there are no monitoring systems for leak detection (Lustgarten 2012). This lack of monitoring is most likely because in 1988, the federal government re wrote how "waste" was defined and "deemed that" all material resulting from the oil and gas drilling process is considered non-hazardous, regardless of its content or toxicity" and therefore, was deregulated and deemed unnecessary to monitor (Lustgarten 2012:1).

The EPA was questioned about UI monitoring and released a statement saying "Underground injection has been and continues to be a viable technique for subsurface storage and disposal of fluids when properly done," however, the "EPA recognizes that more can be done to enhance drinking water safeguards and, along with states and tribes, will work to improve the efficiency of the underground injection control program" (Lustgarten 2012:1). In 2010 there were almost 45,000 wells that were drilled by the oil and gas industry nationwide. That number has increased and will continue to increase until shale gas is depleted. If these wells do leak and contaminate ground water, not only will it be a tragedy but it will also leave the cleanup and the bill to the states and ultimately the municipalities in those areas for many years to come (Kusnetz 2011).

2.2 Chemicals Used in Hydraulic Fracturing

The chemical mixtures needed to fracture shale and extract natural gas also have raised concerns in local communities across New York and Pennsylvania. The approximate 750 chemicals used in hydraulic fracturing are necessary in order to protect drill casings from buildup and breakdown and to aide in the actual "fracturing" of the shale (NYCDEP 2009:2). Since the chemical makeup used in hydraulic fracturing varies from company and geology, the list below contains those that are used most often and are of concern.

Figure 8: Table of Chemicals Components of Concern: Carcinogens, SDWA-Regulated Chemicals and Hazardous Air Pollutants – (Source: U.S. House of Representatives 2011:8)

Chemical Component	Chemical Category	No. of Products
Methanol (Methyl alcohol)	HAP	342
Ethylene glycol (1,2-ethanediol)	HAP	119
Diesel[19]	Carcinogen, SDWA, HAP	51
Naphthalene	Carcinogen, HAP	44
Xylene	SDWA, HAP	44
Hydrogen chloride (Hydrochloric acid)	HAP	42
Toluene	SDWA, HAP	29
Ethylbenzene	SDWA, HAP	28
Diethanolamine (2,2-iminodiethanol)	HAP	14
Formaldehyde	Carcinogen, HAP	12
Sulfuric acid	Carcinogen	9
Thiourea	Carcinogen	9
Benzyl chloride	Carcinogen, HAP	8
Cumene	HAP	6
Nitrilotriacetic acid	Carcinogen	6
Dimethyl formamide	HAP	5
Phenol	HAP	5
Benzene	Carcinogen, SDWA, HAP	3
Di (2-ethylhexyl) phthalate	Carcinogen, SDWA, HAP	3
Acrylamide	Carcinogen, SDWA, HAP	2
Hydrogen fluoride (Hydrofluoric acid)	HAP	2
Phthalic anhydride	HAP	2
Acetaldehyde	Carcinogen, HAP	1
Acetophenone	HAP	1
Copper	SDWA	1
Ethylene oxide	Carcinogen, HAP	1
Lead	Carcinogen, SDWA, HAP	1
Propylene oxide	Carcinogen, HAP	1
p-Xylene	HAP	1
Number of Products Containing a Component of Concern		**652**

Scientists have revealed that some of the chemicals used in hydraulic fracturing contain at least 29 that are known human carcinogens and are listed as hazardous under the Clean Air Act (CAA) and are regulated under the Safe Drinking Water Act (SDWA), but not in the case of hydraulic fracturing since it is exempt from these regulations (Catskill Mountain Keeper 2012c). These chemicals include: “benzene, ethylbenzene, toluene, xylene, naphthalene, polycyclic aromatic hydrocarbons, methanol, formaldehyde, ethylene glycol, glycol ethers, hydrochloric acid, sodium hydroxide, and others, which are hazardous if inhaled, ingested, or contacted by the skin and are considered caustic, carcinogenic, mutagenic, and teratogenic” (Catskill Mountain Keeper 2012c:1).

Additional side effects to human and animal health, whether the chemicals are used alone or in combinations, consist of: "neurological, pulmonary, gastroenterological, dermatological, immunological, hematological, endocrinological, ophthalmological, reproductive, and genetic illnesses and abnormalities." and it is believed that they are already impacting communities in Pennsylvania where "[l]andowners [are] presenting symptoms, rashes and illnesses believed to be caused by exposure to drilling fluid chemicals in their drinking water from drilling activities that have taken place on or near their land" (Catskill Mountain Keeper 2012c:1; RWMA 2013). However, the totality of the situation cannot be properly assessed by doctors or scientists because of the existence of other potentially hazardous chemicals that are kept secret. This secrecy on chemical usage is allowed because the oil and gas industry is protected by the Trade Secrets Act which require doctors to sign non-disclosure agreements in order to have access to them to treat patients but they cannot share that information with anyone else (Food and Water Watch 2011:4; Brasch 2012).

The medical community is however paying attention and are arranging conferences specifically related to hydraulic fracturing in order to discuss the implications of these chemicals on health. Adam Law, and endocrinologist at Weill Cornell Medical College in NY who spoke at one of these conferences in Arlington, Virginia said "We've got to push the pause button, and maybe we've got to push the stop button" on fracking because of its unknown long term effects (Wayne 2012:1). Jerome Paulson, a pediatrician at George Washington University School of Medicine in Washington, also attended the Arlington conference and called for more peer reviewed studies, particularly on the effects on children, on whether or not drinking water is being contaminated from fracking chemicals. Representative Ed Markey of Massachusetts, a senior Democrat on the House Energy and Commerce Committee, mirrored Dr. Paulson's sentiment when he said in an interview that "We need to understand fully all of the chemicals that are shot into the ground, that could impact the water that children drink," because "The industry is trying "to block that information from being public" (Wayne 2012:1). The oil and gas industry has in response to these concerns set up a website where companies can voluntarily report what chemicals they are using in each well, but they are still not obligated to do so (Wayne 2012:1).

2.3 The Trade Secrets Act

The Trade Secrets Act is what gives the oil and gas companies the option to keep the chemical mixtures they use to fracture shale confidential. This Act was written for companies who come up with proprietary mixtures that may give them a competitive advantage and therefore can be a protected trade secret. However, States can write laws that bypass the Act requiring chemical disclosure as a precursor to permit approval to drill. This has become almost a formality as the State of Wyoming demonstrated when they approved a request by an oil and gas company to keep 146 chemicals they planned to use a secret, even though Wyoming is one of the states that passed a law requiring companies to disclose their chemicals (Orford 2011). The reason why state legislatures and politicians may make chemical disclosure a law but still not enforce it is best explained by Colorado Governor Hickenlooper. Hickenlooper spoke in front of the Senate Committee on Energy and Natural Resources to caution lawmakers on enacting stricter chemical disclosure laws on the oil and gas industry because if they did so, they would most likely not bring their business to states that enforce it (Wolfgang 2013).

The industries use of the Trade Secrets Act is legal, and viewed from a strategic business stand point necessary, in order to maintain an advantage over their competition as a Halliburton executive explained to the Colorado Gas and Oil Commission in the Acts defense by comparing mandatory disclosure the same as "… asking Coca Cola to disclose the formula for Coke" (The Case for a Ban on Fracking 2011:10). Additionally, the oil and gas companies also maintain that the chemicals they use are safe and therefore it is not necessary to have to reveal them as former lobbyist for Colorado Oil and Gas was quoted as saying: "There is nothing more dangerous in the fluid than what's in your makeup, honey or your toothpaste or what you use to clean your hot tub" (Food and Water Watch 2011:12). Governor Hickenlooper has even claimed to have drunk a glass of fracking fluid that was given to him by Halliburton to demonstrate how safe it is because he was told it contains nothing more than "ingredients sourced from the food industry" (Wolfgang 2013:1). However, not everyone is convinced especially not the medical and scientific community or home owners located next to drill sites.

2.4 Regulations

"Our community is like many around the country that have, as the gentleman from New York referenced, sophisticated planning and zoning regulations. These are elements that are developed as a result of local community pressure to balance interests." - *Earl Blumenauer* (WinWisdom 2014)

In regards to the issue of regulating hydraulic fracturing, the oil and gas industry would like to continue the current environment by keeping regulations minimal and in the hands of the states. The states regulatory involvement has been necessary because of hydraulic fracturing's exemption from federal regulations such as: The Safe Drinking Water Act (SDWA) which "Under this exemption, oil and gas companies can now inject anything other than diesel in association with fracking operations without having to comply with SDWA provisions intended to protect our nation's water supplies", the Clean Air Act (CAA) which hopes to "protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare." Section 101(b)(1)", the Clean Water Act (CWA) "… enacted to protect and improve water quality in the nation's rivers, streams, creeks, and wetlands", The Emergency Planning and Community Right to Know Act which "generally requires companies to disclose information related to locations and quantities of chemicals stored, released, or transferred", the Resource Conservation and Recovery Act (RCRA) that was "enacted by Congress as a "cradle to grave" regulatory framework for managing solid waste, including hazardous waste" and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) that is a "framework for cleanup of toxic materials through creation of the Superfund Program" (Environmental Defense Center 2011:1; EPA 2010; Stoeve 2014).

These exemptions have therefore sidelined the federal government's ability to exercise oversight, require testing and to hold the oil and gas industry accountable for violating them. States are now responsible for regulating hydraulic fracturing by using their own laws. An example of this comes from Pennsylvania where Attorney General Kathleen Kane filed "criminal" charges against XTO Energy Inc., a division of Exxon Mobil, for a 2010 spill of gas well wastewater in Lycoming County (Litvak 2013). Her

case has been given the green light by a grand jury that agreed that XTO can be tried under the environmental crimes section for being in violation of the clean streams law and the Solid Waste Management Act of Pennsylvania. The outcome of this case will determine if the oil and gas companies can be tried for criminal charges by the State of Pennsylvania over the spilling of wastewater that leads to contamination (Litvak 2013).

The 2005 Energy Bill has not been amended and it therefore can be assumed that the federal government must be satisfied with the state's ability to regulate the oil and gas industry (Clark 2011). However, the Obama administration has tried to respond to citizen's concerns over the safety of hydraulic fracturing and acknowledged them by releasing a statement recognizing that "the national regulators should have more authority, noting that federal drinking water laws give them that right" (Eagle Information Mapping Inc. 2011; Silverstein 2013:1). Even more to the point, a letter was delivered to Interior Secretary Sally Jewell, that was written and signed by six lawmakers, expressing their collective agreement that the "federal agency needs to put people before profits, noting that the would-be rules — as they now stand — are not "transparent" and that the trend in states strengthening their regulations on hydraulic fracturing should be noted and also followed by the federal government as well (Silverstein 2013:1).

President Obama has proposed to pass measures that would "require producers to disclose their fracking chemicals as well as stronger standards for well construction to limit fugitive releases and safer dispensing of the dirty water that flows to the surface after drilling" but the ramifications from these requirements still have not been resolved in order to implement them (Silverstein 2013:1). In the meantime, the oil and gas industry is happy with the current system in place and would rather work with the states, as the statement by The American Petroleum Institute reflects: "… the states are doing a fine job and that additional federal laws would be overly burdensome" (Silverstein 2013:1).

The issue with the states having the task of regulating hydraulic fracturing is that they are having a hard time in keeping up with its expansive pace. This is because

regulatory agencies in Pennsylvania and New York are underfunded and understaffed and were never structured to deal with such a large industrial process. In Pennsylvania for example, the Department of Environmental Protection (DEP) "has less than 200 inspectors to keep tabs on the state's expansive inventory of gas wells." that totaled 6,391 in 2011 (Preston 2011:1; Amico, DeBelius & Detrow 2011). This lack of manpower and money has essentially left "Gas producers [to] report their own spills, with their own spill response plan and lead their own cleanup efforts" (Food and Water Watch 2011:10).

There is however another component to New York and Pennsylvania's regulatory authority over hydraulic fracturing, in that municipalities in both states have home rule rights and therefore have regulatory powers over land use. Given that hydraulic fracturing affects local communities the most, municipalities have been actively using their zoning powers in order to regulate where hydraulic fracturing can take place in order to maintain the safety, health and welfare of their area. This added dynamic of home rule is creating tensions between local communities and the oil and gas companies where the companies are suing over ordinances that restrict their ability to extract natural gas.

There are movements in favor of federal regulations such as the bipartisan bill called the Fracturing Responsibility and Awareness of Chemicals (FRAC) Act of 2011, H.R. 1084; S. 587, whose main objective is to remove the exemption that hydraulic fracturing has from the SDWA which would allow the EPA to regulate it nationally; however it has failed to pass in both houses. One would assume that the FRAC Act would have a large support base from local communities but the reality is, is that it has caused mixed feelings over a potential one size fits all federal regulation that would not take into consideration a local areas unique attributes (Orford 2011).

The oil and gas industry would also like to keep states as the regulators because, as Chesapeake Energy stated, "Measures required by state regulatory agencies in the exploration and production of deep shale natural gas and oil formations have been very effective in protecting drinking water aquifers from contamination attributable to fracking" (Landry 2009:1). However, it seems that the job of regulating a process such as hydraulic fracturing that is relatively new, large in scope and fast in pace is proving

problematic for states. Earthworks, an environmental watchdog group, decided to conduct its own study using industry data on regulations and discovered that "every state we studied fails to adequately enforce regulations on the books" (Stoeve 2012:1). Maybe the real reason for the industries support of state regulations over federal is more in line with The American Petroleum Institute's statement in 2009 which said, that federal regulations would hurt the industry by lowering development activity (Landry 2009).

2.5 EPA Regulations

The US Environmental Protection Agency (EPA) was created by the federal government in order to protect "human health and the environment by writing and enforcing regulations based on laws passed by Congress" which is reflected in their mission statement: "our mission is to protect human health and the environment" (EPA 2013:1) However, since hydraulic fracturing has been exempted from federal regulations, the EPA has no official authority to oversee this process. Currently though, after much pressure Congress has directed the EPA to study the full water cycle as it is used in hydraulic fracturing in order to decide if federal water regulations are needed which is anticipated to be complete in 2014 (EPA 2014).

Pennsylvania

There have been some signs from the EPA office in Washington that some would interpret as being sympathetic towards the oil and gas industry by enabling the current regulatory environment (EPA 2011; Banerjee 2012). Questions were raised over three large cases that the EPA had been investigating to determine whether or not drilling in those communities caused the contamination of drinking water. The first case took place in Dimock, Pennsylvania where drinking water tested positive for methane, arsenic and manganese resulting in 64 homeowners not being able to use their well water. After years of complaints the EPA decided it would test their water and concluded that the water was safe to drink because "The sampling and an evaluation of the particular circumstances at each home did not indicate levels of contaminants that would give EPA reason to take further action," and therefore, the investigation was stopped (Banerjee 2012:1).

However, these results were in conflict with the mid-Atlantic EPA office in Philadelphia who disagreed with the EPA office in Washington over the Dimock conclusion because of the four years' worth of data the Philadelphia office had collected, which did show that "methane and other gases released during drilling apparently caused significant damage to the water quality" (Banerjee 2012:1). The Philadelphia office additionally found that ""methane is at significantly higher concentrations in the aquifers after gas drilling and perhaps as a result of fracking [hydraulic fracturing] and other gas well work" (Banerjee 2012:1). The Philadelphia EPA office felt so strongly about their data that they called in the Center for Disease Control to do its own research.

Robert B. Jackson, professor of Environmental Sciences at Duke University, also weighed in on the Dimock case because he had been researching methane concentrations in the area for a few years. Between the Philadelphia EPA's data and Jackson's data, Jackson said: "What's surprising is to see this data set and then to see the EPA walk away from Dimock" (Banerjee 2012:1). Jackson and other Duke scientists ended up publishing their findings that the water wells they tested in Pennsylvania had greater risks of methane contamination the closer they were to natural gas production. The most likely cause of methane migration into the wells, they felt, came from "faulty metal casings inside a natural gas well that allow methane to seep out as it travels to the surface or shoddy concrete work that is supposed to keep gas and water from moving into the space between the well casings and the rock" (Banerjee 2012:2). In response, the Cabot Oil & Gas Corp. who had drilling operations in Dimock did their own investigation and disagreed with the contamination assertion with Cabot's Chief Executive Officer stating that "Through our investigation, Cabot concluded that methane gas existed in groundwater and water wells in the Dimock and Springville townships long before Cabot began drilling in the area" (Banerjee 2012:1).

Texas

Steve Lipsky and his family have a home in Weatherford, Texas that is located next to natural gas drill sites owned by Range Resources. Shortly after drilling began, the Lipskys noticed their water was bubbling and reported it to the Texas Railroad Commission who is in charge of regulating hydraulic fracturing. However, the EPA felt

that the Texas Railroad Commission was not taking the case seriously and took over the investigation by issuing an emergency order stating “at least two homeowners were in immediate danger from a well saturated with flammable methane” (Plushnick-Masti 2013:1). EPA scientists tested the Lipskys and another homeowners well and confirmed that they “were in danger from methane and cancer-causing benzene and ordered Range Resources to take steps to clean their water wells and provide affected homeowners with safe water” (Plushnick-Masti 2013:1).

In the meantime, The State of Texas did its own testing and concluded that Range Resources was not responsible for the methane in the water of the two homeowners which resulted in Range Resources taking the EPA to federal court over its results (Plushnick-Masti 2013). In preparation for court, the EPA conducted another independent scientific study by asking Geoffrey Thyne to chemically test water samples taken from water wells around Range Resources drill sites. After the analysis, “Thyne concluded … that the gas in the drinking water could have originated from Range Resources' nearby drilling operation” (Plushnick-Masti 2013:1). Rob Jackson, chairman of global environmental change at Duke University's Nicholas School of the Environment, also looked over Thyne’s data and agreed with Thyne that methane in Lipsky’s water may have come from the Barnett shale (Plushnick-Masti 2013:1).

However, after almost two years of testing, the EPA dropped its pursuit of Range Resources in March of 2012 by cancelling the emergency order, shelving Thyne’s study and halting the court case with no explanation (Plushnick-Masti 2013). Instead of responding to questions on why they dropped the case, the EPA emailed statements explaining their actions as a shift in "focus … away from litigation and toward a joint effort on the science and safety of energy extraction" (Plushnick-Masti 2013:1). Even if true, it does not hide the fact that the EPA dropped the case at the same time they were conducting a national study on hydraulic fracturing. Range Resources threatened to not cooperate with the study if the EPA went forward with this case and “told EPA officials in Washington that so long as the agency continued to pursue a "scientifically baseless" action against the company in Weatherford, it would not take part in the study and would

not allow government scientists onto its drilling sites, said company attorney David Poole" (Plushnick-Masti 2013:1).

Wyoming

The most confusing case that the EPA dropped, in June 2013, is the case in Pavillion, Wyoming where the town's aquifer was confirmed by the EPA in Washington to be contaminated with hydraulic fracturing compounds. Pavillion's results represented the first time water contamination from hydraulic fracturing was conclusively verified and therefore the EPA's decision to stop the investigation and hand it over to the State shocked those on both sides of the debate. Wyoming took over the investigation and secured the funding for it by the same company that was being investigated for contaminating the aquifer in the first place, EnCana (Lustgarten 2013). In fact, when the EPA's report was first released confirming contamination, EnCana released a statement saying that "the EPA's findings are "irresponsible" and full of discrepancies and that the "conclusions do not stand up to the rigor of a non-partisan, scientific-based review" (Henry 2011:1). Even though there is a clear conflict of interest with the funding of the investigation by EnCana, the EPA stood by its decision saying that handing the case over to the state was the right thing to do because it will result in a quicker resolution (Lustgarten 2013).

Since Pavillion was the first place that hydraulic fracturing compounds were scientifically linked to water contamination, scientists feel it should have received further unbiased investigations because the EPA's tests confirmed the presence of: "high levels of cancer-causing compounds and at least one chemical commonly used in hydraulic fracturing", "thermo genic Methane, Petroleum compounds, phenols like toluene and 50 times the safe amount of benzene" in Pavillion's aquifer (Casey 2011:1). This confirmation was significant not just for Pavillion residents but for the potential it had in justifying adding hydraulic fracturing to the SDWA (Food and Water Watch 2011:4).

One of the reasons the EPA might have handed the Pavillion case to the State of Wyoming to finish could be the cost which was millions of dollars just for the portion that they did complete. Money is an ongoing issue because the EPA is operating on a

budget below 1998 levels and therefore they cannot afford to do their job when it comes to intensive types of investigations (Banerjee 2013:2). However, even if there was enough funding, there is the added political roadblock that the EPA has also faced when researching into hydraulic fracturing activities. This type of politic has raised some questions like Katie Sinding from the Natural Resources Defense Council who said "We don't know what's going on, but certainly the fact that there's been such a distinct withdrawal from three high-profile cases raises questions about whether the EPA is caving to pressure from industry or antagonistic members of Congress" (Banerjee 2013:2).

Many feel that the dropping of these cases has posed a troubling political trend especially since the EPA has been accused of practicing “regulatory overreach” just by the small amount of research that it has done (Banerjee 2013:2). In one instance, Senator James Inhofe of Oklahoma wrote letters to the EPA’s top administrator when he was a member of the Senate Environment and Public Works committee expressing his view that their conclusion of industry related water contamination in Pavillion Wyoming was “unsubstantiated” and pillorying it as part of an “Administration-wide effort to hinder and unnecessarily regulate hydraulic fracturing on the federal level” (Lustgarten 2013:1). Senator Inhofe also asked the EPA to provide him with all of its briefings on the matter and wanted to know every dollar they spent on Pavillion (Lustgarten 2013:1).

For the EPA to get involved in Texas, Pennsylvania and Wyoming where water regulations and hydraulic fracturing are regulated by the states is unusual and therefore there must have been good reason to do so (Plushnick-Masti 2013). However, if the EPA cannot be counted on to fulfill its mission to protect the environment and human health at the federal level, it further legitimizes zonings use at the local level without the political and industry influence from the top (Drajem & Klimasinska 2012:1).

2.6 Job Creation

One of the main justifications by Pennsylvania and other states behind widely opening their doors to hydraulic fracturing is said to come from the economic benefits of job and revenue creation at the local community level. The oil and gas industry,

politicians and the previous and current presidents have repeated these positive justifications to the American public as a great opportunity which we cannot afford not to do. However, in regards to job figures, the numbers are not so cut and dry. For example, the International Energy Agency (IEA) has said that in 2010, 600,000 jobs were created in the United States from "the development of shale resources" and the National Association of Manufacturers has estimated that shale gas recovery will create up to 1,000,000 jobs by 2025 (Jorgensen 2012:1). In regards to Pennsylvania, estimates from researchers at Penn State University have calculated that natural gas drilling would support 216,000 jobs in that state alone by 2015.

In contrast, the data from the Bureau of Labor Statistics (2012) shows that the actual employment by the oil and gas industry in Pennsylvania to be around 4,144 which would mean over 200,000 jobs would need to be created over three years if the researchers from Penn State were correct (Jorgensen 2012). In addition, when employment statistics from counties in northern Pennsylvania were compared with similar counties in New York, they show that Pennsylvania's counties who have been drilling for natural gas for many years only had approximately 1,350 more jobs than New York's that are still under a moratorium (Jorgensen 2012).The Marcellus Shale Education and Training Center also found that when they surveyed natural gas companies in Pennsylvania on their employment numbers and the residential origin of their employees, 70 to 80 percent were out of state workers, mostly from Texas and Oklahoma, not locals (Jorgensen 2012).

2.7 Boom Town Effects

The Western states, who have been drilling for natural gas and oil longer than other areas of the US, are a great source at providing statistics on how hydraulic fracturing has impacted the economics of an area. A study at Cornell University found that when comparing heavy drilling with comparable counties that do not have hydraulic fracturing, the drill heavy areas were not able to attract the same diverse forms of economic activities as non-drilling counties (Christopherson 2011). Some of the activities that declined within hydraulic fracturing areas are important services such as retirement

communities, tourism and recreation “uses that are essentially incompatible with an industrialized landscape” (Meyer 2012:1). Cornell also discovered that only a modest “growth in earnings per job and per capita income” had occurred which is in contrast to the natural gas industries claims that hydraulic fracturing brings lots of jobs and investments to local areas (Christopherson 2011:29). Even in the communities that have experienced positive economic impacts still show that “fossil fuel development can produce a local economy that is overly dependent on one industry, leading to lower economic resilience, greater income equality and a less educated workforce” (Goho 2012:2).

Tim Kelsey, Professor of Agricultural Economics at Penn State, and David Kay, an economist at Cornell University, have both questioned how local communities handle the information that oil and gas companies give them in regards to the economic returns from hydraulic fracturing. Kelsey and Kay both caution communities on industry figures because they say they are mostly “…based on a number of assumptions,” and “They are shaped by good geo-physicists who simply don’t have enough information to work off of (Remington 2013:1). Therefore companies have a structural incentive to be optimistic about the amount of natural gas available and assume smooth build-outs over time” (Remington 2013:1).

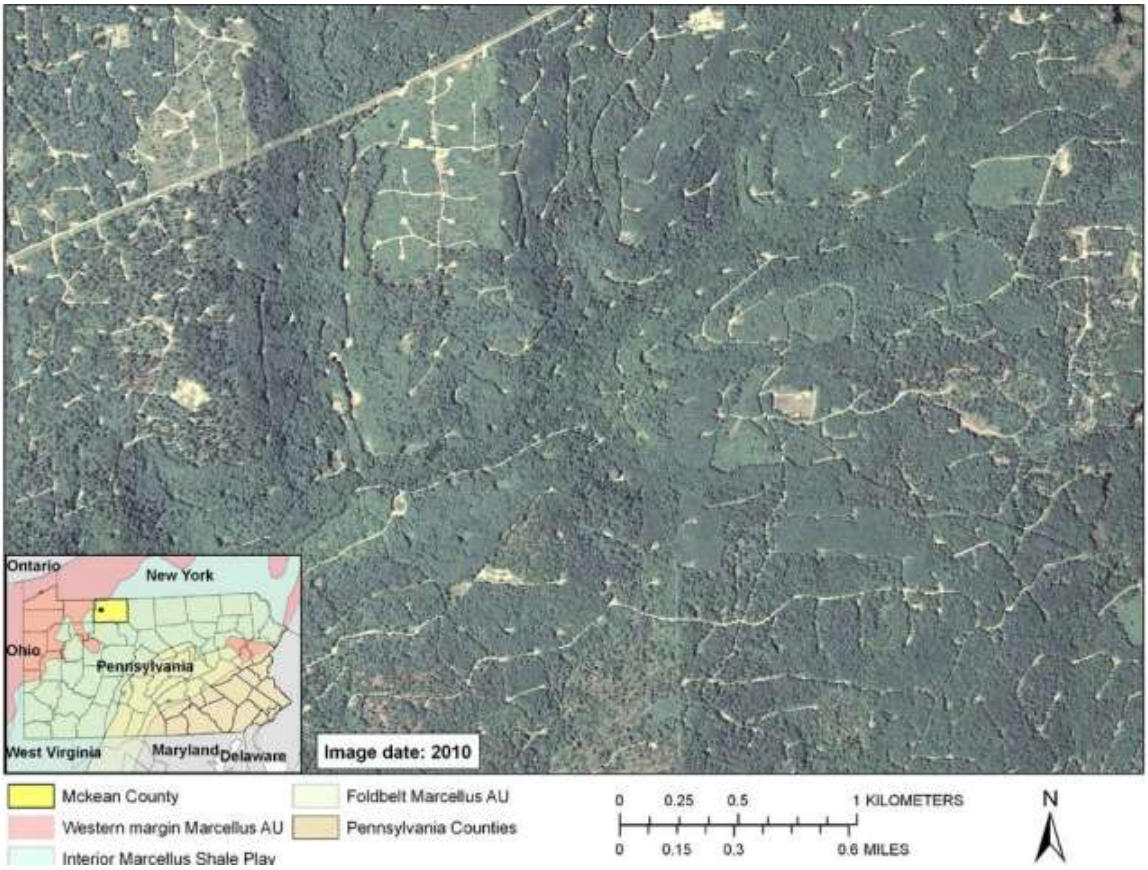
Figure 9: Before and After Photos of What the Hydraulic Fracturing Traffic and Equipment do to Town Roads - (Source Christopherson 2011:18)

An illustration: SR 3020 in Towanda Township, Bradford County, Pennsylvania after a high volume of overweight drilling trucks and a Northeast winter
(Photo: PennDOT Engineering District 4-0)

Road damage as shown in Figure 8 is a costly impact from hydraulic fracturing that local municipality's deal with particularly on smaller roads found in rural areas. When understanding these impacts, some communities have successfully worked with the oil and gas companies where the companies have agreed to pay for infrastructure damages and some have even paved roads prior to drilling to mitigate road damage (Remington 2013). This demonstrates the possible positive outcome when the oil and gas companies are willing to work with local governments in mitigating their impacts.

However, hydraulic fracturing is a high impact land use that even with tough regulations causes permanent damage to local landscapes because: "Forests are fragmented by roads and rights of way; land is clear-cut and covered over by cement well pads; the rural ambience is replaced by the drone of compressor stations, drilling and fracking equipment, and diesel truck engines; and rural sceneries are punctuated by metal towers rising among forest or farmland" that impact the "character of local communities" (Meyer 2012:1).

Figure 10: Demonstrates the Spatial Effects on Forests as they Become Fragmented by Hydraulic Fracturing Well Sites Effecting Human Populations and Wildlife – (Source: USGS 2012)



2.8 Property Leases, Rights and Mortgage Concerns

Negative economic consequences are not generally part of the discussion when oil and gas companies approach land owners when wanting to lease their land, nor do they tell them that leasing to "oil and gas operations violate standard mortgage agreements" (Catskill Mountain Keeper 2012b:1). Even insurance companies, such as Nationwide, are rewriting their policies to not cover damages that occur on properties

because of the high risks associated with "methane leaks, chemical spills, blowouts and more" (Bambrick 2012:1).

Buyers, who are looking at homes that already have active leases to drill, can also be denied mortgages on those homes "because gas leases stay with the property once it is sold" (Catskill Mountain Keeper 2012b:1). The denial by banks even extends to those seeking second mortgage loans and even sometimes to the neighbors of properties that have leases (Catskill Mountain Keeper 2012b:1; Bambrick 2012:1). On top of bank issues, other lenders, such as the FHA (Federal Housing Administration) and Department of HUD (Housing and Urban Development) will not provide financing if "surface or sub surface gas rights have been leased within 300 feet of a residential structure or within 300 feet of property boundary line[s]" (Catskill Mountain Keeper 2012b:1). Unfortunately, many land owners do not have the above information when deciding to lease the subsurface rights of their property for hydraulic fracturing.

Many rural, agrarian and poor areas welcome drilling since leasing their land becomes a source of income. In fact, some New York state residents within these areas have already signed leases in the anticipation that Governor Cuomo is going to open up the state to hydraulic fracturing in the near future. These communities have been struggling for years and therefore "landowners look with envy toward neighboring Pennsylvania, where gas companies are paying in excess of $1,000 per acre plus royalties for the right to drill for natural gas on a property per month" (Kastenbaum 2012:1). However, as home owners in Pennsylvania and other states like Texas have found out, allowing drilling on one's property can lower its value and even render it unsellable through contamination and loss of quality of life and property (Jorgensen 2012).

Because of the potential impact on home values, a Texas realtor company commissioned Integra Realty Resources to study property values in areas where homes were located next to hydraulic fracturing sites in the town of Flower Mound. What Integra found was, "homes valued over $250,000 that were immediately adjacent to well sites can lose 3 percent to 14 percent value" (Barth 2012:3). Another realtor in the area, Kris Wise, said that the loss of value was even greater, and the Wise County Central Appraisal District's Appraisal Review Board discovered that home values have been known to be decreased by "75% when a gas well sits on the land" (Barth 2012:3).

2.9 The Potential Natural Gas Bubble

In spite of the economic return the oil and gas industry and others have calculated from hydraulic fracturing, there are others that see these projections as false. Two reports were published in 2013, The Post Carbon Institute (PCI) report, authored by J. Dave Hughes a geoscientist that used to work for the oil and gas industry, and the Energy Policy Forum (EPF) report, authored by Deborah Rogers who used to work as a Wall Street Analyst. Both experts concluded “that the hydraulic fracturing ("fracking") boom could lead to a "bubble burst" akin to the housing bubble burst of 2008” because it is driven by the record level of hydraulic fracturing activity, speculative leases and “fee-driven promotion by the same investment banks that fomented the housing bubble” “...” (Horn 2013:1).

Mrs. Rogers discusses the “law of diminishing returns” where natural gas well life spans are not as long as some of the industry has been telling us. Mr. Hughes demonstrated the lack of life spans by looking at production rates in 31 shale areas examining 65,000 wells using the same database (DI Desktop/HPDI database) that is used by the United States government and the oil and gas industry. What he found was that the “Wells experience severe rates of depletion” which then requires hydraulic fracturing to expand at a fast pace to offset the decline. In Mr. Hughes, assessment, he estimates that “7,200 new shale gas wells need to be drilled each year at a cost of over $42 billion simply to maintain current levels of production” (Horn 2013). Hughes also disagreed with President Obamas statement in his 2012 State of the Union address where he said there is 100 years’ worth of natural gas, which is the same amount the oil and gas industry has been quoting. Hughes believes that 25 years is probably a closer accurate number based on the database calculations (Horn 2013).

Mrs. Rogers further described the financials of the industry and how they meet their targets. She found that "leases were bundled and flipped on unproved shale fields in much the same way as mortgage-backed securities had been bundled and sold on questionable underlying mortgage assets prior to the economic downturn of 2007" (Horn 2013:1). Therefore in Mrs. Rogers’s opinion, with the industries ties to Wall Street, Wall

Street is acting as the market activators behind the push for drilling and creating a bubble that can burst with economic consequences (Horn 2013).

2.10 Scientific Studies of the Impacts from Hydraulic Fracturing

People in communities across New York and Pennsylvania are concerned about the risks hydraulic fracturing poses to their families, local community and environment. In order to assess these risks more scientific studies are needed so that states and local governments can make informed decisions that are right for the health of their residents. However, since drilling has been happening at such a fast pace over a short period of time, scientists have not been able to collect the data that they need leaving a void of comprehensive studies. Without this information, local governments have had to make the safest decisions with the regulatory and policy tools that they have in order to mitigate possible risks to the environment and public health (Rosenberg 2013a).

Duke University Study

Thankfully, the scientific community is trying to catch up with hydraulic fracturing and there are some scientific and peer reviewed studies available. Researchers at Duke University collected data on possible methane contamination of water resources from hydraulic fracturing in Pennsylvania revealing important results (Osborn et al 2011:1). Prior to this study, the fact that methane is found naturally in water resources meant the causation of methane contamination was inconclusive when figuring out where it came from. What Duke University was able to define was the difference between regularly occurring methane called biogenic methane, and methane released from hydraulic fracturing called thermogenic methane. Biogenic methane is formed at shallow depths in low temperatures and is not associated with hydraulic fracturing because it naturally occurs close to the surface. The methane that is associated with hydraulic fracturing has a thermo genic based signature from its formation deep in the earth under high heat and pressure and therefore has the presence of higher chain hydrocarbons that are brought up to the surface during hydraulic fracturing (Osborn et al 2011:2). With this defined distinction of methane from hydraulic fracturing, it was then possible for Duke to create a fingerprint from drill sites and then test nearby water wells (Osborn et al 2011).

What the Duke researchers found was that 21 out of 26 water wells located near drilling sites had the presence of thermo genic methane and higher chain hydrocarbons like ethane, propane and butane. In contrast, only 3 of 34 wells in non-active drilling areas had methane but the three that did consisted of biogenic methane, not thermogenic (Osborn et al 2011). Even though out of the 68 wells sampled there were none that tested positive for fracking fluids, thermogenic methane concentrations were "17 times higher on average in wells located within a kilometer of active hydraulic fracturing sites" (Osborn et al 2011:3).

However, there is an issue with fingerprinting because the hydrocarbon makeup from the shale basin at the drill sight does not usually exactly match the contamination sites hydrocarbon fingerprint. Geologists have pointed out that gas composition does change over distance and time from the source, which could be the reason for this discrepancy but this fact is not currently being taken into consideration and without an exact hydrocarbon match, natural gas companies are not being held responsible (Osborn et al 2011; Harris 2010). It was also importantly noted in this study that even though methane is a known asphyxiate and explosive in its gas form, it is not known what it does to human and animal health when it is dissolved in water so the scientific consensus was that more testing is needed before hydraulic fracturing can be considered safe (Harris 2010).

Methane Emissions and Statistics

In addition to the increase in water contamination possibilities and the health risks from methane, escaped methane into the atmosphere during hydraulic fracturing has also become a concern because of its impacts on air quality and the environment. Methane, CH4, is the main component of natural gas (90 percent) and is "a powerful greenhouse gas" which leaks and escapes during hydraulic fracturing along with other volatile organic compounds that affect ozone (Clean Air Task Force 2013:3; CIRES 2013). Hydraulic fracturing is reported to be the largest methane emitter in the United States by the EPA and therefore scientists have been interested in quantifying how much is escaping over these areas (Brooks 2012; EPA 2013).

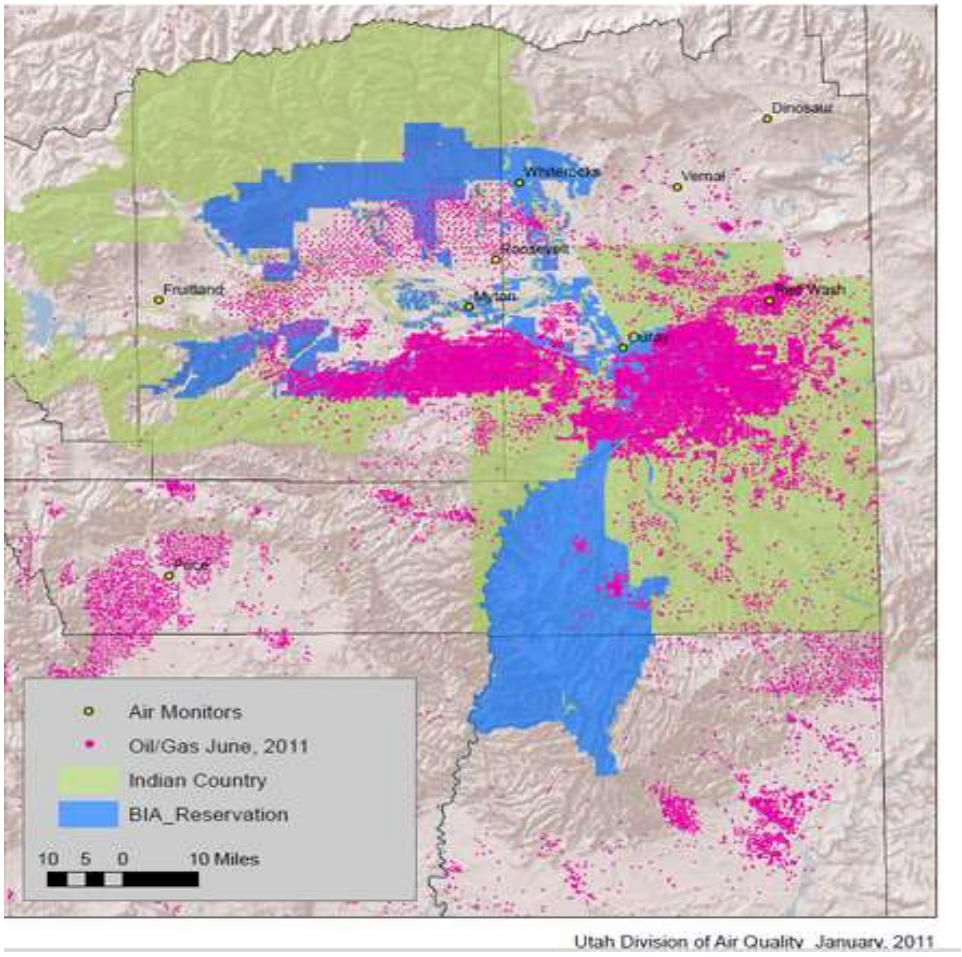
The National Oceanic and Atmospheric Administration (NOAA) reported in 2013 that methane rates found in the atmosphere were much higher than anticipated and that the fast rate of hydraulic fracturing expansion across the United States has made it necessary to monitor and quantify methane emissions (Brooks 2012). Robert Howarth from Cornell University has also previously discussed his belief in the underestimation of methane emissions by the industry and the EPA, and feels that the more realistically higher levels of it in the atmosphere make hydraulic fracturing and shale gas worse than coal for the environment (Lavelle 2012). Howarth seems to be correct; the Intergovernmental Panel on Climate Change (IPCC) has said that the current scientific consensus is that methane is actually 34 times stronger when it comes to its Global Warming Potential (GWP) than CO2 due to its ability to trap more heat in the atmosphere. Therefore, the EPA's use of the outdated equation of 21 times stronger when formulating methane's GWP is a large underestimation. According to the IPCC's new methane calculation "methane is a whopping 60% stronger than EPA calculates in its GHG inventory" (Romm 2013:1). The American Petroleum Institute's spokesperson, Carlton Carroll, in response to questions about the industries methane emit ions said that the "The oil and natural gas industry is leading the way in reducing emissions and is the largest investor in zero- and low-emission technologies" and that they will be compliant with the emission standards set by the EPA (Stecker 2012).

University of Colorado Studies

There is additional information on the concentrations of methane in the ambient air over hydraulic fracturing areas in Utah and Colorado that collaborates the IPCC's numbers and Professor Howarth's prediction (Yale Environment 360 2013). Colm Sweeney, "a scientist with the Cooperative Institute for Research in Environmental Sciences (CIRES) at the University of Colorado Boulder, who leads the aircraft group at NOAA's Earth System Research Laboratory Global Monitoring", was part of a group that collected methane concentration data over the Uintah Basin in Utah (CIRES 2013:1). What they found there, was that 6 to 12 percent of the methane from hydraulic fracturing leaked hourly during production (CIRES 2013). The CIRES numbers are considerably higher than a federal report which calculated a 1 percent average leakage rate of methane

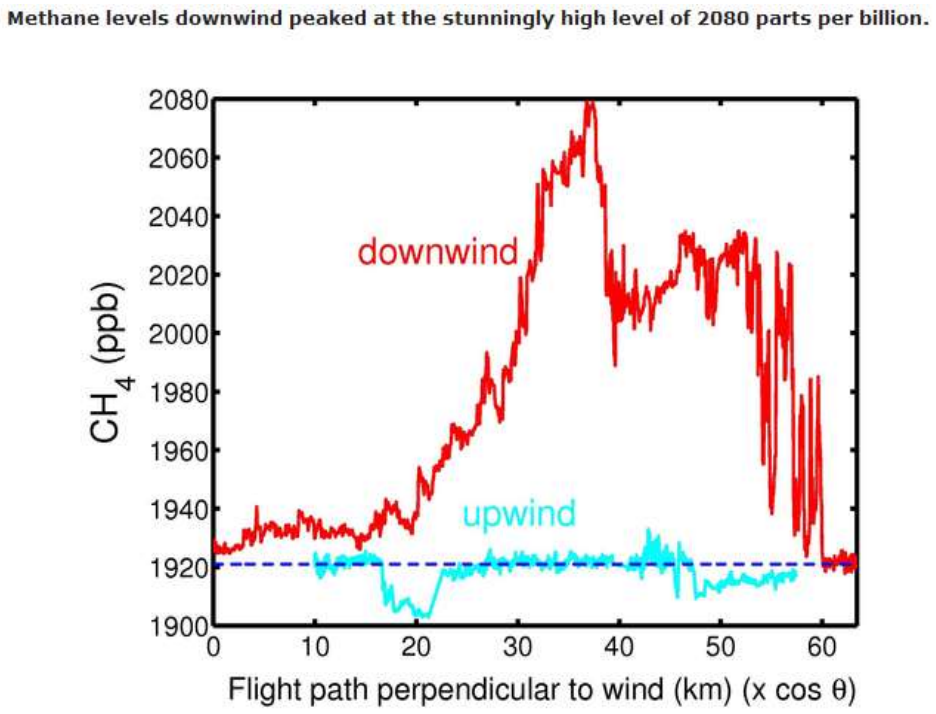
from hydraulic fracturing although it did recognize that the Uintah Basin probably would be higher because of the large concentration of wells there (CIRES 2013).

Figure 11: Oil and Gas Well Concentration in Pink in the Uintah Basin in Utah – (Source: Daily KOS Group 2013)



The NOAA and CIRES scientists collected the air samples by deploying a small plane over the Uintah Basin with the technological ability to detect methane and other volatile organic compounds in the atmosphere. Figure 11 represents the levels of methane that were measured upwind and downwind as they followed and measured an air mass going into the region and then measured the amount of methane it had when it left the area of study (Daily KOS Group 2013; CIRES 2013).

Figure 12: Downwind Methane Levels in Utah's Uintah Basin - (Source: Daily KOS Group 2013)



Even with these alarming numbers, the industry is planning on drilling 25,000 more wells on top of the already existing 10,000 in this basin which will mean this area will be non-compliant with EPA regulations that are meant to maintain air quality (Daily KOS Group 2013:1). These leakage rates are significant because anything over 3.2 percent is said to reverse the positive effects that natural gas has over coal (Romm 2013a).

Additionally, The University of Colorado's School of Public Health published a study discussing the effects of air pollution from hydraulic fracturing on people who live in proximity to these sites. After three years of research, they found that those living closer to drilling sites had a higher cancer and non-cancerous health risk than those further away. These conclusions were formed by measuring ambient air samples for the byproducts of hydraulic fracturing and then applying the EPA standards of health risks to

concentration exposure (Kelly 2012). The byproducts found in the air that were linked to these adverse health effects were:

> "… toxic petroleum hydrocarbons … including benzene, ethylbenzene, toluene and xylene. Benzene has been identified by the Environmental Protection Agency as a known carcinogen. Other chemicals included heptane, octane and diethylbenzene but information on their toxicity is limited "with Benzene being the main risk factor to higher cancer rates and non-cancerous reactions. Other irritants in the ambient air that were found were "trimethylbenzenes, aliaphatic hydrocarbons, and xylenes, all of which have neurological and/or respiratory effects, the study said. Those effects could include eye irritation, headaches, sore throat and difficulty breathing." (Kelly 2012)

Cornell Study on Hydraulic Fracturing Effects on Animals

Not only are humans adversely affected by hydraulic fracturing, animals are to. This next study, *Impacts of Gas Drilling on Human and Animal Health*, by two Cornell Researchers, Robert Oswald, a professor of molecular medicine at Cornell's College of Veterinary Medicine, and veterinarian Michelle Bamberger, involves the research into animals in 6 states that were exposed to hydraulic fracturing chemicals by interviewing their owners and veterinarians. Bamberger and Oswald felt their study was necessary because of the "industrialization of populated areas" that do not have the scientific technology to monitor natural gas extraction and its effects. Animals were used as their subjects because "animals often are exposed continually to air, soil, and groundwater and have more frequent reproductive cycles," and therefore were deemed to be good indicators of the impacts on human health (Bamberger & Oswald 2012:1).

Out of the interviews conducted, there were a few cases of animals that came into direct contact with fracking fluids. One exposure happened over human error when fracking fluids were released into a cow pasture next to the drilling site which resulted in the deaths of 17 cows within an hour of the release. Two other cases involved cattle and goats where they were exposed to fracking fluids and wastewater through leaks and a well blow out which led to reproductive issues, congenital defects and stillbirths in both animals. In regards to pets or companion animals, which included "horses, dogs, cats, llamas, goats, and koi", most of their exposure to hydraulic fracturing chemicals

happened by “ingested affected water from a well, creek or pond” (Bamberger & Oswald 2012:11).

The interviews from the owners of the companion animals and their veterinarians revealed the symptoms observed after exposure to the chemicals as: “Reproductive problems (irregular cycles, failure to breed, abortions, and stillbirths) and neurological problems (seizures, incoordination, ataxia)” as well as “gastrointestinal (vomiting, diarrhea) and dermatological (hair and feather loss, rashes) origin” (Bamberger & Oswald 2012:12). Bamberger and Oswald concluded from these interviews that the chemicals used in hydraulic fracturing in which the animals were exposed to “may be linked to shortened lifespan and reduced or mutated reproduction in cattle—and maybe humans” (Bamberger & Oswald 2012:1).

Bamberger and Oswald admit that more in depth epidemiological studies are needed and that their study was lacking in some areas by pointing out the difficulty in obtaining more information “due to the lack of testing, lack of full disclosure of the International Union of Pure and Applied Chemistry (IUPAC) names and Chemical Abstracts Service (CAS) numbers of the chemicals used, and the industry's use of nondisclosure agreements” (Bamberger & Oswald 2012:4). The non-disclosure agreements that animal owners are obligated to sign in order to settle their lawsuits with the oil and gas companies, have made it even harder to research whether there is a link to the death and illness of animals from hydraulic fracturing (Bamberger & Oswald 2012:4).

Therefore, without access to the needed information, the main motivation for this research was to establish that there are health risk links to animals living next to drill sites, that it is difficult to gather the needed scientific data and that more attention is needed in this area to what they feel is an unmonitored scientific experiment taking place on a global scale. Bamberger and Oswald concluded their study with proclaiming that “Without complete studies, given the many apparent adverse impacts on human and animal health, a ban on shale gas drilling is essential for the protection of public health.” and for the states already extracting natural gas using hydraulic fracturing, “common sense measures” and testing are necessary to reduce negative side effects to humans and animals (Bamberger & Oswald 2012:23).

The Energy Trade Groups released a rebuttal to Oswald and Bamberger's study by stating that "assumptions made in the study are not based on any scientific merit, instead, they use unverifiable, anecdotal information to fit a predetermined narrative, one that is in conflict with a number of studies on the same issue — including four recent studies from Texas and neighboring Pennsylvania" (Seachrist 2012:1).

This information collected by Bamberger and Oswald however, backs the actions taken by agricultural insurance companies whom are starting to deny the coverage of damages related to hydraulic fracturing and deny insurance for farmers who have drilling on their properties. In reaction to the insurance company's actions, farmers are now starting to shift their cattle and crops outside of these areas when possible. This reaction to potential animal contamination initiated the testing of cattle pastures where cow deaths occurred and were suspected to have come from the exposure to hydraulic fracturing chemicals. The results of the tests confirmed air, water and soil contamination raising questions if plants and animals in these areas are even safe for human consumption. (Food Contamination 2012; Bewig 2013:1).

Endocrine Disruptors Present in Hydraulic Fracturing Chemicals

This last study discusses a peer reviewed paper on endocrine disrupting chemicals used in hydraulic fracturing. The study, *Estrogen and Androgen Receptor Activities of Hydraulic Fracturing Chemicals and Surface and Ground Water in a Drilling-Dense Region* by Kassotis et al, found the presence of Estrogen and Androgen Receptor disruptors in more than 100 out of the known approximate 750 chemicals used for hydraulic fracturing. The drilling dense area of Garfield County, Colorado was used to collect water samples with results showing that a majority of these samples "… exhibited more estrogenic, anti-estrogenic, or anti-androgenic activities than reference sites with limited nearby drilling operations." and therefore Kassotis et al concluded that their data suggests "that natural gas drilling operations may result in elevated EDC activity in surface and ground water" (Kassotis et al 2013:1). Some of the comparison site tests did return positive results for the presence of endocrine disruptors, at considerably lower concentrations, because they can be found naturally in water bodies (Kassotis et al 2013). The final conclusion made from the results found a correlation between spills in Garfield Count and a "greater activity of EDCs in the water" (Banerjee 2013:1). In addition to the

Kassotis et al information, the *Endocrine Disruption Exchange* organization also independently tested the chemicals used in hydraulic fracturing and found that 43 percent of them would disrupt endocrine functions (The Catskill Mountain keeper 2012c).

The motivation for finding out whether these manmade chemicals used in hydraulic fracturing contain endocrine disruptors that find their way into the environment is because of the affects they have on our endocrine system. When endocrine disruptors are "absorbed into the body, [they] mimic hormones or block hormones and disrupt the body's normal function. They have been linked to infertility, ADHD, autism, diabetes, thyroid disorders. Even childhood and adult cancers have been found to be linked to fetal exposure to endocrine disruptors" (The Catskill Mountain keeper 2012c:1).

However, The Energy In Depth advocacy group dismissed the study by Kassotis et al and called it "inflammatory" even though the scientists that participated in its peer review commented that it was done with caution and was in no way trying to make a case for water contamination from hydraulic fracturing (Banerjee 2013).

The studies just discussed, in the least, have echoed the lack in comprehensive knowledge and understanding of the overall long term effects on climate, humans and animals as the environment is exposed to the chemicals and the byproducts of hydraulic fracturing. Therefore, how can local communities and state regulatory agencies know if hydraulic fracturing is safe? If the scientific community cannot definitively answer this question (yet) then local communities should have the right to regulate where hydraulic fracturing can take place safely, if at all.

2.11 Misinformation

Because of the growing number of local governments and activists who oppose hydraulic fracturing, oil and gas companies have been using public relation tactics to try and discredit negative publicity and to sway public opinion to their side. One such tactic is the use of advertising campaigns in order to persuade us that hydraulic fracturing is safe and that it is the "key to America's energy future" (Heinberg 2013:1). The advertisements placed through mainstream media outlets however, are not where the public relations end. Locally, where the oil and gas industry is having the most problems, some companies have resorted to employing the same tactics as the military in order to

wage psychological warfare "to control the message" (Javers 2011). This troubling revelation was caught on tape at a Conference in Houston, Texas in 2011 where the industry gathered to discuss and exchange ideas on different industry topics. One such session was called "Designing a Media Relations Strategy to Overcome Concerns Surrounding Hydraulic Fracturing" where Range Resources spokesman, Matt Pitzarella spoke and had this to say:

> "We have several former psy ops folks that work for us at Range because they're very comfortable in dealing with localized issues and local governments," Pitzarella said. "Really all they do is spend most of their time helping folks develop local ordinances and things like that. But very much having that understanding of psy ops in the Army and in the Middle East has applied very helpfully here for us in Pennsylvania." (Javers 2011:1)

Matt Carmichael, the manager of external affairs for Anadarko Petroleum discussed their public relations strategy at the "Understanding How Unconventional Oil & Gas Operators are Developing a Comprehensive Media Relations Strategy to Engage Stakeholders and Educate the Public" session by encouraging other companies, as they have, to "Download the US Army / Marine Corps Counterinsurgency Manual, because we are dealing with an insurgency" (Javers 2011:1; Wikipedia 2013e).

These comments were recorded by activist Sharon Wilson, the director of the Oil & Gas Accountability Project for the nonprofit environmental group Earthworks, who paid to attend the conference, taped it and then forwarded the tape to CNBC to share with the public. In response, Matt Pitzarella said his words were taken out of context and that when he did speak on the subject he was only referring to "One employee who works with municipal governments in Pennsylvania has a background in psychological operations in the Army. Since the majority of his work is spent in local hearings and developing local regulations for drilling, we've found that his service in the Middle East is a real asset" (Javers 2011:1). Pitzarella also distanced himself from Matt Carmichaels strategy of using a counterinsurgency manual and said "That's not something I think that we would do,"… "You're not dealing with insurgents, you're dealing with regular people who live in towns and want to know what you're doing" (Javers 2011:1). Matt Carmichael explained to CNBC that his remarks on using a Marine counterinsurgency

manual when dealing with local communities "… was simply suggesting industry embracing a broader move toward more active community engagement and increased transparency, as it's very important to build fact-based knowledge to maintain public trust amidst special interests that often use misinformation to create fear" (Javers 2011:1).

Wilson took away from what she learned by saying: "What's clear to me is that [they] are having to use some very extreme measures in our neighborhoods," ... "And it seems like they view it as an occupation." (Javers 2011:1). In response to Carmichaels comment another attendee at the conference, Chris Tucker, a spokesman for the industry group Energy in Depth, felt that the reference to treating the opposition as an insurgency was "simply meant as a joke" and that "There are no black helicopters here" ... "No one's rappelling down from a helicopter at three a.m. looking through people's trash. We go to township meetings, and we hear what people have to say" (Javers 2011:1). The mixed messages from the industry on how they view and interact with the public at the local level has created suspicion because their strategy whether genuine or not, is still about maximizing drilling (DeSmogBlog Society of British Columbia 2010).

Chapter 3

Zoning

3.1 Zoning and Hydraulic Fracturing

Zoning

Zoning is the tool in which local governments can regulate and/or label a use for a particular area in order to ensure the health, safety and welfare of its residents through designated zones (Block 2011:1). The ability for counties, cities and towns (municipalities) to regulate their districts through the passing of zoning ordinances (local laws, statutes or regulation) is given to them by the state, through statutes or "enabling acts" through constitutional provisions as part of home rule, where they can "determine what can and cannot be done on, and with, land" in their local area (National Paralegal College 2013:1; Olson, Jenkins & Olson: 2013). States however, "… can impose procedures governing the exercise of the zoning power" that preempt local laws (Olson, Jenkins & Olson 2013:1).

Zoning ordinances "create zone boundaries for which land uses may be allowed or exempted; and describe specific requirements for each of these zones that establish property line setbacks, structure size/height/coverage limitations; noise, smell, and lighting restrictions; and zone screening buffers, among others" (Blaikie & Damchek 2010:16) and are passed in order to maintain the "public safety, health, morals, and General Welfare" of a municipality by preventing: (legal-dictionary 2013a:1):

> …glue factories beside country clubs; and oil refineries in close proximity to restaurants. Moreover, it is feared that rapacious land developers will erect, profit from, and then abandon buildings, placing undue strain on the capacities of municipal services. Further, the un zoned city will be one of haphazard construction, falling property values, instability, disregard for neighborhood "character," irrational allocation of property - and a haven for unscrupulous speculators. (Block 2011:1)

The purpose of these ordinances are therefore to ensure that property is protected from neighboring uses that may be "harmful to the use or enjoyment of the property" and this basis of planning is what historically led to the separation of commercial and industrial activities from residential areas (National Paralegal College 2013:1).

This segregation of usual low density residential areas from higher density commercial and industrial areas is from the assumption that commercial areas will have more traffic and noise and industrial areas will add pollution which are impacts that are considered harmful to residential areas, while recognizing commercial and industrial activities as vital uses (National Paralegal College 2013:1). Zoning does differ from municipality to municipality where, for example, some municipalities may allow mixed uses of business and residential in the same area where others may restrict their residential zones to single family homes only. This ability to be able to design a comprehensive plan that is unique for each municipality is made possible through zoning which establishes a local community's character (Phillips 2013).

The Planning and Zoning Commission in charge of enforcing regulations and amendments are usually locally elected residents. These officials exercise the powers of zoning called police powers which are "the legal basis for all land use regulation "if it is reasonably related to the public welfare" (Hegarty 2013:3). Public welfare is interpreted to mean many things and covers the "spiritual as well as physical, aesthetic as well as monetary." attributes of an area, while zoning ordinances enforce a "beautiful as well as healthy, spacious as well as clean, well balanced as well as carefully patrolled" community which promotes public welfare (Hegarty 2013:4). Therefore, police powers are exercised through the enactment of laws and regulations on private property by passing zoning ordinances. The power to zone given to local governments can be broad but it is still limited to function within the state and federal constitutions. If a zoning ordinance is challenged and found to surpass its authority, it will be overthrown and considered null and void by the courts (National Paralegal College 2013:1).

Not all residents agree with the zoning ordinances that exist and they can seek to rezone through an amendment or try to invalidate them. When a property owner asks for an amendment or invalidation, it is either granted or denied by the zoning board. At this point the property owner can either accept the ruling or constitutionally challenge it at the circuit court in order to argue that:

> … the zoning ordinance violates the owners right to substantive due process by unreasonably restricting the use of the property, or a facial challenge to the ordinance itself, as for example, a claim that the ordinance by its terms is

> exclusionary and will not allow the use or uses desired by the property owners. More rarely, the owner claims that as applied, the ordinance constitutes a taking of its property without compensation. (Pierson 2013:12; Olson & Olson 2013)

However, zoning boards adhere to a comprehensive plan for their district which is meant to guide their regulations as is "intended to avoid arbitrary (unreasonable) exercise of government power" (legal-dictionary 2013b:1). The comprehensive plan also serves to outline the municipalities proposed changes and growth for its geographical area which is enforced through population density controls and space allotments for public areas and schools in order to provide stability (legal-dictionary 2013b). Policies on growth can be a difficult challenge for zoning boards because: "They must balance the need for the development of local resources with the environmental and community issues associated with the exploration and development of these resources" (Ayers 2012:2).

Municipalities must also follow the Zoning Procedures Law (ZPL) which consists of "procedural requirements that local governments must follow when making zoning decisions" (Weissman et al 2010:1). The ZPL is designed to establish the requirements of the zoning process such as: Public hearings must be held before a zoning decision is made, advance advertisement of the hearing must be announced in a local paper within a given amount of time stating the date, time and place, and the required policies and procedures of the local government in regards to zoning hearings must also be made available to the public. In addition, "the ZPL mandates that local governments must adopt written standards that govern the local government's exercise of its zoning power" (Weissman et al 2010:1). If local governments do not follow the ZPL procedures or their own supplemental procedures, then a zoning ordinance can be found to "be unconstitutional on procedural due process grounds if the state or municipality did not follow established procedures for enacting a zoning law" as per the 14th amendment which states that the "procedural due process is the guarantee of a fair legal process when the government seeks to burden a person's protected interests in life, liberty, or property, and substantive due process is the guarantee that the fundamental rights of citizens will not be encroached on by government" (Justia 2013:1).

Therefore, in order for a property owner to challenge an ordinance they must demonstrate that they have gone through the proper procedural channels in trying to

resolve a dispute by establishing a "standing" or "a sufficient stake in the controversy to merit judicial resolution" (D'Orsi 2013:1). In order to have a standing, the ordinance must have had a direct effect on a landowners property or an effect on a developer who can demonstrate at least having an equitable use of part of the property. Once this is established, if "a local government administrative (quasi-judicial) zoning decision[s]" is not in favor of the land owner, then an appeal at the Superior Court can be sought where a judicial review will explain the legal rights of each party in the case presented (Olson, Jenkins & Olson 2013:1; D'Orsi 2013:1; Olson & Bowen 2013). When deliberating disputes over zoning ordinances no jury is involved and they only go to the Supreme Court level when there is a constitutional contention with the ordinance in question (Olson, Jenkins & Olson 2013).

These disputes are settled in a court of law because zoning powers are given to local governments by the state constitution and zoning ordinances are therefore considered a legislative act and legally binding and can only be invalidated by a Plaintiff that provides "clear and convincing evidence" that the ordinance, as applied to his or her property, is "arbitrary, unreasonable, and not substantially related to the public health, safety or welfare" (D'Orsi 2013:1; Olson, Jenkins & Olson 2013).

Takings

Sometimes zoning laws can go too far and therefore will be considered a "taking" violating part of the 5th Amendment of the US Constitution which says that property taken for public use, should receive just compensation. In order to prove this, the burden is on the landowner and they must show that the zoning ordinance made their property worthless for the use they intended and if found to be true, the property owner is owed compensation for their loss. Zoning boards try to avoid this situation by "grandfathering" "in and allow[ing] non-conforming uses that pre-date the passage of the new zoning law, while prohibiting any new usages that do not conform to the law" (National Paralegal College 2013:1). In the circumstances where a property owner can prove an unfair hardship that resulted from an ordinance, the zoning board of appeals has the option to issue a variance which is an exception to the law, but the standards in order for one to be granted are very tough (National Paralegal College 2013).

The takings clause originates from the Magna Carter written in England and signed into power by King John I in the 13th century which states; "No freemen shall be taken or imprisoned or disseised or exiled or in any way destroyed, nor will we go upon him nor send upon him, except by the lawful judgment of his peers or by the law of the land." (Sullivan 2013:1). This quote is the start of the defining of due process for the United States when it was added to the Constitution in 1788 by request from the State of New York which said "[n]o Person ought to be taken imprisoned or disseised of his freehold, or be exiled or deprived of his Privileges, Franchises, Life, Liberty or Property but by due process of Law" (Wikipedia 2013n:1). This proclamation that land could not be taken from an individual without the guarantee of due process or without the supervision of law, also found its way into the United States Bill of Rights as the Fifth Amendment. Originally the Bill of Rights only applied to the Federal Government but after the Civil War, states and local governments were included limiting the control they had over their constituents (Wikipedia 2013n:1).

Early on, case law continued to define and redefine the laws around property rights. In 1922 the U.S. Supreme Court presided over the case of Pennsylvania Coal v. Mahon, 260 U.S. 393 (1922) leaving a precedent decision that is still referenced to this day in taking issues (Sullivan 2013:1). This case involved the property owner, Mahon, who bought a house that only included surface rights, with the subsurface rights owned by Pennsylvania Coal. Pennsylvania Coal wanted to mine anthracite coal under Mahon's house which was going to cause structural damage and perhaps the complete collapse of the home. After Mahon bought his house, the Kohler Act had passed which forbade the "mining of anthracite coal in such way as to cause the subsidence of, among other things, any structure used as a human habitation" (UDayton 2013:1). Mahon then took Pennsylvania Coal to court and used the Kohler Act to try and stop them from mining under his house. Pennsylvania Coal argued that the Kohler Act prevented it from mining its land and therefore wanted to be compensated for the loss of its use and the revenue it would have yielded. Justice Holmes delivered the court ruling in an 8 to 1 decision saying that the Kohler Act went too far and that the 5th Amendments Taking Clause was violated and therefore it was considered a taking and Pennsylvania Coal should receive just compensation. Justice Holmes also explained that the court felt there was not enough

public interest in stopping Pennsylvania Coals right to mine in this case and therefore the policing powers went too far and "if regulation goes too far it will be recognized as a taking" (Oyez 2013:1).

This was an important ruling because prior to this case regulations were not looked at in degrees in what was considered a taking, they were just regulations meant to be followed. This case has been used as a reference for judges to be able to interpret what constitutes an over regulation, and therefore a taking, and is an important case in land use and regulation issues (UDayton 2013:2).

History of Zoning

William Fischel, from the Department of Economics at Dartmouth College, theorizes that zoning was born out of the "increasing interdependence of urban land-use that arose after the dawn of the twentieth century and the need to deal with incompatible uses by means other than traditional nuisance law and private covenants" (Fischel 2001:4). In 1892 in Boston, a law was passed to regulate the height of buildings so that the city would not be overtaken with skyscrapers over 125ft. At the time, another building was also being proposed in Copley Square that would be within the 125ft limits but was considered too tall for this particular area of Boston because it would affect the "attractive appearance and public enjoyment of the square which was then considered the show-place of Boston" (Citizen Planner 2012:4). This situation prompted the passing of a statute that would limit buildings built within Copley Square to 100ft and included compensation for the loss of height use. The use of the 100ft height limit was also applied to apartment buildings being built to house Boston's growing population in the vicinity of Boston Commons, another aesthetically important area of the City (Citizen Planner 2012).

Because of these trends in growth, the City of Boston finally passed legislation in 1904 that divided the city into two districts, residential and commercial, with different height restrictions in each. Boston's right to pass legislation that would regulate building height and district separation was upheld by The United States Supreme Court as "Reasonable grounds for a distinction between the two districts were recognized and as the statute applied to all property similarly situated in each district, it violated no constitutional right" (Citizen Planner 2012:7).

New York City however, is considered to be the forefront of zoning because it was here, in 1916, that the first "comprehensive zoning code "was passed due to development of the city" and "established height and setback controls on buildings and separated incompatible uses to stop the encroachment of industry into Manhattan's office and department store district" (Rosenberg 2013:1). The motivation behind the first zoning code, encouraged by Boston's success at the U.S. Supreme Court, was in reaction to a 42 story building whose size was unprecedented at the time (1915), called the Equitable Building (which is still standing at 120 Broadway). Those living in the vicinity of the Equitable Building demanded regulations because it rose "without setbacks to its full height of 538 feet"… and "cast a seven-acre shadow over neighboring buildings, affecting their value…" (Erickson 2012:1). As a result, a code was passed but instead of regulating building height, it regulated their shape where the buildings had to get smaller as they got taller because "The idea was that that light and air would reach the sidewalk; light and air were a major issue." as is displayed in Figure 12 (Erickson 2012:1). These first zoning laws in New York City were written by planning lawyers and were signed into official practice in 1924. They were called The Standard State Zoning Enabling Act that other states used for their first zoning blueprints (Wikipedia 2013: l).

As mentioned previously, in addition to building design New York City's zoning code also separated the city into business and residential zones. This separation of districts through zoning was meant to exclude "obnoxious or incompatible uses from residential areas, protecting property values and thus changing the value of land based upon the zoning qualifications" (Rosenberg 2013:1). However, the separation of the districts became an issue when first passed because of the distance some had to travel to the business districts for work. This all changed when the street car was invented and people could travel farther making the separation of work and living areas no longer a hardship for most and land use regulations were then favorably "… seen as a way of assuring buyers that their neighborhood won't change adversely" (Erickson 2012:1).

Figure 13: The Barclay-Vesey Building in NYC Shaped as the Building Designed to Meet the Building Code - (Source Erickson 2012).

In 1926 another landmark event happened which further established the constitutionality of zoning by the U.S. Supreme Court through the ruling of the case *Village of Euclid, Ohio v. Ambler Realty Co.*. In Euclid Ohio zoning ordinances were passed by the town in order to keep out the planned industrialization by Ambler Realty which owned 68 acres there. Ambler Realty sued saying the ordinances were a taking of its land in violation of the 14th amendment's due process clause "arguing that the zoning ordinance had substantially reduced the value of the land by limiting its use, amounting to a deprivation of Ambler's liberty and property without due process" (Wikipedia 2013m:1). A lower court sided with Ambler Realty on the grounds that the zoning ordinances did constitute a taking and were unconstitutional therefore requiring compensation. On appeal, the Supreme Court sided with Euclid because it felt "the zoning ordinance was not an unreasonable extension of the village's police power and did not have the character of arbitrary fiat, and thus it was not unconstitutional." and therefore did not violate Amblers 14th Amendment and the lower court's ruling was overturned (Wikipedia 2013m: 1). This ruling resulted in the use of zoning to become widespread and gave validity to local governments "in maintaining the character of a neighborhood and in regulating where certain land uses should occur" (Wikipedia 2013m: 1).

Home Rule

Both Pennsylvania and New York are "home rule" states which means their local governments have been given broad control to freely pass laws unless the state constitution specifies a denial of power or preemption in a certain area. Therefore, with home rule, local governments have the lawful ability to manage their affairs in regards to land use controls without interference from the state or an agency of the state, if they choose to do so (Ayers 2010).

Home rule law was first enacted in Missouri in 1875 in response to the enormous amount of time required by the state in order to deal with the issues at the municipality level. To remedy this, local governments were incorporated allowing for self-government within the laws of the state so they could have more control over their affairs (Lang 1991:3). This control existed within a home rule framework where broad powers were delegated from the state to the local governments by amending the state's constitution to give "cities, municipalities, and/or counties" the ability to govern themselves (Thompson and Knight 2012:1). This meant that as long as they worked with in the state and federal constitutions, they could pass ordinances without a charter from the state. New York adopted home rule law under Section 3(d) (1)) of its constitution in 1963 and Pennsylvania became a home rule state in 1968 "guaranteeing the right of all Pennsylvania counties and municipalities to adopt home rule charters and exercise home rule powers" (Thompson & Knight 2012:1).

The fact that Pennsylvania and New York are home rule states is important in understanding the powers that they have access to in passing zoning ordinances over land use decisions, such as hydraulic fracturing (Stinson 1997:1). However, the amount of autonomy municipalities have varies and since the states can pass "uniform state laws" and statutes to negate local authority over certain regulatory issues, home rule powers can be narrowed (Thompson & Knight 2012:1). Additionally, the U.S. constitution does not discuss local governmental laws and therefore state courts are the interpreters of them when there are disputes in deciding if a state constitutional or statutory violation has occurred (Lang 1991:4; Stinson 1997:9, 10; Orford 2011).

3.2 Zoning in New York and Pennsylvania

New York

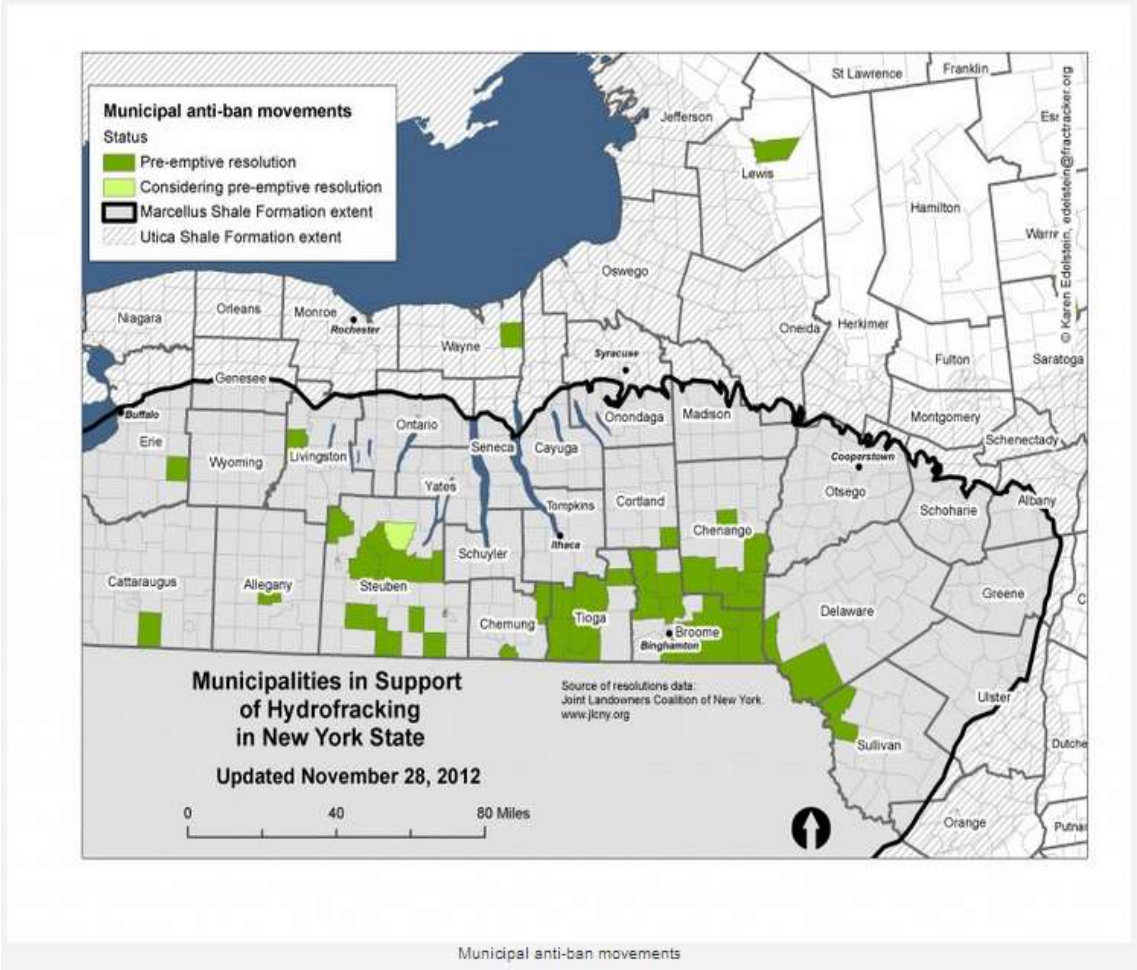
It is not uncommon or unheard of for local governments to pass ordinances regulating hydraulic fracturing, even in areas where the oil and gas industry has been tolerated, such as in Pennsylvania. The types of ordinances that are generally passed address distance setbacks and noise levels around schools and residential areas (Ross 2012). In New York however, municipalities have used their zoning powers even further by passing land use ordinances that exclude or ban hydraulic fracturing within their geographical boundaries.

New York State's constitution was written in a way that granted its municipalities the right to liberally exercise their zoning authority by stating that these powers are "among the most important powers and duties granted by the legislature to a town government" (Meyer 2012: 3). Article IX is the section that specifically discusses home rule powers that give local governments the ability to adopt and enact local laws pertaining to the "property, affairs or government" and "government, protection, order, conduct, safety, health and well-being of persons or property"(Ayers 2010: p13-20). Article IX also explains that a statute would need to be passed by the state legislature for a limit to be imposed on zoning laws but that existing ordinances still cannot conflict with the state law.

Therefore, it is important for the context of this paper to further discuss court cases relevant to New York's hydraulic fracturing situation that test the powers given to municipalities by the New York State Constitution. Furthermore, the case law will also serve to help define the outcome of the crisis hydraulic fracturing presents at the local level and the difficult task that municipalities have in deciding which balance to choose in weighing where hydraulic fracturing can occur while weighing the welfare of its communities (Alessi, Kuhn 2013).

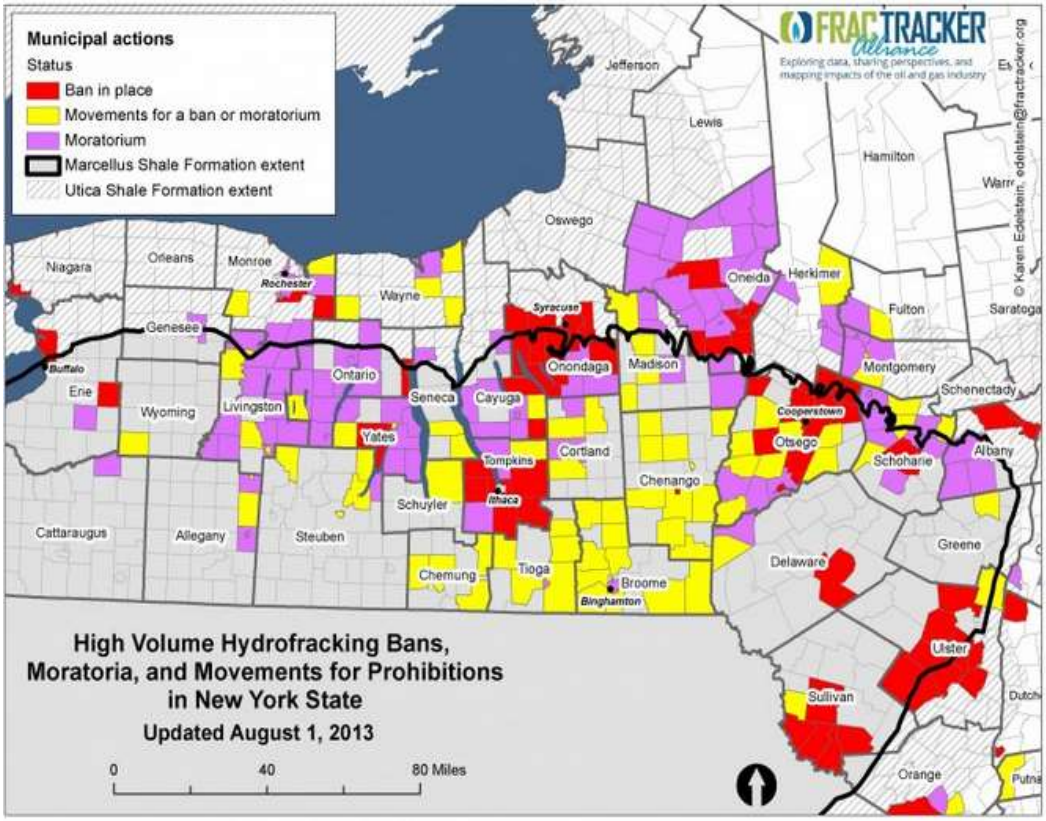
The two maps below show the areas that are in support of hydraulic fracturing and those that have, or are, in the process of passing bans through zoning laws.

Figure 14: Municipalities in New York in Favor of Hydrofracking - (Source: Edelstein2 2013)



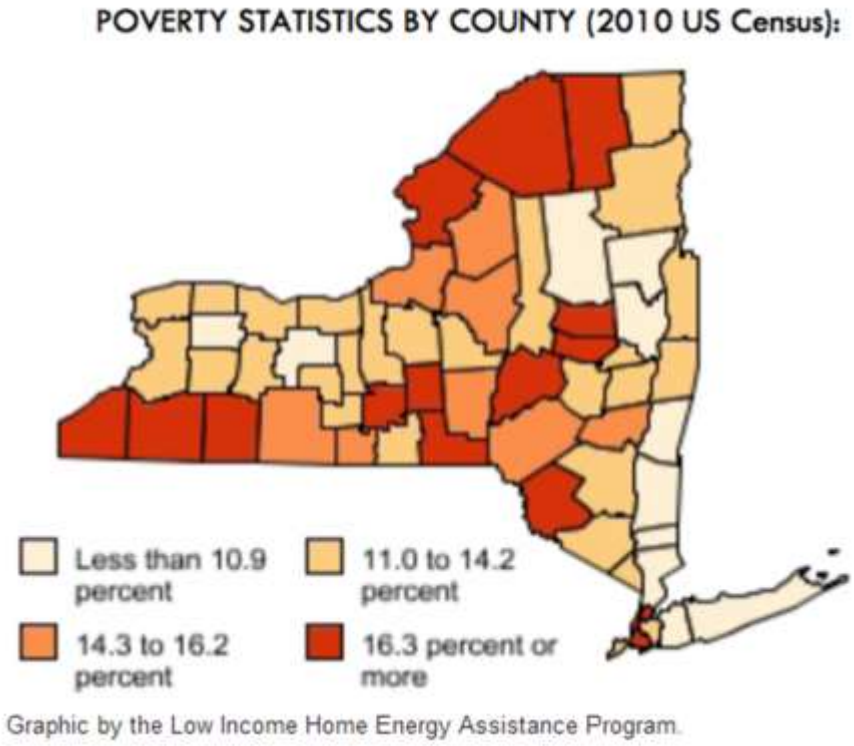
Municipal anti-ban movements

Figure 15: Municipalities Taking Actions to Ban Hydrofracking - (Source: Edelstein 2013:1)



It is important to point out that the possible motivation for pro hydraulic fracturing in certain areas of New York might have to do with poverty levels. Figure 15 below displays a map of poverty statistics by county that when compared to Figure 13 shows a correlation of pro fracking sentiment and poverty levels. These areas mainly consist of old farming communities with declining economies and therefore, the leasing of these properties to natural gas companies would bring needed revenue (Bump 2013).

Figure 16: US Census Poverty Statistics by County in New York State - (Source: Bump 2013)



Environmental Conservation Law 23-0303(2)

All the court cases from New York that are relevant to this paper have been initiated by the oil and gas companies in order to dispute zoning ordinances that have restricted their ability to extract natural gas using hydraulic fracturing. These cases rest on the argument that the state's Oil, Gas and Solution Mining Law (OGSML), has a preemption clause located within its Environmental Conservation Law (ECL) §23-0303 that outlines its regulatory authority:

> "supersede [s] all local laws or ordinances relating to the regulation of the oil, gas and solution mining industries, but shall not supersede local government

> jurisdiction over local roads or the rights of local governments under the real property tax law. NY ECL § 23-0303(2).” (Marten Law 2012:1; Kenneally & Mathes 2010:2)

The oil and gas companies have argued that this suppression clause outlines its preemption of local ordinances regulating hydraulic fracturing by the state. The issue of state preemption, which defined in law terms, “refers to situations in which a law passed by a higher authority takes precedence over a law passed by a lower one”, happens between a state and a local government when “a law passed by a state legislature takes precedence over an ordinance passed by a local government, like a city council or zoning board” (Rottenstein 2011:1). The justices in New York however have been finding no conflict between the ordinances and the ECL § 23-0303(2) wording. They have justified this ruling by drawing the distinction between a local governments’ legal right to regulate where these activities can take place within its boundaries and the OGSML’s job in regulating the mineral extraction process (Marten Law 2012).

Furthermore, the Court of Appeals, New York’s highest court, said that preemption of local laws is to be used *only* when state laws are perfectly clear on preemption because to use it any other way would “drastically curtail” the power of a local government (Kenneally & Mathes 2010:2). If the Court of Appeals had not interpreted ECL §23-0303 as vague on preemption, it would have been in conflict with the states directive to the court to “liberally” allow zoning enactment by municipalities in regards to limiting or banning a land use as long as it is in the context of the “public welfare” including the “physical as well as intangible aesthetic considerations” (Meyer 2012: 3). Therefore, the cases in this paper will further define and test the context of the ECL § 23-0303(2) which is key in understanding their rulings that ECL § 23-0303(2), or Article 23, was never meant to preempt land use ordinances even if they ban a mineral extraction activity such as hydraulic fracturing.

Additionally, the New York State Department of Environmental Conservation (DEC) who is the regulatory agency over mineral extraction has to honor zoning ordinances regardless of its state mandated authority to permit and regulate mining activities, unless the Court of Appeals rules that the ordinances are preempted by the DEC’s authority, which it hasn’t (yet). Steven Russo, a former deputy commissioner

who left the DEC for the law firm Greenberg Traurig LLP elaborated that the "DEC's permits are by definition subject to local law, so therefore a DEC permit would be meaningless where it was zoned out" (Campbell 2013:2). However, when the DEC is finished writing its draft supplement to its original Environmental Impact Statement (dSGEIS) on hydraulic fracturing to demonstrate that they can mitigate the "… potential environmental impacts," from "hydraulic fracturing / horizontal well drilling operations in the Marcellus and Utica shale plays in New York", they could then have an approved regulatory system in place to satisfy the state and depending on the language of the new regulations, the preemption issue might have to be revisited (Whitman Osterman and Hanna 2009:1).

Relevant Court Cases in New York over Zoning and HF

An important case that is frequently referenced in New York in regards to the preemption clause in the ECL is the matter of *Frew Run Gravel Products v. The Town of Carroll*, (1987). In this case, New York's Mining Land Reclamation Law (MLRL), which is the statute for surface mining, was used by Frew Run Gravel to challenge the Town of Carroll's zoning ordinance which prohibited the Department of Environmental Conservation's (DEC) permitting of sand and gravel removal from the town, since their land use was zoned for agricultural purposes. New York's Court of Appeals ruled in favor of the Town of Carroll stating that the permits issued by the DEC for the sand and gravel removal did not preempt the towns zoning laws because the town had the right to decide what land use is permitted, which is not considered a regulation on the industry as is the job of the MLRL and the DEC (Meyer 2012, Marten Law 2012).

The court concluded "that the Town's zoning ordinance "relate[d] not to the extractive mining industry but to an entirely different subject matter and purpose: i.e., 'regulating the location, construction and use of buildings, structures, and the use of land in the Town…'" (Whitman Osterman & Hanna 2009:2). In ruling with the Town of Caroll, the court set a precedent by defining the MLRL's suppression clause ECL 23-2703(2) that states:

> this title shall supersede all other state and local laws relating to the extractive mining industry; provided, however that nothing in this title shall be construed to

> prevent any local government from: a) enacting or enforcing local laws or ordinances of general applicability … or b) … local zoning ordinances or laws which determine permissible uses in zoning districts. (Van Nest 2012:1)

By defining the ECL 23-2703(2) the court upheld the power of the municipality to pass zoning laws regulating land as was: "granted in subdivision (6) of section 10 of the Statute of Local Governments and in Town Law § 26" which says that mining can be "permitted or prohibited in a particular zoning district" (Whitman, Osterman & Hanna 2013:31). After this ruling the ECL 23-2703(2) was actually amended to clarify the power of local authority to regulate land use (Whitman, Osterman & Hanna 2013:31).

The *Matter of Frew Run Gravel Products v. The Town of Carroll* is important to start with because it is an earlier ruling (1987) handed down by New York's highest court and at the heart of the case was the preemption issue which clarified the MLRL supersession clause. Another case *Gernatt Asphalt Products, Inc., Respondent, v. Town of Sardinia et al., Appellants (1996)* continued the *Frew Run Gravel* cases' decision when the Town of Sardinia passed a zoning ordinance banning sand and gravel removal during the time Gernatt bought 400 acres and obtained a permit for sand and gravel removal. Gernatt took the town to court and argued that the MLRL's ECL 23-2703(2) legislation states it preempts local law. However, the court recognized the right of home rule and struck down the attempt to limit local government authority by interpreting ECL 23-2703(2) the same as *Frew Run Gravel* finding that "zoning ordinances are not the type of regulatory provision the Legislature foresaw as preempted by Mined Land Reclamation Law; the distinction is between ordinances that regulate property uses and ordinances that regulate mining activities" (Whitman, Osterman & Hanna 2013:33).

The defining of the MLRL's ECL 23-2703(2) legislation by the court in *Frew Run Gravel* is now being applied as a reference in the court room with the recent hydraulic fracturing cases where the Oil Gas and Solution Mining Law's ECL § 23-0303(2) (written for subsurface mining) suppression clause is also being argued to have been written to preempt local zoning ordinances that exclude hydraulic fracturing (Blaikie & Demchak 2010).

The year 2012 was an important year for municipalities in New York wanting to ban or enact moratoria on hydraulic fracturing. State Preemption, "the issue of whether

state oil and gas laws preempt local towns' ability to regulate fracking within its borders" was clarified in New York in two landmark cases that handed down similar rulings *Cooperstown Holstein Corp. v. Town of Middlefield* and *Norse Energy Corp. v. Town of Dryden* (Pincow 2013:1).

In *Cooperstown Holstein Corp. v. Town of Middlefield,* 943 N.Y.S.2d 722 (N.Y. Sup. Ct. 2012), the plaintiffs, Cooperstown Holstein Corporation, asked for a summary judgment and for the Appellate Court to invalidate a zoning law passed by the defendant, Town of Middlefield, because they claimed it was preempted by the OGSML's ECL §23-0303 suppression clause. The defendants were seeking a dismissal of the case by asking for a summary judgment. The zoning law in question that was passed by the defendants states that "Heavy industry and all oil, gas or solution mining and drilling are prohibited uses..." which bans gas and oil drilling within the defendants borders. The plaintiff had already secured drilling leases in the defendant's area and therefore wanted the court to void the zoning law. Their justification for the voidance was that the New York State Department of Environmental Conservation (NYSDEC) was given the legal authority by the State of New York to issue permits and regulate hydraulic fracturing and therefore preempts The Town of Middlefield's use of zoning ordinances that prohibit natural gas extraction.

The court took the approach of examining the history and intent of the legislation to decide if the ECL did give the state preemptive powers, invalidating the ordinance. The court found that the regulatory authority given to the NYSDEC over the oil and gas industry by the ECL was only for the purpose to oversee that the state had uniform management over drilling and a long term energy development plan. Added to the Environmental Conservation Law in 1981 was Law §23-0303 which the plaintiffs cited for their case, but the court found that this suppression clause only re-confirmed that the NYSDEC's only power is to regulate the oil and gas process. Most importantly noted was that nowhere within these laws was there mentioned an intent to support the preemption of land use management practices of municipalities by the state even if there are incidents where activities of the industry are impacted. Therefore, the summary of judgment sought by the plaintiff to void the defendants zoning law was denied and the defendant's grant of a dismissal of the complaint was given.

This case is currently at the Court of Appeals where interested parties submitted briefs on their opinions to the court to consider, some including “New York Farm Bureau, the Associated General Contractors of New York, and the American Petroleum Institute” (Pincow 2013:1). The decision is expected in early 2014.

In the case of *Anschutz Exploration Corp. v. Dryden***,** 940 N.Y.S.2d 458 (N.Y. Sup. Ct. 2012), also known as *Norse Energy Corp. v. Town of Dryden*, the petitioner-plaintiff, Anschutz Exploration Corporation was calling for a declaratory judgment to void an amended ordinance that the respondents-defendants, Town of Dryden and Town of Dryden Board, enacted to prohibit hydraulic fracturing by banning exploration, production and storage of natural gas in its geographical area. This ordinance was amended in response to the Dryden residents requesting a ban to the questionable natural gas extraction method of hydraulic fracturing. The issue for Anschutz was, it had gas leases on 22,200 acres within the town prior to the amendment but with the amendment, they would not be able to extract natural gas even with a permit from the DEC since the ordinance states that "[n]o permit issued by any local, state or federal agency, commission or board for a use which would violate the prohibitions of this section or of this Ordinance shall be deemed valid within the Town"(Dryden Zoning Ordinance, Section 2104[5]). Anschutz brought the declaratory judgment against the Town because they felt that the Oil, Gas and Solution Mining Law (OGSML) preempted the amendment and conflicted with state authority over the regulation and the production of natural gas. The Town responded by requesting that the declaratory judgment be dismissed and to affirm that the zoning amendment is valid.

The court looked at the OGSML clause and also reviewed the *Matter of Frew Run Gravel Prods. V Town of Carroll* case because of the similarities between the two. In *Matter of Frew* the court found that The Mined Land Reclamation Law (MLRL) did not have power over local zoning ordinances because the ordinances were not regulating mining but were about land use. This court compared the language of the MLRL and OGSML ECL clauses and found that they were almost identical. Therefore, it was found that there was no intent within the OGSML legislation that would preempt local zoning laws and a zoning ordinance could ban operations in its area in relation to the production of oil and gas.

However, even though the court did find that the town could ban hydraulic fracturing, the part of the Dryden Zoning Ordinance, Section 2104[5] that prohibits permits from local, state and federal agencies was found to be out of their policing power because permits from other governmental agencies had to be honored and this part was preempted by the OGSML. This did not mean the whole zoning amendment would be found invalid but that this section would be stricken from the amendment.

This case has two different Petitioners because when Anschutz lost at the lower court, they sold their holdings to Norse Energy Corp. and left the case, and Norse Energy then went through with the appeal (Hart 2013). However, the Appellate Division court came to the same conclusion as the lower court unanimously stating that "the pre-emption language was designed to "ensure uniform statewide standards and procedures with respect to the technical operational activities of the oil, gas and mining industries in an effort to increase efficiency while minimizing waste," not to "usurp the authority traditionally delegated to municipalities to establish permissible and prohibited uses of land within their jurisdictions" (Bunyan 2013:2). Norse Energy Corp. has since filed for bankruptcy "claiming that New York State's moratorium on hydrofracking caused it to lose its investment" (Hart 2013:1).

In *Jeffrey v. Ryan*, No. CA2012-001254 (N.Y. Sup. Ct. Binghamton Co. Oct. 2, 2012), the Petitioner, was seeking a review and a dismissal of local law 11-006 passed by the City Council of Binghamton, Ryan the Defendant, which placed a moratorium for two years banning the extraction and exploration of oil and gas. Jeffrey claimed that law 11-006 was "an illegitimate moratorium" or an invalid zoning regulation which Ryan denied, saying it was "a legit imitate exercise of municipal police powers to protect public health and safety" (Walavalker 2013:12).

Judge Lebous ruled in favor of the Plaintiff stating that the law was not a zoning regulation but a moratorium and that the procedure for passing a moratorium was not met by the Defendant. Judge Lebous explained that the threat that the City used as a means to pass the moratorium "was not sufficiently grave to justify the exercise of municipal police powers through a moratorium" because without the NYSDEC finalizing its regulations, no drilling can take place and therefore there is no crisis that would be settled when the moratorium expired (ELF 2014; Walavalker 2013:12; Smith 2013). The court

further explained that regardless of the controversy in gas exploration, "… a municipality may not invoke its police powers solely as a pretext to assuage strident community opposition" (Smith 2013:10).

However, the Judge did point out that the findings of the court were as such because it was the *procedures* of the law that made it invalid and not that it was preempted by ECL 23-0303(2) of the OGSML and the Judge referred to the *Anshutz* and *Cooperstown* cases to validate Binghamton's right to regulate its own land use. This ruling by the court clarified the line between using local laws legitimately for land use regulations and illegitimately as found here where "the court overturned a local law prohibiting HVHF [high volume hydraulic fracturing], determining that the local law was an improper moratorium because they did not demonstrate an emergency situation under the circumstances. In so doing, the court casted doubt upon and questioned the legality of all moratoria prohibiting HVHF" (ELF 2014; Nearpass & Brenner 2012:3).

These cases demonstrate that municipalities in New York may regulate land use, which is not the same as regulating hydraulic fracturing, and therefore can use zoning ordinances to ban natural gas extraction as long as they follow the proper procedures (Kenneally, Mathes 2010). The *Jeffrey v. Ryan* ruling did reign in Binghamton's use of a moratorium that the judge interpreted as motivated by the protest of hydraulic fracturing and not its threat and could impact future cases on moratoria (Nearpass Brenner 2012:13). The rulings of *Dryden* and *Middlefield* are however important standings where "the Appellate Division, 3rd Department, upheld two state Supreme Court decisions banning fracking within the boundaries of those towns" (Millett, Green 2013:1).

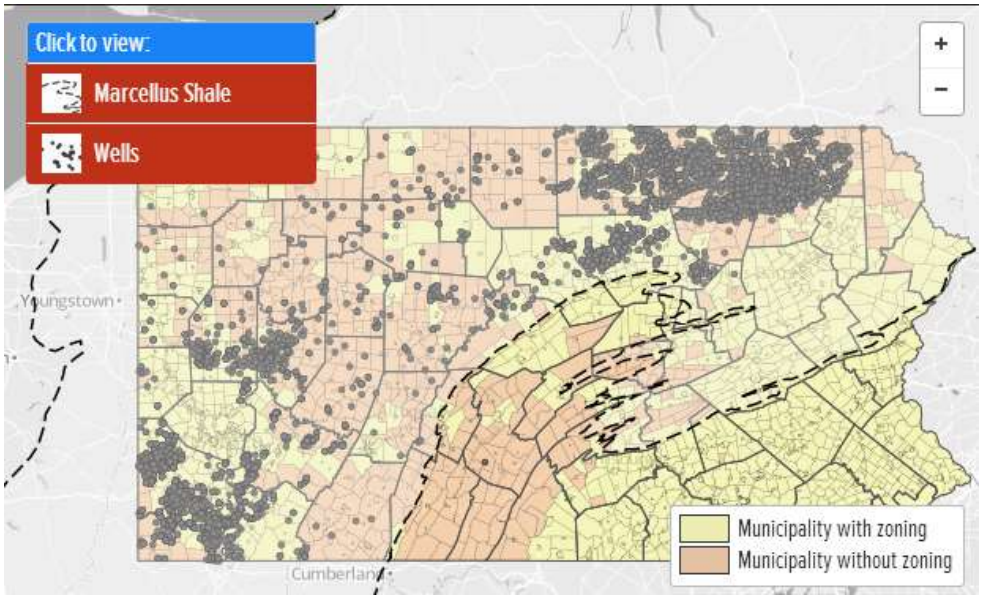
These cases reaffirmed that local municipalities can ban hydraulic fracturing and, "It is unlikely New York's highest court will reverse the Appellate Division, as case law, the New York Constitution and statutes explicitly support local government control over land use" (Millett, Green 2013:2). Deborah Goldberg of Earth Justice, counsel for the Town of Dryden, in the *Norse Energy Corp. v. Town of Dryden* case sums up the situation in New York as: "The oil and gas industry largely has been deregulated at the federal level. While state officials struggle with their decision to permit fracking, local officials are working to implement their own decisions. Today's ruling signals to local officials that they are indeed on solid legal ground" (Bunyan 2013:2).

3.3 Pennsylvania

In the context of comparing Pennsylvania to New York in regards to zoning powers, it is important to realize that municipalities in Pennsylvania have had a harder time than New York's in using their home rule powers because of the passing of uniform state laws. Another significant difference between these two states is that 40 percent of the municipalities in Pennsylvania have chosen not to adopt home rule while all of New York has (Colaneri 2014; Coon 2011).

In both states it is the rural farming communities that tend to be pro drilling and in Pennsylvania Bradford County that opted out of home rule is where most of the early hydraulic fracturing activity has been located (Colaneri 2014). Bradford County Planning Director Ray Stolinas explained that the choice to not adopt home rule and use zonings ability to designate safe hydraulic fracturing areas by rural communities as: "Fortunately for them, it's not an urbanized landscape because they can pick and choose where the most viable place is to set up a pad and tap into the Marcellus and convey that via pipeline to compressor stations within the countryside" (Colaneri 2014).

Figure 17: Map of Municipalities in Pennsylvania by Zoning Capabilities with the Marcellus Shale and Well Location Overlay – (Source: StateImpact 2014).



Residents located in the non-zoning areas also tend to have the same outlook as Jackie Kingsley, a supervisor in the township of Smithfield, who when asked about the potential negative impacts from drilling said "Why would we interfere at this point? We signed the lease, we have to live with it," and that "We might not like it [hydraulic fracturing], but we have to live with it" because "people fight their own battles. They don't need or want the government to do it for them" (Colaneri 2014:1).

This situation may work for those in rural Pennsylvania but farming communities and suburban and urban areas where home rule is utilized is where the oil and gas companies are facing resistance. The passing of ordinances within these areas to restrict where hydraulic fracturing can take place has caused headaches because, as an oil and gas industry attorney with the Pittsburgh-based firm Babst-Calland explained, "time is money – money the industry doesn't want to spend working around hundreds of differing local regulations" (Colaneri 2014:1). In reaction to the oil and gas companies' discontent with having to work around zoning, the Oil and Gas Act was revised by the government into Act 13 which Governor Corbett signed into law in 2012.

ACT 13's provisions specifically relate to hydraulic fracturing where the new uniform state regulations are meant to allow hydraulic fracturing and its activities to take place regardless of an areas zoning (DEP 2013). It passed at a time when local governments were trying to determine the best places drilling should take place in order to protect "public health, safety, morals, and general welfare." from the encroachment of an industrial activity into residential areas (Raichel 2012:1). ACT 13 served to give the oil and gas companies more freedom to drill by stripping the "rights from communities and individuals" in order to "supersede and preempt local regulation of oil and gas drilling and related activities" (Rosenfeld 2012:1; Navarro 2012; Burcat 2012a:1). An example of this interference is the ACTs specification that drilling could take place up to 500ft near sensitive areas that zoning had been able to protect, such as neighborhoods, parks, schools and hospitals. Additionally, the Public Utilities Commission (PUC) was given the power to act on behalf of oil and gas companies if they felt an ordinance went too far and to overturn the ordinance if it determined that "… [the local law] violates" the new state oil and gas law" (Sourcewatch 2014:1). This ACT therefore was going to have

a “wide geographic and even social impact” because “approximately 60 percent of Pennsylvania (is) underlain by such formations” that contain shale gas (Burcat 2012:1; Ross 2012).

In another contrast to New York’s municipalities, Pennsylvanian’s cannot ban hydraulic fracturing because ACT 13 did not carry over from the previous Oil and Gas Act a “2009 decision by the Pennsylvania Supreme Court upholding municipal rights to write zoning laws that excluded oil and gas drilling if it did not fit the community’s “character” and “special nature” (Sourcewatch 2014:1). After the 2009 decision, Pittsburgh became the first city in the US to ban hydraulic fracturing in 2010, but this is no longer possible for other cities, towns or counties in Pennsylvania (Morris 2013). There seemed to be a silver lining within the ACT when it required the collection of impact fees from the oil and gas companies in order to compensate local areas for the potential impacts and inconvenience caused from individual drill sites. However, in order for municipalities to receive their portion of the fees, they would be required to accept the full terms of ACT 13 which would mean giving up their ability to regulate land use specific to hydraulic fracturing (Marcellus-Shale.US 2012).

Ben Price of the Community Environmental Legal Defense Fund summarized Act 13 by saying: “The state has surrendered over 2,000 municipalities to the industry. It’s a complete capitulation of the rights of the people and their right to self-government. They are handing it over to the industry to let them govern us. It is the corporate state. That is how we look at it” (Rosenfeld 2012:1). However, the DEP in its summary of ACT 13’s proposals reiterated that the purpose for the revisions to the Oil and Gas Act was in order to “… require additional oversight of applicable standards and controls. For these reasons, new regulations are needed to ensure that the commonwealth’s oil and gas resources are developed safely, responsibly and in an environmentally protective manner” (DEP 2013:1).

When this Bill was signed, seven municipalities and other parties sued over the “provisions in Act 13 that limit land-use control and over the requirements to change local zoning laws to conform to state statute or risk losing shale impact fee funding.” and

they received a judicial stay for 120 days so that the zoning changes dictated did not have to be followed until further court review (Ross 2012:1).

The State of Pennsylvania has had a history of writing corporate friendly legislation, for example, in 2005 The State passed legislation called ACT 38 (HB1646, 2005) or ACRE, signed by then Governor Rendell, that gave power to the State Attorney General to act against and overrule, instead of the courts, municipalities that pass anti-corporate farming ordinances. Since the passing of ACRE the Attorney General has sued municipalities on behalf of corporations disallowing them the right to protect themselves from the harm corporations do to the environment and small businesses (CELDF 2012). Another example was the passing of the Uniform Construction Code which created a one code system for construction companies stating it was necessary because:

> … a multiplicity of construction codes currently exist and some of these codes may contain cumulatively needless requirements which limit the use of certain materials, techniques or products and lack benefits to the public. Moreover, the variation of construction standards caused by the multiplicity of codes may slow the process of construction and increase the costs of construction. (Pennsylvania Dept. of Labor and Industry 1999: 2)

Some see code uniformity as a positive since they feel that they serve "To provide standards for the protection of life, health, property and environment and for the safety and welfare of the consumer, general public and the owners and occupants of buildings and structures" (Pennsylvania Department of Labor and Industry 1999: 2). However, they may also interfere with local autonomy that can affect community character.

Governor Corbett also signed the Indigenous Mineral Resources Development Act, a bill that gives 14 public universities located on top of the Marcellus Shale the ability to open up their campuses to natural gas and oil drilling, and coal mining to offset education costs. Not everyone is convinced of the Acts benefit because of the lax regulations and past violations of environmental laws by the drilling companies which are a concern with environmentalists and University staff due to the potential harm to students and faculty. These fears are based on the possible explosions, spills and leaks of

contaminants into the water system and air pollution which have happened at other drilling sites documented within Pennsylvania (Brownstone 2012). Professor Bob Myers from the Lock Haven University, one of the campuses that could take advantage of this proposal, is horrified and states; “I've become extremely concerned, disturbed, and disgusted by the environmental consequences of fracking.” "They've had explosions, tens of thousands of gallons of chemicals spilled and we're going to put this on campus?” (Brownstone 2012:1)

Section 602 of Pennsylvania’s Oil and Gas Act

As with New York’s OGSML’s Environmental Conservation Law 23-0303(2) , Pennsylvania’s Oil and Gas Act also has a suppression provision found in Section 602 (58 P.S. § 601.602):

> “Except with respect to ordinances adopted pursuant to … the Municipalities Planning Code… all local ordinances and enactments purporting to regulate oil and gas well operations regulated by this act are hereby superseded. No ordinances or enactments adopted pursuant to the aforementioned acts shall contain provisions which impose conditions, requirements or limitations on the same features of oil and gas well operations regulated by this act or that accomplish the same purposes as set forth in this act. The Commonwealth, by this enactment, hereby preempts and supersedes the regulation of oil and gas wells as herein defined. Section 602 (58 P.S. § 601.602).” (Pennfuture 2011:3)

This provision has also been used by the oil and gas companies in litigation to claim state preemption over zoning ordinances that restrict hydraulic fracturing (Lucas 2011). This is where New York and Pennsylvania, even with their differences, have similarities where the courts in both states have ruled relatively the same by recognizing properly written ordinances that do not serve the same purpose as state mineral laws. Even in Pennsylvania where its pro-drilling government has tried to weaken home rule powers, it has been legally confirmed that ordinances are not preempted by its OGA, now ACT 13 (Lucas 2011).

Relevant Court Cases in PA over Zoning and HF

This first case set a precedent and is important since it has been used by justices in later rulings on preemption. *Huntley & Huntley Inc. v. Borough Council of the Borough of Oakmont*, 964 A.2d 855 (Pa., 2009) is similar to the *Frew Run Gravel* case in New York in that the court was to decide if section 602 of the Pennsylvania Oil and Gas Act, that says: a local government cannot "impose conditions, requirements or limitations on the same features of oil and gas operations regulated' by the [Oil and Gas] Act.", preempts the ordinance that the Borough of Oakmont passed that would zone out drilling for natural gas and require the industry to apply for special use permits (Whitman Osterman & Hanna 2009:2).

The court ruled that section 602 of Pennsylvania's Oil and Gas Act "did not prohibit municipalities from regulating which types of land uses are appropriate within their municipal boundaries" and found that Oakmont's ordinance "was about land values, conservation, minimizing congestion, and open spaces, thus serving a different purpose than the OGA" and was valid (Whitman Osterman & Hanna 2009:2; Blaikie, Damchek 201:14). The court further elaborated and said that "the scope of section 602's preemption extended only to regulation of the "technical aspects of well-functioning and matters ancillary thereto (such as registration, bonding, and well site restoration), [but not] the well's location" and therefore the intent of the zoning ordinance is different than the purpose of the Oil and Gas Act and is valid (Appeals Court New York State 2013:38).

The next case is the case of *Range Resources v. Salem Township*, 964 A.2d 869 (Pa., 2009), where the Salem Township wanted the Pennsylvania Supreme Court to review a ruling by a lower court which invalidated its ordinance "regulating oil and gas well operations and associated surface and land development" because the lower court said it was preempted by state law per the language found in section 602 (58 P.S. § 601.602) in the Oil and Gas Act (Walakalver 2013:17). The Lower court found that the ordinance in question had even stricter regulations than the Oil and Gas Act in regards to regulating the activities of oil and gas extraction because the ordinance requirements "on the location of activities that are necessarily incident to the development of wells" fall within the jurisdiction of the Oil and Gas Act. Therefore, the ordinances were regulating

activities that would be the responsibility of the Pennsylvania Department of Environmental Protection (DEP) and were invalidated (Smith 2013:10).

The Supreme Court upheld the lower court's decision because they said the Township exerted an "illegitimate assertion of unlimited discretion over oil and gas development in violation of conflict preemption doctrine" (Walakalver 2013:17) because it went too far as a comprehensive regulation by including "permitting procedures, bonding requirements, wells, and site restoration, which are all covered by the DEP/ OGA" and "this regulated oil and gas development rather than zoning" (Blaikie, Damchek 2010:14). The court also cited the *Huntley & Huntley v. Borough of Oakmont* case, which ruled in favor of Oakmont's ordinance in order to point out that the *Borough of Oakmont*'s ordinance, was only written to regulate the location of wells which is recognized as a municipal land use power (Walakalver 2013).

Penneco Oil Company Inc. v. County of Fayette, 4 A.3d 722 (Pa. Commw. Ct., 2010) started with Penneco Oil petitioning the court to invalidate a zoning ordinance passed by the County of Fayette which would require the oil and gas companies to obtain a special use permit or an exemption certificate to drill in certain areas within the County. Penneco argued that the requirement of permits was preempted by the Oil and Gas Act because they were essentially acting in the same authority. The court ruled that the ordinance "did not violate either the express preemption clause of the Act or conflict its preemption doctrine and cited the precedent established by the Pennsylvania Supreme Court in *Huntley & Huntley Inc. v. Borough Council of the Borough of Oakmont.* 965 A.2d. 869 (2009)" (Walavalker 2013:19). The court further elaborated and said that the ordinance was sufficiently broad and was not acting in the same manner as the Oil and Gas Act as a "comprehensive regulatory scheme" and found that "the central objective of the Zoning Ordinance to encourage beneficial and compatible land uses was upheld as consistent with municipal land use powers" (Walavalker 2013:19).

Lastly, the most recent case in Pennsylvania involving zoning and hydraulic fracturing regulation is the case of *Robinson Township, et al.v The Commonwealth of Pennsylvania, Pennsylvania Public Utility Commission (Commission).* The Robinson Township, Petitioners, filed a petition for review over the constitutionality of Act 13.The

main issue for the petitioners was that the Act was purposely written by the Commonwealth to preempt local environmental laws and zoning codes specific to oil and gas operations. They allege that Act 13 circumvented their "constitutional and statutory obligations" to the welfare, health and safety of their constituents and the surrounding environment.

The Commonwealth responded by filing preliminary objections stating that the petitioners lacked standing to even file their claims and is non-justiciable and political and should be dismissed because hydraulic fracturing does not cause harm to the municipalities. They further explained that even if there were to be harm caused, the individual affected could state their own claims and therefore, the petitioners should not be acting as litigants for them. The petitioners countered that they do have standing because Act 13 affects their local governmental functions by modifying their zoning laws in a way that makes their ordinances unconstitutional. In addressing The Commonwealths objections the court agreed with the petitioners and found that they do have standing to bring about this action and that the question of Act 13's constitutionality is a valid question for this court.

In the end the court found all of Act 13 to be constitutional except for articles 58 Pa. C.S. § 3304 and 58 Pa. C.S. § 3215(b) (4). Article 58 Pa. C.S. § 3304 was found to act as a zoning ordinance itself which states that industrial uses are to be allowed in residential areas and that comprehensive plans must be changed to allow for these uses, even in areas where they would normally be zoned out. The court elaborated that 58 Pa. C.S. § 3304 does violate Article 1 §1 of the Constitution by forcing municipalities to violate their comprehensive plans in favor of promoting the oil and gas industry over the local demographics. This requirement for municipalities to violate their comprehensive plans violates due process, violates the basis of land use restrictions which is irrational and violates the purpose of the policing powers, even if it is The Commonwealth (the State of Pennsylvania) who endorsed the provisions.

Article 58 Pa. C.S. § 3215(b) (4) was also ruled unconstitutional and null and void because it allowed the DEP to waive wetland and water body setbacks if the oil and gas companies requested these waivers which fails to follow through on the constitutions

guidelines that says "legislation *must contain adequate standards which will guide and restrain* the exercise of the delegated administrative functions" and therefore, 58 Pa. C.S. § 3215(b) (4) is unconstitutional.

The Commonwealth appealed this ruling and on December 19th 2013 the Pennsylvania Supreme Court declared in a 4-2 vote that "a provision allowing natural gas companies to drill anywhere, regardless of local zoning laws, was unconstitutional" as written in ACT 13 which states that "drilling, waste pits and pipelines [will] be allowed in every zoning district, including residential districts, as long as certain buffers are observed" (Valentine 2013:1; Walavalker 2013:19; Appeals Court of NY 2013). Furthermore, out of the 4 justices who agreed that these specific provisions were unconstitutional, 3 of them signed the plural opinion that further elaborated on the role the Environmental Rights Amendment, located in Article I Section 27 of Pennsylvania's Constitution, played in their decision by stating: (AF 2014:1)

> Rather, at its core, this dispute centers upon an asserted vindication of citizens' rights to quality of life on their properties and in their hometowns, insofar as Act 13 threatens degradation of air and water, and of natural, scenic and esthetic values of the environment, with attendant effects on health, safety and the owners' continued enjoyment of their private property. (Valentine 2013:1)

It may seem that Pennsylvania's coal mining history may not have been far from the justice's minds where coal companies "… really ravished the land--they took the money out and left many miles of acid-mine drainage polluted (rivers)" (AF 2014:1) as the justice's alluded to below:

> That Pennsylvania deliberately chose a course different from virtually all of its sister states speaks to the Commonwealth's experience of having the benefit of vast natural resources whose virtually unrestrained exploitation, while initially a boon to investors, industry, and citizens, led to destructive and lasting consequences not only for the environment but also for the citizens' quality of life. (Foster 2013:1)

This attempt by the Commonwealth of Pennsylvania to appease the oil and gas industry by trying to pass uniform regulations for hydraulic fracturing was not surprising. Nor was the ruling by the court that sidelining a municipalities policing power was unconstitutional. What was surprising to many was the use of the Environmental Rights Amendment that "has not been a feature of Pennsylvania jurisprudence," nor "the centerpiece for overturning legislation." As noted by Paul Stockman, a Pittsburgh-based energy lawyer for McGuire Woods (AF 2014:1). Therefore, in addition to finding the ACTs preemption of local zoning and its setback waiver policy as unconstitutional, the court also correlated the inability of municipalities to exercise these rights as a violation of the Environmental Rights Amendment of the state constitution. Both justifications in overturning articles 58 Pa. C.S. § 3304 and 58 Pa. C.S. § 3215(b) (4) legitimized zoning by the court as a constitutional and righteous use of municipality power over the industries and state interests to exploit the environment and its citizens for political and monetary gains (Navarro 2012).

All of these cases demonstrate that the right to regulate where natural gas extraction takes place is a local government's right of self-determination given to them by home rule, which justices in both states recognized (Bloomberg 2013). However, the oil and gas industry isn't backing down and they still feel that local governments should not have the power to impede hydraulic fracturing as "Attorneys for the gas industry have warned that allowing municipalities to ban drilling would be an unworkable practice and leave their multi-million dollar investments in oil-and-gas rights subject to the whims of a town board" (Campbell 2013:1). However, the court's decision over ACT 13 in Pennsylvania was a setback to the state's policy and the industries plan in trying to achieve uniform regulations regardless of the consequences at the community level.

Municipalities can also overstep their authority and the courts have fairly ruled to invalidate ordinances that do so as was demonstrated in the *Jeffrey v. Ryan* in New York and the *Range Resources v. Salem Township* in Pennsylvania (Appeals Court New York 2013). These two cases can serve as examples to other municipalities on how to form and write their ordinances and to ensure that they have a valid reason to do so or they will be invalidated. As drilling tries to expand in Pennsylvania and with the possibility of it

taking off in New York, “the response of the courts and the legislatures will likely add to the complex relationships involving governmental regulation and common law and statutory protections both for the industry and affected property owners” (Levine & Gallagher 2008:369).

Chapter 4

Politics and Trends

Elected officials have the power to form policy through the enactment of regulations and laws which can affect hydraulic fracturing activities and local communities. There are many motivations and reasons a politician has in forming their policy that can be either favorable or unfavorable to an industry as demonstrated in New York and Pennsylvania. However, there may also be a correlation to the amount of money a politician, such as a Governor, receives from lobbyists. For over 10 years now the natural gas industry has been lobbying politicians to prevent further regulation and oversight of hydraulic fracturing, spending $747 million in the process (Kaplan 2013). In addition to the $747 million, a report by The Common Cause also found that the industry paid $20 million in campaign donations to Congress members, two from Pennsylvania, Rep. Tim Murphy, and Sen. Pat Tooney whom received some of the highest amounts overall. Of the top 25 politicians who received the most contributions from the industry between 2001 to 2010, Republicans received the most at 84% totaling $2.2million with Democrats receiving a total of $428,000, most of which came after 2008 (Sourcewatch1 2010). Since a relationship may exist between politicians and oil and gas industry lobbyists, it is worthwhile to look at the recent political histories of New York and Pennsylvania (Kapalan 2013).

4.1 Pennsylvania Politics

In 2004 Pennsylvania allowed Halliburton to conduct its first experimental drilling using hydraulic fracturing to extract shale gas and since then, the oil and gas industry has been continuously supported by the majority of the state's politicians (Halliburton 2013). Since 2004, there have been two Governors presiding over Pennsylvania, Ed Rendell, Democrat from January 2003 thru January 2011 and Tom Corbett, Republican from January 2011 with his re-election campaign coming up in 2014 (Wikipedia 2013g). Rendell opened the state to hydraulic fracturing early on but he recognized the possibility of the "industrialization of public lands" from the rush to drill by the oil and gas companies prompting him to sign an executive order banning natural gas development on state forest land for preservation purposes (Zeller Jr. 2010:1). Later on, Rendell was

asked why he did not follow New York and place a larger moratorium on hydraulic fracturing in Pennsylvania and he responded by saying "…it doesn't matter what I think. The Legislature will never vote for a moratorium." because of the dominance of the Republicans in the Senate (Clark 2012:30). Rendell also failed to get support from the state legislature near the end of his term to pass a severance tax on hydraulic fracturing (Clark 2012).

Even though Governor Rendell initiated some policies to protect natural resources during his last term in 2008, the EPA called the contamination of water from the fracking wastewater disposal methods used in Pennsylvania at that time as "one of the largest failures in U.S. history to supply clean drinking water to the public" (New Yorkers against Fracking 2013:1). This failure in regulation and oversight on the treatment and release of contaminated wastewater into the Susquehanna River resulted in large populated areas, such as Pittsburgh, having to have to drink from water bottles (New Yorkers against Fracking 2013). This was because the water tested **"**3,609 times more radioactive than the federal limit and greater than 300 times more radioactive than a Nuclear Regulatory Commission limit" endangering people as far down as the Chesapeake Bay area where 6 million people get there drinking water (New Yorkers against Fracking 2013:1; Urbina 2011:2). When Governor Rendell left office, he encouraged the incoming Governor Corbett to try again to pass the severance tax and urged him to keep the moratorium on state forests in place.

Rendell was, and still is a lobbyist for the oil and gas industry and is currently a spokesperson for the drilling company Range Resources as well as a private investor in a firm that is invested in hydraulic fracturing services. Rendell still continues to use his political influence as demonstrated in 2011when he pressed the EPA to drop a lawsuit from investigating Range Resources over possible water contamination in Texas. After he spoke with the then head of the EPA, Lisa Jackson, the investigation was dropped (Soraghan 2013). In 2013, Rendell also wrote an opinion piece in the New York Daily News publicly urging Governor Cuomo of New York to open his State to hydraulic fracturing because of the economic benefits, which he said added 7 billion to Pennsylvania's GDP (Rendell 2013).

The successor to Rendell and the current Governor of Pennsylvania is Tom Corbett. It is reported that Governor Corbett had been receiving money from the oil and gas industry as early as 2001 and received more campaign funding than any other politician, approximately $360,000. Governor Corbett's Democratic competitor in comparison, Dan Onorato, had also received campaign funding from the industry but in the much lesser amount of $60,000 (Sourcewatch1 2010). In Pennsylvania lobbyists are legally allowed to be very influential in politics because there are no laws that limit the amount of money that can be contributed to campaigns (Sourcewatch1 2010). As a result, Corbett brought with him into the governor seat a total of 1.6 million from the gas industry raising questions as to where his loyalty lies. In response to those questioning his possible bias Governor Corbett said that ""had they not given me a dime, I would still be in this position, saying we need to grow jobs in Pennsylvania" by pushing forward with opening the state to hydraulic fracturing (Eshelman 2011:1).

Corbett did not waste time in passing policies that would facilitate the growth of the natural gas industry starting with overturning Rendell's moratorium on drilling in state owned lands as well as weakening overall environmental oversight (Piette 2012). Corbett made his plans for hydraulic fracturing even clearer when during the budget address of 2011 he stated "Let's make Pennsylvania the hub of this [drilling] boom. Just as the oil companies decided to headquarter in one of a dozen states with oil, let's make Pennsylvania the Texas of the natural gas boom" (State Impact 2013:1). Corbett has consistently defended his policies towards the oil and gas industry "as creating energy independence and economic prosperity" for Pennsylvania (Clark 2012:36).

Even if Corbett is for making Pennsylvania a hub of the natural gas boom in the name of energy independence and economic prosperity, it seems that he may not have meant opening the whole state to the impacts of hydraulic fracturing. While removing obstacles to drilling in most areas, he signed a six year moratorium on hydraulic fracturing in "the state's wealthiest counties" to protect them "from the direct impact of natural gas drilling" (Piette 2012:1). Even the uniform regulations written in Act 13 meant to fast tract drilling in residential and other sensitive areas was apparently also not meant to be applied, such as in Harrisburg the state capitol, as Sen. Chuck McIlhinney stated: "My colleagues in Harrisburg never intended for the Marcellus Shale law to affect

our region" (Piette 2012:1). Meanwhile, poorer districts continue to complain of the rise in industrial zones within their residential areas (Piette 2012).

In addition to the weakening of regulations on hydraulic fracturing, Corbett has also been criticized for not taxing the natural gas industry. However, when he did sign The Marcellus Shale Law (ACT 13) in 2012, it outlined the plan to collect impact fees from the oil and gas companies which are intended to go to the municipalities where drilling operations take place. As a result, in 2012 the impact fees pulled in $200 million dollars which is more than what would have been generated from the standard tax on the industry that Rendell wanted (Wikipedia 2013h: 1).

4.2 New York Politics

In New York, the State legislature made some key decisions about hydraulic fracturing that took New York on a different path than Pennsylvania. David Paterson became Governor of New York while serving as Lieutenant Governor under Elliot Spitzer, who was later forced to resign leaving Paterson the position until the next election. Under Governor Paterson in 2010, 30 Bills were introduced to create panels that would look into hydraulic fracturing and as a result, on Aug 3, 2010, "the New York State Senate passed S8129B, by a vote of 48-9, which prohibited drilling permits from being issued by the Department of Environmental Conservation (DEC) before an ongoing state environmental review of fracking had been finalized. The bill passed the Assembly by a vote of 93-43 on November 30, 2010" (Sourcewatch 2012:1).

However, Governor Paterson vetoed this bill and in its place he issued "an executive order banning permits for horizontal drilling, thereby leaving vertical wells free to operate under permit" because banning vertical drilling would eliminate jobs in those areas that had already been "… permitted by the Department of Environmental Conservation" (Clark 2012:27). Most importantly, before Paterson left office he also signed another executive order putting a moratorium in place for the whole state until July 1, 2011in order to ensure that the Environmental Impact Statement requested by the state legislature from the Department of Environmental Conservation would have enough time to be completed.

Governor Andrew Cuomo, who was elected in January of 2011, carried on with Governor Patterson's policy and let the July 1st deadline pass allowing the moratorium to continue because the Environmental Impact Statement still was not complete. Additionally, the Commissioner at the New York State Department of Environmental Conservation, (NYSDEC), Joseph Martens, also proposed to Governor Cuomo to wait for the EPA's study on fracking and water contamination in addition to the completion of the Environmental Impact Statement to make his decision on lifting the moratorium, which is expected to be complete in 2014 (Sourcewatch 2012).

The residents of New York have also loudly weighed in on whether or not to open the state to hydraulic fracturing and have used the information being reported from other states, such as Pennsylvania, to justify their cause. It is the information on hydraulic fracturing's impacts available through the media that have driven many New Yorkers to question the safety of the process which has resulted in the passage of bans and moratoria at the local level. The movement against hydraulic fracturing is said to be having an impact on Governor Cuomo and those close to him have expressed that he will most likely set a state policy that would give municipalities' the power to decide for themselves if they want to allow or ban hydraulic fracturing, but that he would sign an executive order designating some areas off limits (Hakim 2012).

Even though New York has a state wide moratorium in place, it does not mean that lobbyists are not at work there. New York politicians have received campaign contributions of about $2 million dollars between 2005 and 2010 with Chesapeake Energy being the top contributor (Sourcewatch 2012). However, without the Governor lifting the moratorium, companies like Chesapeake energy, who had secured leases on 13,000 acres, are getting tired of waiting and lobbying. Chesapeake eventually released those leases on September 9th 2013 saying that because of the length of time New York has been under a moratorium, a large number of lease owners wanted out and they were losing court battles with municipalities to get bans overturned (McAllister 2013).

4.3 The Ability to Extract Natural Gas and National Security

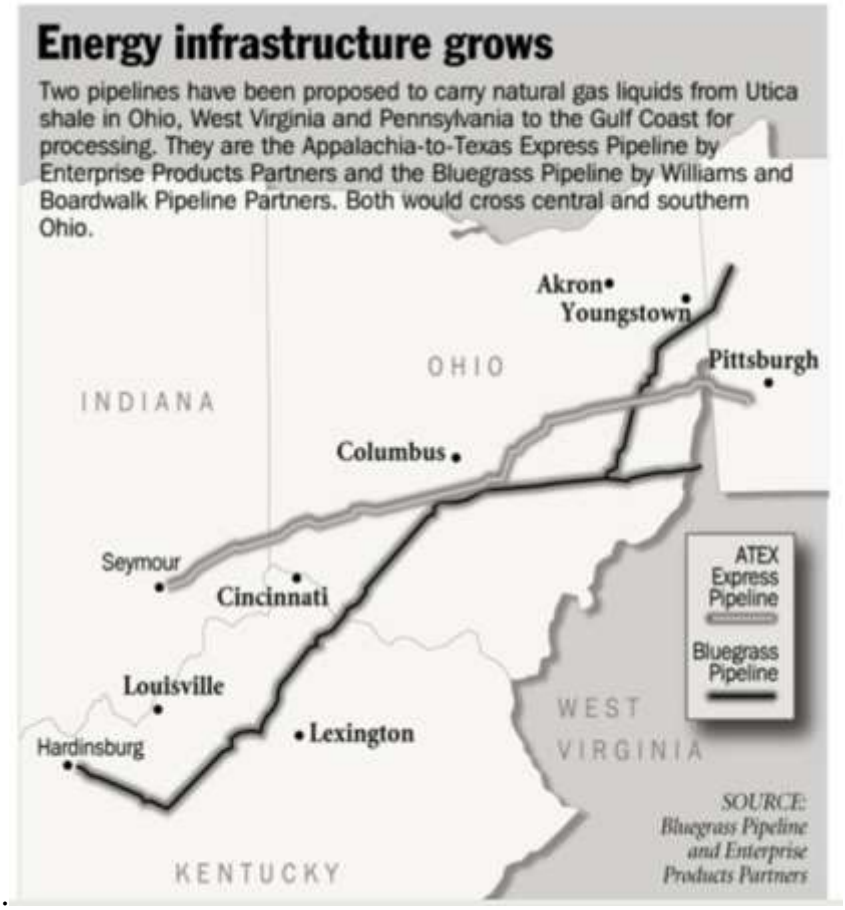
Another aspect of the economical frontier directly related to hydraulic fracturing that zoning can effect, is natural gas' export ability and its impacts on national security.

Some analysts feel within ten years we could be independent from relying on foreign energy sources achieving domestic stability from the technology of hydraulic fracturing and its ability to extract unconventional oil and gas. The selling of hydraulic fracturing to the American public in order to reach energy independence has now added energy security to the list. This is because American natural gas is now going to be brought to the world market where it will enhance the United States diplomatic capacity, as the director of the Peace-building and Human Rights program at Columbia University David L. Phillips articulated, by adding "tools to the US diplomatic toolbox" giving the US the freedom to draw lines that couldn't be drawn before (Fischer-Zernin 2013:1).

In March of this year (2013), the first pact was signed by the United States to export liquefied natural gas (LNG) to the British utility company Centrica PLC through Cheniere Energy based out of Louisiana. Enough LNG will be shipped to England, starting in 2018, to supply approximately 1.8 million homes with heat (Engel & Windrem 2013). Besides Chenier's deal, Exxon Mobil and Sempra Energy are also asking the United States government permission to "export as much as 29 billion cubic feet of natural gas a day" for the overseas market (Brinkerhoff 2013).

In order for Cheniere to export LNG, more infrastructure needs to be built such as the 1,153 mile pipeline already in the works to be used to transport natural gas from the Utica and Marcellus shale's reserves stored in Ohio. Two energy companies have already contracted to construct these pipelines, The Williams Company out of Oklahoma and the Boardwalk Pipeline Partners of Texas. These two companies will merge under the name The Bluegrass Pipeline LLC, and will work to connect the new pipelines to already existing ones in Kentucky. When all is said and done, the pipelines will provide "these two world-class resource plays [Utica and Marcellus shale's] with access to one of the largest and most dynamic petrochemical markets in the world" (Millett & Green 2013:4). However, the plans still have to be completed and permission will be needed from the public in acquiring "right of way acquisitions" to place the pipelines (Downing 2013; Millett & Green 2013:4).

Figure 18: Proposed Natural Gas Pipelines to Reach the Gulf Coast for LNG Processing - (Source: Downing 2013)



The key to understanding why the export of LNG is being sought after is directly related to its pricing system which is different than oil. Natural gas prices are dependent on the importers location because of the difficulty in transporting it to those markets which then varies in price, for example; gas prices "in Asia reached $15.63 mcf in December 2012, while spot prices in the U.S. were only $3.30. The spread was even wider earlier in 2012, when prices in Japan reached $17.59 while U.S. spot prices were below $2.60" (Cunningham 2013:3). This price differential between the American prices

and Asian prices is a huge motivator for the industry in wanting to export their surplus (Cunningham 2013).

However, even though the US is far ahead in natural gas extraction activity using hydraulic fracturing than most countries, this will not last and the spending of billions on LNG facilities may not pay off. Even if this moves forward and there is an economic benefit to the U.S., there are still environmental concerns in constructing and regulating the LNG facilities and infrastructure because the LNG conversion process "is energy-intensive to compress, transport, and decompress" and as a result, "the life-cycle greenhouse gas impact of gas shipped as LNG can be 20 percent greater than that of gas shipped through pipelines (Goho 2013).

This information is important because the expansion of hydraulic fracturing across shale basins would greatly increase in order to keep up with the demand of other markets. This brings up the issue of zoning since the impacts from the increased expansion will be felt locally and will prompt even stricter land use regulations from local communities. This could lead to the federal government applying national policies to counteract the interruption in production or an abolishment of home rule by some states therefore impacting local government's abilities to regulate their areas in order to protect the health, safety and welfare of the public and the environment.

4.4 The Trans Pacific Partnership (TPP)

The potential finalization of the Trans Pacific Partnership (TPP) is another important global economic/political development that can impact a local governments' ability to legally zone in the United States. Signatories to this partnership are allowed to sue other signatory partners over any laws they have that can inhibit an exchange of commodities they want. The United States and Japan are among the members joining or thinking of joining the TPP which is important to understand for the context of this paper. This is because Japan is the second largest importer of LNG in the world and is looking at the United States as a possible supplier. Under the guidelines of the TPP, if Japan wanted to import LNG from the United States we would have to oblige, even if it took

away from our own reserves, or we would be in violation of the TPP causing a legal dispute (Jones 2013).

If the United States finds itself in this situation and local zoning ordinances through bans, moratoria or restrictions decrease drilling capacity affecting export quantities, as a member to the TPP Japan would have the ability "to work around any legislation designed to curb U.S. LNG exports" (Jones 2013:1). This would mean that Japan can impact a local governments' ability to pass and enforce its ordinances, regardless of state court rulings, if it sued the U.S. for noncompliance to the TPP and won. This case would end up not in a US court but in secret arbitration resided by three judges with no appeals allowed to their decision (Smith 2013).

Japan would lawfully be within its right to do this because the signatory nations to TPP who have investments in the country in question are allowed to sue over any laws that inhibit an exchange of commodities. There are examples of this type of dynamic with NAFTA members who have been sued by other members because NAFTA has similar requirements as the TPP, for example: Canada was sued by Lone Pine Resources for allowing Quebec to set environmental limits on hydraulic fracturing in its province and was asking for $250million dollars as a result of lost revenue (Smith 2013). There have been 100s of other examples around the world according to Ilana Solomon, director of the Responsible Trade Program for the Sierra Club such as "Germany's decision to phase out nuclear power plants is being challenged by the Swedish company Vattenfall and Uruguay's move to add warning labels to cigarette packages has prompted a suit from Philip Morris" (Smith 2013:1).

The passage below is from leaked portions of the TPP, since it is confidential at this point, which explains that when a country signs to this pact they are agreeing to:

> … investor state provisions that would grant transnational corporations the power to challenge virtually any environmental law, regulation or court decision that negatively affects their expectation of profits as a "regulatory taking" through international tribunals that circumvent domestic judicial systems. Consumer safety rules, banking regulations and a host of other public interest policies would also be subject to attack" and the TPP would give "individual corporations the power to

challenge democratic policymaking through a tribunal system that takes precedent over domestic courts and legislatures. (Citizens Trade Campaign 2013a:1)

If the federal government had to curb regulations by states and local governments in order to not violate the TPP, they could use the commerce clause located in Article 1, Section 8, Clause 3 of the U.S. Constitution which "has historically been viewed as both a grant of congressional authority and as a restriction on states' powers to regulate" which "refers to the prohibition, implied in the Commerce Clause, against states passing legislation that discriminates against or excessively burdens interstate commerce" (Cornell University Law School 2013:1). This clause would allow the federal government to preempt states and therefore municipality laws in order to be compliant with the TPP. This is "Because trade agreements take precedent over U.S. laws at the federal, state and municipal level," and the Fast Track option of the TPP "enables an amazingly wide range of public interest policies to be rewritten without any of the typical public processes associated with democratic lawmaking" (Citizens Trade Campaign 2013b:1; Cornell University Law School 2013). Fast Tracking the TPP is therefore a concern and currently President Obama is trying to use it which he mentioned in his 2013 Trade Policy Agenda. (Citizens Trade Campaign 2013b:1).

4.5 Future Court Cases and Regulation

The Future of Court Cases

Because of the many complex issues attached with the growth of hydraulic fracturing, it is inevitable that there will be more court cases over zoning ordinances in New York and Pennsylvania (Goho 2012). The dilemma with which the oil and gas industry finds itself, the courts siding with zoning over land use regulations, may be here to stay because of the foundation of the rulings and interpretation of the mineral extraction suppression laws. This is an important factor because zonings is reshaping the regulation atmosphere and is pushing the industry to include local communities as a valid democratic governmental power (Fletcher 2012).

In another interesting development, the state of New York is currently in the process of being legally challenged on its moratorium from a pro drilling group called the Joint Landowners Coalition of New York. This group claims that "Gov. Andrew Cuomo

has been stalling the state's regulatory review process in an effort to keep the moratorium in place while he focuses on his 2014 re-election campaign" and therefore they are claiming that the moratorium is acting as "an illegal "taking" of private property under the Fifth and Fourteenth Amendments of the U.S. Constitution" (Booher 2014"1). The Joint Landowners Coalition of New York justifies its potential lawsuit because they feel since the moratorium is not allowing the oil and gas companies to move forward with hydraulic fracturing, it has resulted in a complete loss of economic value of their mineral rights (Booher 2014).

The Coalition can make an impact here even if proving a taking is going to be difficult. In the least, it could achieve an end to the state moratorium and if they succeed, what will stop the overturning of municipality bans and moratoria using the takings argument (Hinman, Howard & Kattell 2011)? This situation will generate new court cases within the hydraulic fracturing context in order to decide what would qualify as a taking requiring compensation. This next step makes sense since maturation of one issue, such as preemption, will then generate new "firsts" since no one seems to think that the oil and gas industry or local communities are going to back down anytime soon, but a large reference of prior cases will still exist (Marten Law 2013).

The Future of Regulation

The debate over regulating hydraulic fracturing is ongoing with different opinions on who should be making these decisions, the federal government or the states. Jody Freeman, professor of law at Harvard University and former counselor for energy and climate change at the White House, argues in favor of federal regulations because of the regional impact hydraulic fracturing has on water supplies and the "accidents" that can cross state lines raising national concerns. Freeman also feels that individual states have shown that they do not have the funding and the manpower to enforce regulations particularly states that are seeing mass drilling for the first time within their border which can be overwhelming. Freeman further points out that states such as Texas who have had years of experience dealing with hydraulic fracturing are still having a hard time regulating it because of the speed at which it is expanding (Wogan 2013).

David Spence, professor of law at The University of Texas at Austin argues that

states should keep their job as regulators of hydraulic fracturing. Spence does not agree with Freeman in that it is causing cross state issues except maybe with methane leaks but he points out the EPA is already addressing this. Spence argues that even though there have been problems in the past, states have done a good job adapting to them by making the necessary changes needed to continue to successfully regulate hydraulic fracturing. Most importantly, Spence discussed the different geography and geology that states have which requires different rules in regards to water disposal and drilling specifications that requires regulations to work with local communities and therefore, it is best left at the state level (Wogan 2013).

The views of Freeman and Spence when debating federal versus state regulations for hydraulic fracturing touch on the heart of the main arguments on both sides. If the federal government ever does decide to regulate hydraulic fracturing, local communities would lose their participation in defining the character of their community since "Local government is the most accessible of all governments, the most responsive to the popular will" versus someone in Washington, DC (Morris 2013:1). Also, if court cases on constitutional issues were brought to the US Supreme Court under federal authority, local communities would most likely not enjoy the same support as they have at the state level because "The U.S. Supreme Court has rarely come down on the side of local authority" and feel municipalities "are created as convenient agencies for exercising such of the governmental powers of the State as may be entrusted to them in its absolute discretion" (Morris 2013:1)

However, since the states are currently in charge of regulating hydraulic fracturing the debate needs to be focused on local communities' v the states which the courts in New York and Pennsylvania are defining. The *Robinson Township, et al.v The Commonwealth of Pennsylvania, Pennsylvania Public Utility Commission (Commission)* case and the Joint Landowners Coalition of New York v The State of New York's potential case are doing just that (Morris 2013).

Private land owners are also starting to get creative and educated with land use options in order to use them to protect their properties from the effects of hydraulic fracturing. One land owner in Pennsylvania, Dr. J Stephen Cleghorn, has fought to preserve his certified organic farm by creating a conservation easement on his private

property (Kawaguchi, 2013:1). A conservation easement "is a legal agreement between a landowner and a land trust or government agency that permanently limits uses of the land in order to protect its conservation values. It allows landowners to continue to own and use their land, and they can also sell it or pass it on to heirs." (Land Trust Alliance 2014:1). The conservation easement that Dr. Cleghorn filed in Jefferson County Pennsylvania was created to recognize "the rights of nature" to justify the banning of "activities that would do systemic harm to the ecosystem both above and deep below the surface of his farm" (Kawaguchi, 2013:1).

Dr. Cleghorn partnered with the Community Environmental Legal Defense Fund, or CELDF, a nonprofit public interest law firm, to help him come up with ideas that would put legal barriers in place to confront hydraulic fracturing. Ben Price, Projects Director for the CELDF, commented that using this type of conservation easement will be just "one of a number of prongs in an effort to protect nature from being used simply as property and a commodity" (Kawaguchi, 2013:1). However, Dr. Cleghorn realizes that he could lose value on his property because of the restrictions easements have, but since the subsurface rights were already leased to a drilling company when he bought the property, he feels it is worth it. On November 14th, 2012 Dr. Cleghorn filed his conservation easement and is waiting to see if the company who holds the mineral lease will challenge it in court, if so the CELDF has offered to represent Dr. Cleghorn (Kawaguchi, 2013).

4.6 Analysis of Current Trends in New York and Pennsylvania

It seems that hydraulic fracturing is certain to continue into the future until the point shale gas is depleted or no longer a viable option. The financial motivations from influential stake holders to extract as much natural gas as possible using hydraulic fracturing, a water intensive chemical laden high impact land use, have influenced the regulatory environment in a way that has broken the trust of citizens in New York and Pennsylvania for it to do its job. Without the trust in the regulatory system, together with the impacts already felt at the local level, the case for municipalities to use their zoning powers in order to protect their short term and long term interests from the hydraulic fracturing process has been made.

Courts have ruled in both New York and Pennsylvania to uphold a municipality's constitutional right to regulate land use through their home rule powers without being preempted by state laws. This affirms that when the Oil and Gas Act in Pennsylvania and the OGSML in New York were written, their preemption clauses were not intended to preempt local governments from making land use decisions nor were they written to insure that every ounce of natural gas be extracted. In response to the courts interpretations of the Oil and Gas Act in the State of Pennsylvania, the pro drilling State Legislature and Governor responded by restructuring it and passing ACT 13 in its place which intended to bypass zonings ability to regulate land use specifically for hydraulic fracturing, but was ruled unconstitutional. The overruling of ACT 13's sections on zoning restored the ability of local communities to continue to decide the safest place hydraulic fracturing can take place.

What will the state do next in order to appease oil and gas companies and continue to host profitable drilling operations un impeded by local laws? It can either work with local governmental authority to regulate and respect public welfare or it could away with its incorporation of municipalities abolishing home rule, which the state has the power to do, making them merely an appendage but this is most unlikely (Morris 2013).

In New York, the Oil Gas and Solutions Mining Law and the Mineral Land and Reclamation Laws Environmental Conservation Law clauses were also interpreted to not preempt a municipality's ability to regulate land use and this allowed for the continued passing of bans and moratoria on hydraulic fracturing. On the flip side, land owners in New York who want hydraulic fracturing have had to resort to suing the state for not being pro drilling enough by using the takings clause. If Governor Cuomo allows the permitting of hydraulic fracturing, there most likely will be a new wave of cases generated by the oil and gas industry in order to overturn existing bans and moratoriums. Since Governor Cuomo has not decided on hydraulic fracturing in New York, this is a wait and see situation for New York but Pennsylvania has served as an example to what can happen in a pro drilling state. Furthermore, fortunately or unfortunately depending on your view, both New York and Pennsylvania could have different landscapes in their hydraulic fracturing future that will be determined by elections in 2014.

A pattern was therefore established by the court's rulings in both New York and Pennsylvania when ordinances passed by local governments were challenged. In Pennsylvania, cases that defined *where* hydraulic fracturing can take place were upheld unless the ordinances were deemed too comprehensive or came too close to conflicting with state regulations and therefore they would be invalidated (Goho 2012). The courts even upheld the use of zoning when the Commonwealth of Pennsylvania challenged its own local governments home rule powers by passing ACT 13. On appeal, the Supreme Court justices upheld the lower court ruling and added that the provisions in ACT 13 prevented zoning from protecting the health, safety and welfare of its community by making them violate their own comprehensive plans and violated the Environmental Rights Act.

In New York, not only were moratoria upheld but so were bans since the permitting of hydraulic fracturing has not yet begun. The exception to New York's case law came with the striking down of the Town of Binghamton's moratorium in *Jeffrey v Ryan* because the court failed to see the need for a halt of an activity that had not yet begun. It will be interesting to see how local governments and the courts adjust their actions from the *Jeffrey v Ryan* precedent and if it will have any bearing on future challenges to moratoria in New York.

Through the comparative analysis of New York and Pennsylvania, important parallels were discovered between both states even with their different situations:

- Both states have given the option of home rule to their municipalities.
- Local community sentiment and its desire to regulate hydraulic fracturing in order to protect the public and the environment in both states confirmed zoning as an appropriate tool.
- The courts in New York and Pennsylvania also confirmed that local governments have a legal core municipal function to regulate land use in regards to mineral extraction activities through its exclusion as an incompatible use that is not pre-emptible by state mineral extraction laws.

Therefore, within this context, New Yorkers and Pennsylvanians through their zoning powers have legal solutions to regulate and mitigate impacts from hydraulic fracturing at the local scale (Blaikie & Demchack 2010).

Chapter 5

Conclusion

I have come to the conclusion that in the absence of federal regulations, states have a hard time in properly and honestly regulating the large, wealthy and influential industry that oil and gas has become, because of the invention of hydraulic fracturing using horizontal drilling and the discovery of shale gas. The qualitative methodology revealed through the literature review the problematic situations hydraulic fracturing has created at the local level and the resistance municipalities have faced from the oil and gas companies when using their zoning powers to regulate where hydraulic fracturing can take place. To substantiate the situations that confirmed zonings importance, the process of hydraulic fracturing (a high impact, chemically laced water intensive process) was explained and the repercussions from its use highlighted. Furthermore, the adverse effects experienced from hydraulic fracturing at the local level were downplayed and denied by the oil and gas companies who are enabled by the absence of conclusive scientific evidence of culpability that they have enjoyed under the current regulatory framework. It was therefore not surprising that local communities chose to use zoning to regulate hydraulic fracturing under these circumstances.

The questions raised in regards to the safety of hydraulic fracturing opened the scrutiny into its regulatory framework in order to understand which government entity was accountable for protecting public welfare and why they weren't doing a better job. When the regulatory framework was inspected, it exposed its exemption from federal oversight, further deregulation and lack of structure, funds and manpower at the state level which resulted in adverse impacts at the local level, as demonstrated in Pennsylvania. The deregulation of hydraulic fracturing, as lobbied by the oil and gas companies to willing politicians, is profit motivated and not public welfare motivated and this is the reason local communities needed to use their zonings regulatory powers because of its inherent ability to try and balance an economic activity with the health, safety and well-being of a community through the use of its land use regulations.

In addition to using existing literature, Regulatory Theory was also applied to test the outcome from the literature review. Regulatory Theory asserts that private capitalist entities are for profit and should therefore be regulated by legal governmental bodies.

This is theorized to preserve capitalism because the Marxist philosophy on capitalism, which Regulatory Theory expanded on, asserts that without regulations from the state, the people will revolt and threaten the capitalist system. More to the point, the environment of deregulation that the oil and gas industry favors that does not include public welfare, has initiated a response by society where ethical and moral questions are being raised leading to an uprising in order to exclude hydraulic fracturing. Regulatory Theory then further expands this thought and adds the welfarist concept to the capitalist cost benefit equation in order to balance the crisis at the local level in this case. Welfarism inserts the consideration of the health and welfare of humans, animals and the environment when implementing regulations, the same as zoning, which is why zoning was deemed as an appropriate reaction to the regulatory crisis that exists within the context of this paper. Regulatory Theory has then justified zoning, as the courts did within the literature review, to factor in a moral evaluation for communities so that hydraulic fracturing can continue to satisfy the market while working within local government regulations.

The case comparison of New York and Pennsylvania confirmed the predicted outcome of market failure as Regulatory Theory discusses when there are limited government regulations. In New York, this has led to a complete market failure (so far) in that hydraulic fracturing is under a state wide moratorium until the New York Department of Environmental Conservation finishes its assessment on the process with a new set of strict regulations in its Environmental Impact Statement. When this is complete and if drill permits are allowed, many areas may still be off limits since municipalities have already placed bans on hydraulic fracturing using their home rule powers due to still unresolved concerns.

In Pennsylvania, the pro- drilling governor and state legislature tried to appease the oil and gas companies by fulfilling their requests for weak uniform state laws over hydraulic fracturing in order to exempt the process from local laws. When the Oil and Gas Act was rewritten into ACT 13 to do just that, it succeeded in giving the industry the right to drill anywhere regardless of how it was zoned. When municipalities took the state to court over these provisions, the State of Pennsylvania's Supreme Court gave the best example of recognizing the importance of zonings welfarist concepts when it ruled that these portions of ACT 13 were unconstitutional because:

> Rather, at its core, this dispute centers upon an asserted vindication of citizens' rights to quality of life on their properties and in their hometowns, insofar as Act 13 threatens degradation of air and water, and of natural, scenic and esthetic values of the environment, with attendant effects on health, safety and the owners' continued enjoyment of their private property.
> (Valentine 2013:1)

Therefore, when the State of Pennsylvania and the oil and gas industry worked together to bypass zoning and its ability to regulate an industrial activity, they failed and now have to work around land use regulations even if it limits production.

Zoning, whose history and purpose has given it the legitimacy as a legal regulatory tool to be used for the greater welfare of all, I feel, was underestimated by the oil and gas industry. This is because the oil and gas lobbyists have been able to successfully influence politicians and policy makers since "political actors at all levels often aim to maximize their own self-interest, rather than the public interest, in their public decision-making", but it was the local element that they could not deter (Balleisen, Moss 2009:3). Therefore, a local government's use of zoning to protect its community from the impacts of hydraulic fracturing was proven to be an appropriate legal response, supported by Regulatory Theory, to the situations as they exist within the context of this paper.

There are other areas that are connected to this research that I would have liked to have included and expanded on, such as: natural gas' impact on suppressing alternative energies and how local communities in New York and Pennsylvania would use their zoning powers in response to alternative energy infrastructure compared to how they have tended to use it with hydraulic fracturing, NIMBY (Not In My Back Yard) attitude and whether zoning is being used to support this mind frame in regards to hydraulic fracturing, the expansion of the political aspects in order to understand the federal government's reason for exempting hydraulic fracturing from its regulatory authority and lastly an expansion on the debate of federal v state regulations and which is best for local communities. However, the court cases and the other sections of this paper were the main focus in order to stay on topic.

Further Research Opportunities

There are plenty of avenues for continued research particularly since there are still unanswered questions and unknowns. One relevant area is the gathering of as much data as possible on hydraulic fracturing using a geographic information system (GIS). Scientists are trying to collect comprehensive data on hydraulic fracturing in order to create a transparency of information and to assess its safety. The creation of a nationally shared hydraulic fracturing geodatabase where local and state governments, researchers, scientists, geologists and environmental agencies could contribute information that would be open to the public to be used in predicting and curbing long term consequences through the reporting and modeling of hydraulic fracturing activities and its impacts. Additionally, I think it would be beneficial to research the encroachment of hydraulic fracturing within urban and suburban areas throughout hydraulic fracturing's lifecycle to see how effective zoning is in mitigating its impacts. Also, the research into a shared regulatory system over industries such as hydraulic fracturing in order to be able to agree on who regulates what the best based between the federal government, the states and the local governments. This leads into another topic, is zoning going to be enough against capitalism, globalization and will it last under the current trend of deregulation? Lastly, an in-depth look in the future on how local governments have fared throughout this process and to see what type of regulatory framework was formed and what lessons have been learned. Therefore, I am confident that the information and circumstances represented in this paper, and the information still to come, will further open the debate to other economic and social reforms in future discussions on hydraulic fracturing as well as how much zoning played a role within them.

Limitations

There are limitations to this paper which are important to point out: First, my own anti hydraulic fracturing bias and the fact that I do live in New York could have influenced the literature that I chose and how it was structured, thereby possibly skewing the outcome. Second, because of the lack of comprehensive and conclusive scientific studies in determining whether or not hydraulic fracturing is safe, a lot of information cited came from news outlets and environmental groups which tended to be emotional

and anti-fracking which could have also added a bias. Third, using the qualitative paradigm possibly limited the scope since I did not include quantitative data that could have supported, or not, a lot of the underlying material influencing the conclusion. Lastly, the fact that New York has not given its decision on whether to permit hydraulic fracturing limited its contribution in its comparison with Pennsylvania, even though this added its own dynamic, and another state might have been a better choice. However, when New York does release its decision, the circumstances it generates can be used for future research.

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