THESIS

FRACKING POLITICS: A CASE STUDY OF POLICY IN NEW YORK AND PENNSYLVANIA FROM 2008-2011

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ABSTRACT

FRACKING POLITICS: A CASE STUDY OF POLICY IN NEW YORK AND PENNSYLVANIA FROM 2008-2011

This paper focuses on the politics of regulating natural gas hydraulic fracturing (fracking) in New York and Pennsylvania from 2008 to 2011and how policy has changed in each state during this time. By applying Kingdon's multiple streams model as a tool, this paper finds four major influences on the stringency of fracking in New York and Pennsylvania. First, is increased negative news reporting, which results in the problem being seen as more significant than previously believed and contributing to a change in policy stringency. Second, the presence of focusing events increases the likelihood of a change in policy stringency. Third, policy entrepreneurs exert influence over policy stringency. Fourth, when Republicans are in control, they seek less stringent fracking regulation while Democrats work for more stringent fracking regulation. Finally this paper observes that when the aforementioned streams converge and a window of opportunity opens there is significant policy stringency change in both New York and Pennsylvania.

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Introduction

The United States now has over three hundred million people living within its borders. Over half of the homes occupied by these people are heated with natural gas.[1] In addition, natural gas is used in a variety of other domestic and industrial applications. Because of this, natural gas is a valuable commodity and any methods that allow an increase in its production are likely to be pursued. A method of natural gas extraction called hydraulic fracturing has recently come to the forefront as a way to increase natural gas production in the United States. Hydraulic fracturing, or "fracking," is not a drilling method but an extraction method for retrieving natural gas from deep shale formations. After drilling thousands of feet downward and thousands of feet horizontally, a cocktail of water, sand and chemicals is injected into the well bore at high pressures to break up shale formations and release the gas trapped within them. This method thus allows for the extraction of natural gas in shale formations where extraction was not previously feasible. Although fracking is seen as a boon by the natural gas industry and citizens excited for cheap and plentiful natural gas, others, mainly environmentalists and concerned citizens, are worried about the environmental impacts of fracking. These impacts are now being evaluated, because of the technique's relatively uncommon use until a few years ago.

This study focuses on the regulation of fracking in the states of New York and Pennsylvania. Both states contain major portions of the Marcellus shale formation, a basin that contains hydrocarbons trapped within layered pockets of rock thousands of feet below the surface of the earth. This shale formation is the largest geographically in the country, with portions extending to six different states, but the bulk of the formation being in New York and Pennsylvania. But both states have taken surprisingly different courses in the way in which they

[1]U.S. Energy Information Administration. "Natural Gas Year In Review 2009" retrieved: May 3, 2011, http://www.eia.gov/pub/oil_gas/natural_gas/feature_articles/2010/ngyir2009/ngyir2009.html

have regulated hydraulic fracturing. The purpose of this study is to examine those differences and determine the reasons for them.

First, I will give an overview of the issue of hydraulic fracturing. Second, I will explain how I will use John Kingdon's multiple streams model to guide my research. Third, I will discuss Bennett and George's congruence case study method which guides my research and my expectations for my results. Fourth, I will use Kingdon's multiple stream model to analyze case studies in New York and Pennsylvania. Finally, I will discuss how well Kingdon's policy worked and identify ideas for future research.

Issue Overview

Natural gas usage has experienced an era of maturation. For sometime, the energy industry focused on oil and in many cases, natural gas was simply burned up at sites where the two energy sources were found together. Natural gas requires a transportation system through a pipeline from the extraction site to processing centers and finally to the consumer. This has made natural gas's rise much slower than other forms of fossil fuel production due to the necessity of proximity to markets and complexity of distribution. Natural gas has important advantages, however. Natural gas burns much cleaner than petroleum fuel or coal, and it is found in relative abundance in a great many of the lower 48 states. Due to its economic benefits the local, abundant nature of natural gas has led states to promote and facilitate its production rather than regulate it.[2] Many of these industry friendly relationships have continued even as natural gas extraction has encountered increasing negative environmental impacts.

[2]Davis, Charles. 2011. "The Politics of "Fracking": Regulating Natural Gas Drilling Practices in Colorado and Texas." Western Political Science Association Conference Paper.

The most prominent technical advance in natural gas extraction is hydraulic fracturing. Hydraulic fracturing is a technique for extracting natural gas from shale formations deep beneath the surface of the earth. Although this technique has been around for half a century, advances in technology, such as combined horizontal drilling and fracturing, and increases in fuel prices have made the practice more economically feasible in the past decade and production has substantially increased since 2008.[3] Because of its relatively limited use in the past, fracturing has not generated enough problems to receive scrutiny from environmentalists or regulators.

The increase in fracking since 2008 is seen by some as one of the answers to the question of how to meet America's ever increasing demand for domestically produced energy. The U.S. Energy Information Administration estimates that the United States holds as much as 2 quadrillion cubic feet of recoverable natural gas.[4] Sixty percent of this energy is in stores such as shale, coal beds, and tight sands that cannot be reached through conventional vertical drilling.[5] In 2010, 63 billion cubic meters of gas was extracted through shale and it is projected that number will increase to 340 by 2035.[6] At that time, hydraulic fracturing will account for half of all natural gas production in the United States.[7] These estimates help advocates promote fracking as important for the future of U.S. energy independence.[8]

Hydraulic fracturing may also contribute to job creation. The President of the American Petroleum Institute claimed that Marcellus Shale drilling has created 57,000 jobs in Pennsylvania

[3]Jackson RB, B Rainey Pearson, SG Osborn, NR Warner, A Vengosh. 2011. "Research and Policy Recommendations for Hydraulic Fracturing and Shale gas Extraction." *Center on Global Change*, Duke University, Durham, NC.
[4] U.S. Energy Information Administration. "Natural Gas Year In Review 2009." retrieved: May 3, 2011, http://www.eia.gov/pub/oil_gas/natural_gas/feature_articles/2010/ngyir2009/ngyir2009.html
[5]Jackson et. Al, 2.
[6]Jackson et. Al, 2.
[7]Jackson et. Al, 2.
[8]Jackson et. Al, 2.

and West Virginia alone.[9] The industry argues that additional regulation of the practice would hurt profits and lead to less development and consequently, fewer related jobs.[10] These assertions carry great weight in tough economic times, such as the slow recession recovery faced by the United States at the time of this writing. This could be a deterrent to regulation.

The environmental merits and demerits of natural gas production through fracking are currently under scrutiny. Natural gas is a cleaner burning alternative to oil or coal but this benefit could be outweighed by an environmentally questionable extraction process.

In the fracking process, millions of gallons of water laced with chemicals are pumped through a well bore past ground water and into the depths of the earth. The well bore is encased in cement so that the fracking cocktail is contained and does not leach out into groundwater sources. Gas companies claim these casings are quite sturdy and cannot be compromised since they must be able to withstand incredible pressures from fracking itself. Yet environmentalists have pointed to contamination of wells around drill sites as evidence that groundwater can be contaminated by fracking.[11] Fracking proponents argue that migration of fluids upward after being pumped into the shale does not occur due to that fact that thousands of feet of rock and sediment divide the shale from the groundwater.[12]

The cocktail used in hydraulic fracturing is approximately 99% water and sand; the remaining 1% of additives is a mixture of ingredients. Benzene and diesel are harmful chemicals found in fracking fluids and have drawn environmentalist's attention. The chemicals added in hydraulic fracturing have been concealed by the natural gas industry.[13] Industry supporters argue

[9]Associated Press. 2011. "API president pushes for domestic drilling to create jobs" *AP/Washington Post* (Mar. 25).
[10]Associated Press.
[11]Soraghan, Mike. 2011. "Groundtruthing 'Gasland'" *E&E Greenwire* (Feb. 24).
[12]Soraghan.
[13]Baca, Marie. 2010. "2 companies ask for fracking chemicals to remain trade secrets" *ProPublica* (Nov. 2).

these ingredients are proprietary secrets and going public could hurt advantages that one company has over another.[14] Environmentalists argue that the disclosure of these chemicals is seen as a first step to be taken in better regulation of fracking. In many gas producing states, such as Wyoming, disclosure is now mandatory, but the secrets remain with regulators and are not released to the public. In this way, energy friendly states like Wyoming have created more clarity for regulators and less risk for industry by not making the proprietary contents of the fluid available for competitors to copy. Other states, such as Colorado, have followed suit and implemented similar regulations for disclosure of fracturing chemicals.

In addition to the concerns over the content of fracking fluids, the act of horizontal drilling coupled with fracking causes environmental stress as well. Literally a thousand truckloads of water and equipment are brought to each drilling site in order to complete a well.[15] The trucks usually travel to well sites on haphazardly built dirt roads that cut for miles into remote areas.[16] The dust, emissions and noise pollution add another negative incentive for hydraulic fracturing. The industry argues, on the other hand, that well sites produce natural gas for years once the fracking itself is completed. In addition, because of horizontal drilling technology, well bores can be re-fracked in other directions from the same pad. This cuts down on the number of drill pad sites that are needed in comparison to traditional vertical wells.[17]

As previously mentioned, the practice of hydraulic fracturing has been around for decades, but in the past three years its use as a means of gas production has increased significantly. The regulation of this practice has been handled traditionally by the individual states, which used the same regulations to regulate fracking as traditional gas extraction

[14]Baca.
[15]Soraghan, Mike. 2011. "Groundtruthing 'Gasland'" *E&E Greenwire* (02/24/2011).
[16]Soraghan.
[17]Soraghan.

practices. At the national level regulation of fracking has fluctuated over the years. Under the 1974 Safe Drinking Water Act, the Environmental Protection Agency established criteria for regulating and permitting underground injections through its underground injection control program, yet hydraulic fracturing remained free of EPA jurisdiction.[18] Until 1994, the EPA's reasoning was that the principle function of the well was not to inject fluids but to extract oil and gas. The fracturing is a relatively short process, amounting to only hours compared to the months or years of gas production from the fracked well. Therefore, it was exempt from most underground injection controls.

In 1994, a case from Alabama reached the eleventh circuit court of appeals and re-evaluated the EPA's position on the whole process. The court's decision led to the inclusion of fracked wells in Class II permitting requirements with some pragmatic modifications to rules specific to fracking.[19] Class II wells are those in which injection of some sort is used for fossil fuel extraction. According to the EPA, wells must meet minimum requirements for the treatment of brine and other returning fluids, such as re-injection. In addition, a certain level of record keeping is also required under Class II permitting.[20] Subsequent lawsuits put pressure on the EPA to put fracking under full Class II regulation. These decisions and rulings are called *LEAF I* and *LEAF II* and the EPA, under the Bush administration, resisted further regulation until the passage of the Energy Policy Act of 2005 which overturned the *LEAF I* and *LEAF II* decisions with its controversial "Halliburton loophole."[21] The "Halliburton loophole" was an amendment added to the Energy Policy Act of 2005, at the request of then Vice President Dick Cheney, the

[18]Independent Petroleum Association of America v. United States Environmental Protection Agency, United States Circuit Court of Appeals for the District of Columbia Circuit No. 10-1233 (LexisNexis 2010).
[19]IPAA v. EPA, 4.
[20]EPA website retrieved 3/3/2012 available at: http://water.epa.gov/type/groundwater/uic/class2/index.cfm
[21]IPAA v. EPA, 8.

former CEO of Halliburton, which exempted hydraulic fracturing from regulation by the EPA unless diesel was used in the injection chemicals.

As hydraulic fracturing has become more popular, public attention has been drawn to it. The EPA, under the leadership of Obama appointees, has begun to turn its eyes toward fracking again. These actions began with a study of fracking that should be completed by next year. This study will guide future regulation of the process. But until then, fracking is almost an entirely state controlled practice with diesel use as the only exception.

The problems created or solved by hydraulic fracturing have been defined differently by the various actors involved. For Pennsylvania, the problems or the benefits of fracking were essentially unknown four years ago, mostly because the Marcellus shale formation was too costly and difficult to tap before 2008. "When we got started, the Marcellus was not on anyone's radar," said, Joe Holsen one of the early engineers of the Marcellus shale wells.[22] The first fracked Marcellus shale well was announced in Dec. of 2007 and produced an incredible 3 million cubic feet per day at a time when oil was rocketing over 100 dollars a barrel and natural gas prices were surging along with it.[23] The following year, 4000 wells were drilled in Pennsylvania making it second only to Texas as the largest gas producing state.[24]

My study focuses on fracking regulation in New York and Pennsylvania from 2008 to 2011 and how policy has changed in each state during this time period. These variations are the primary concern of my research and will be discussed in the body of my argument.

[22]Howell, Katie. 2008. "Appalachian fields awaken as companies tap vast, deep reservoir" *E&E Greenwire* (May 5).
[23]Howell.
[24]Sapien, Joaquin. 2009. "Fracturing wastewater presents challenge for Pa. Rivers" *ProPublica* (10/03/2009).

Theoretical components/ Literature Review

Since the policy process is difficult to follow and incredibly multifaceted, a model that can deal with such complexity is essential to having a useful study. The process of creating regulations and policies at all levels of the U.S.'s federal system are difficult to follow and even a fairly transparent legislative process does not reveal all pertinent details at first glance. Kingdon's model helps illuminate the process surrounding fracking regulation in the following ways.

One useful aspect of Kingdon's model is that it was developed with the U.S. governmental system in mind and can be applied to both the national and state governments. Kingdon's model posits three types of policy processes; the problem stream, the policy stream, and the politics stream. Each stream is made of a myriad of factors. The problem stream addresses how problems are recognized and how some conditions are defined as problems; the policy stream looks at the policy making community and traces their actions toward policy creation; and the politics stream focuses on variables such as swings in national mood, variations in public opinion, election results, and changes in administration.

One of the purposes of government is to deal with problems. Individuals or interest groups do not possess the power or resources to deal with some of the major issues created by a group of three hundred million people living together in a modern industrialized nation. In addition industry rarely wants to risk its profits to take steps to solve environmental issues without external motivation, so often government intervention is necessary to help solve these problems. Since so many issues exist in the fracking arena it would be useful to look at how certain conditions are defined as problems and which of these problems become priorities for

regulators and policy makers. This is where the first stream of Kingdon's theory is the concerned.

The second stream of Kingdon's model is the policy stream. This stream centers on groups searching for a solution based on what they think is the cause of the particular problem. Because each group comes at the problem from different perspectives as to what constitutes a problem or how to properly solve it, a wide variety of different policy solutions are created. The policy stream also includes a "primeval soup"[25] of factors such as feasibility, value acceptability, and potential for integration into the current system. Technical feasibility must also be considered in order to survive the rigor of political scrutiny at the hands of opposition, media and the public. Value acceptability has to do with the ideas ability to be utilized by participants in the policy stream as compatible with current values. I will identify policy entrepreneurs, within the policy stream. These actors advocate for specific problem definitions and solutions. They can be found both inside and outside of government.

Third is the political stream. This stream looks at things like changes in national mood, legislative and executive turnover through elections, and interest group influence. This stream plays a prominent role in my research due to the drastic changes which have occurred from 2008 through 2011. National mood is an important factor in the political stream but it can be difficult to measure. National mood can actually affect legislation. What exactly is it? How does one find out what it is? Can three hundred million people actually be in the same political mood? Kingdon attempts to answer these questions by characterizing national mood as something that politicians and bureaucrats frequently discuss and reference in communications and speeches as if it is as real and significant as economic measurements or budget numbers.

[25]Kingdon, John. (2003). *Agendas, Alternatives, and Public Policies*, 2nd ed. New York: Longman.

Another important factor in the political stream is the policy entrepreneur. While all the components of the policy stream are fundamental, policy entrepreneurs are the conduit for action. Because of this I will focus on these entrepreneurs in this study. Policy entrepreneurs advocate ideas that can be found both inside and outside of government. Their defining characteristic, according to Kingdon, "is their willingness to invest their resources-time, energy, reputation, and sometimes money-in the hope of a future venture."[26] Policy entrepreneurs are not just politicians, although many are. They can come from bureaucracies, research communities, interest groups, or the public. Their motives are varied and complex, and many times incentives can be both obvious and vague. Regardless of their origins or their motivations, all entrepreneurs promote solutions to problems. Kingdon identifies three motives that help explain why policy entrepreneurs do what they do. The first is promotion of self-interest. For example bureaucrats might want to keep their jobs, expand their agency and promote their personal career. Politicians may desire to reap electoral benefits by claiming credit and publicity for supporting popular causes and legislation. Whatever the specific reason, a great deal of motives can be traced to personal gain.[27]

The second motivation Kingdon identifies in entrepreneurs advocating certain acts is to promote their values and shape public policy. Individually, an entrepreneur could be seen as reaping personal reward for their advocacy, but in the long run it is an established and common desire for ideological success over personal success that sets policy entrepreneurs apart.

The final motive of some entrepreneurs originate is what Kingdon calls "policy groupies." These participants do not have specific incentives but simply enjoy the political game. According to Kingdon, they "enjoy advocacy, they enjoy being at or near the seat of power, they

[26]Kingdon, 122.
[27]Kingdon, 122.

enjoy being a part of the action."[28] Regardless of the seeming frivolity of their motivation, these types of policy entrepreneurs can still be influential, hard workers who can affect the policy stream.

After looking at Kingdon's motives for policy entrepreneurship, I will also look at the four elements that Mintrom and Norman identify as central to entrepreneurial success.[29] Mintrom and Norman follow Kingdon's lead but also go into more detail on what an effective entrepreneur might look like. The four elements they identify are: displaying social acuity, defining problems, building teams, and leading by example. Social acuity is an entrepreneur's ability to make use of policy networks and understand the ideas, motivations and concerns of others in their policy context and then respond effectively.[30] Second, problem definition pertains to entrepreneurs' ability to pay attention to problem definition and then reiterate it to others in a poignant manner.[31] Third, team building consists of an entrepreneur's ability to organize close knit groups of like-minded experts who bring a diverse skill-set to address the issue.[32] Finally, when entrepreneurs lead by example they turn their ideas into actions.[33]

Finally, policy windows are the times when an opportunity is available for entrepreneurs to take action and implement plans for policy and legislation. These opportunities can be obvious and expected or they can be a surprise. Entrepreneurs cannot be caught flat-footed when these windows open; therefore effective entrepreneurs prepare ahead of time for these chances. These

[28]Kingdon, 123.
[29]Mintrom, Michael and Norman, Phillipa. 2009. "Policy Entrepreneurship and Policy Change." *The Policy Studies Journal, Vol. 37, No. 4*. 652.
[30]Mintrom and Norman, 652.
[31]Mintrom and Norman, 652.
[32]Mintrom and Norman, 653.
[33]Mintrom and Norman, 653.

policy windows are important to examine because they help explain the constraints, advantages, and unpredictability that entrepreneurs face when all the streams converge.[34]

Methods

Variables

Change in regulatory stringency in hydraulic fracturing policy and regulation at the state level in Pennsylvania and New York State is the dependent variable in this study. This variable is operationalized as changes in stringency in fracking policy in NY and PA from 2008-2011. One of the indicators of increased stringency will be changes in permitting processes. This is

See Table 1

operationalized as changes in difficulty or time it takes to acquire permits. Whether permitting remained in the same agency is another indicator? The second indicator will be ending or enacting specific bans or moratoriums. Bans and moratoriums have substantial impacts in that they can completely stop fracking in certain places or situations. Another indication of variation in stringency is whether extraction taxes have been levied. Enforcement of regulations is another important indicator of policy stringency. Actions taken by the states environmental regulatory agency compared to recorded violations for that particular year are another indicator. Most notable will be the changes that took place in Pennsylvania after the change in government from a Democrat-dominated to a Republican-dominated, legislature and governor.

Independent variables also are derived from Kingdon's streams model. Indicators of the problem stream include: focusing events and increase in negative news coverage. Focusing events are events, such as the Fukishima nuclear accident of 2011 or the Gulf Oil Spill, that garner attention due to their impact, both positive and negative. News coverage and focusing

[34]Kingdon, 165.

events are operationalized through a study of New York Times articles related to fracking. The New York Times is a widely circulated newspaper nationally and in particular is available in New York and Pennsylvania. This is an excellent resource for measuring the availability of fracking news to the public. Articles are coded as positive, negative, or neutral according to the news presented in them. Focusing events are identified and coded according to the amount of news coverage surrounding the event and the tone of that coverage as taken from the New York Times.

I used Lexus Nexis to analyze the New York Times articles from 2008 through 2011, including news outside Pennsylvania and New York that contained the words "hydraulic fracturing" through the year 2011. I coded each article I found according to the tone of the news. If the news was negative, such as the coverage of a fish kill, or presented with a negative tone, for example the article focused on the negative aspects of fracking, I would code it negative. If the article presented a neutral description of fracking news, it is coded as neutral. Neutral articles usually contained descriptions of fracking that either balanced the two sides of the issue with both the positives and negatives of fracking or contained neither negative nor positive. Finally, if the article spent time discussing the positive outcomes of fracking, like job creation and affordable energy, I would code it as positive.

Policy entrepreneurs are identified and operationalized through their actions and how well they match the elements of policy entrepreneurship explained by Mintrom and Norman.[35] The first element is social acuity, which is when entrepreneurs try to understand the ideas,

[35]Mintrom and Norman, 653.

motives, and concerns of others in their policy context.[36] The second element is defining the problem, when the entrepreneur, defines the situation as a crisis, points out the failings of the status quo, and draws support from beyond the scope of the problem.[37] The third element is team building, in which an entrepreneur makes use of professional and personal connections to form a team to address the issue.[38] The fourth element is leading by example, when entrepreneurs take preemptive action to reduce the perception of risk.[39]

Finally, in the political stream I will look at changes in national mood and partisan control over the states' House of Representatives, its Senate, and its governor. Measuring national mood is a challenge. In Kingdon's research, anti-regulatory fervor among the electorate was sensed by the bureaucrats he surveyed in the late 1970's, yet polling indicated that this was actually not the case and that a majority of Americans still favored regulation in many different arenas of life. Because of this inconsistency I will look for quantitative polling data to inform my research.[40] Operationalization of the national mood will be accomplished through looking at public opinion polls concerning hydraulic fracturing. I use polls done by the Civil Society Institute in both New York and Pennsylvania on November 26-30, 2010.

Additional indicators of the political stream include changes in party control of legislative and executive offices of Pennsylvania and New York from 2008 to 2011. A major divide exists between the two parties when it comes to environmental concerns and voting behavior related to it. Party control of government institutions is important in affecting the decisions that are made. Increasing divergence between the legislative parties on environmental issues can result in new

[36]Mintrom and Norman, 652.
[37]Mintrom and Norman, 652.
[38]Mintrom and Norman, 653.
[39]Mintrom and Norman, 653.
[40]Kingdon, 147.

policy when party control changes. Shipan and Lowry found divergence in the environmental voting scores[41] of legislators from the nation's two dominant parties. On support of environmental protections Republicans consistently scored lower than Democrats. Tanger, Laband and Zeng, reinforce the existence of a divergence between the parties, but also focuses on the divergence during tough economic times.[42] An interesting finding of Tanger, et al., is that the rate of unemployment correlates with an increase in divergence on environmental voting between the two parties.[43] This finding is interesting considering the high unemployment[44] faced by the United States during the time period studied. It is impossible to say however, what effect the unemployment rate had on fracking regulation stringency, because the practice was not widely used in the states of New York or Pennsylvania before the decline in the economy in 2008.

Expectations

Based on Kingdon's model, I expect the components of the three policy streams to influence the stringency of fracking in the following ways. My first expectation is that as there is increased negative news reporting, the problem will be seen as more significant than previously thought and this will contribute to a change in policy stringency. Second, the presence of focusing events will increase the likelihood of a change in policy stringency. Third, policy entrepreneurs are likely to exert influence over policy stringency. Fourth, when Republicans are in control, they will seek less stringent fracking regulation while Democrats will work for more

[41]Scores are given by the League of Conservation Voters. Each year the League chooses what are considered the most important environmental issues voted on in Congress. Once the baseline is determined, each Congressperson is given a score ranging from 0 to 100. 0 reflects no support for environmental issues and 100 represents the opposite.
[42]Tanger, Shaun M., Laband, David N., and Zeng, Peng. 2011. "Party Polarization: Congressional Divergencce on Environmental Policy from 1970-2008." *Journal of Natural Resources Policy Research, 3:2, 183-202.*
[43]Tanger et al. 183.
[44]Between 8 and 10 percent from 2008 to 2012

stringent fracking regulation. Finally I postulate that when the aforementioned streams converge and a window of opportunity opens there will be significant policy stringency change in both Pennsylvania and New York.

Selection of Cases: New York and Pennsylvania

I now turn my attention to the two states I analyze, New York and Pennsylvania. New York and Pennsylvania are two populous states located on the east coast of the United States which share a great deal of demographic and geographic similarities. In addition, they are relatively large in area when compared to other neighboring eastern north states. They share a long border between them, with New York to the north and Pennsylvania to the south. Most importantly, both contain large portions of the Marcellus shale formation, which is the largest geographic shale formation in the country and holds over 50 trillion cubic feet worth of natural gas.[45] Both states share a humid continental climate which means that water scarcity is not significant. Rather, contamination of groundwater[46] and disposal of chemical-laced flow back water is the top environmental issue with respect to fracking in these states.[47]

Political demographics are similar in that both states have diffuse but large conservative rural populations and concentrated and equally sizable liberal, urban centers. In New York registered voters are 49 percent Democrat, while they are 51 percent of registered voters in Pennsylvania.[48] These figures are offset by Republican registration at 25 percent in New York and 37 percent in Pennsylvania.[49] Both states had a Democratic House of Representatives and

[45] Armas, Genaro C. 2008. "Appalachian shale houses mostly untapped reservoir." *Houston Chronicle* (Feb. 4).
[46]Wilber, Tom. 2008. "Marcellus shale boom carries environmental price." *Binghamton [N.Y.] Press & Sun-Bulletin*, (June 8).
[47]Lustgarten, Abrahm. 2009. "Methods to limit fracturing's impact underused" *ProPublica*, (Dec. 13).
[48]Retrieved from New York and Pennsylvania's registrars websites. Available at: http://vote.nyc.ny.us/results.html and http://www.votespa.com/portal/server.pt/community/about_voting_and_elections/13508/political_parties/585279
[49]PA and NY registrars websites

executive from 2008-2010 and New York had a Democratic Senate for the first and only time in half a century. Surprisingly, the New York Senate from 1939 to 2008 spent only one year in Democratic hands, peculiar considering the success and domination of the Democratic Party in just about every other political competition in the state over the past half century. The Pennsylvanian Senate was the only Republican holdout in either state's government during these two years. Because of the similarities in size, climate, region, demographics, politics, and share of the Marcellus shale formation New York and Pennsylvania make excellent case studies for the purpose of my research. The differences in political change over in the 2010 election will inform and guide my research in a way that I think would not be possible while looking at any other two states.

Congruence Case Study Method

There are some advantages in using a case study over statistical studies according to Alexander George and Andrew Bennett, *Case Studies and Theory Development in the Social Sciences.* The first is conceptual validity, which is to find, analyze, and measure key indicators of theoretical ideas related to the study at hand.[50] Case studies can provide a more nuanced approach that avoids bunching together data that prima facie seems the same, but upon deeper inspection is substantially different.[51] Another advantage is that case studies are better at finding variables not previously considered that can lead to new hypotheses. For example, a case study may be more likely to uncover a motivating factor that was not initially anticipated in a quantitative study.[52]

[50]George, Alexander L. and Bennett, Andrew. (2005). *Case Studies and Theory Development in the Social Science.* Cambridge, Massachusetts: MIT Press, 19.
[51]George and Bennett, 19.
[52]George and Bennett, 20.

I use Bennett and George's congruence case study method and Kingdon's policy streams model to analyze hydraulic fracturing policy in Pennsylvania and New York between 2008 and 2011; I then determine how well Kingdon's model explains fracking policy change.

I also believe that use of two similar states gives additional support for my results. By using New York and Pennsylvania, I control for demographic and geographic factors. Without the disruption caused by variations with these factors, the effects of Kingdon's model will be easier to discern.

One important aspect of the congruence case study method that is of utmost importance to study are what George and Bennett call "expectations effects."[53] Expectations effects are "…theoretical reasons why the effects of hypothesized causes might be amplified, diminished, delayed, or sped up."[54] As researchers take these things into account, they can then determine whether the expected relationships among variables are consistent with the model. Do "…they vary in the expected directions, to the expected magnitude, along the expected dimensions…" or are there still unexplained differences? This part of the congruence case study method works quite well with Kingdon's policy stream model, because it focuses on specific problems, policy possibilities, and actors. I examine the cases to see whether the streams exist and whether a policy entrepreneur finds and takes advantage of a convergence of the streams to change fracking policy.

[53]George and Bennett, 183.
[54]George and Bennett, 183.

Analysis and Findings

As stated previously I use Kingdon's multiple streams model as a tool for discovering and assessing actors, events and issues that led to changes in fracking regulation in Pennsylvania and New York.

Problem Stream

Just the word fracking, or even hydraulic fracturing, could barely be found in environmental news prior to 2008. During my examination of New York Times articles,

See Table 2

containing the words "hydraulic fracturing" from 2008 to 2011, I found a steep increase in news pertaining to hydraulic fracturing and a change in tone that went from positive to negative. During this time period, the number of news articles containing the words "hydraulic fracturing" went from 4 articles annually in 2008 to 14 articles in 2009, and 23 articles in 2010. By 2011 the total jumped to 85 articles. These represent a 350% increase in fracking news from 2008 to 2009, a 164% increase in news from 2009 to 2010, and a 370% increase from 2010 to 2011. As the news became more prevalent, the tone became more negative. For example, in 2008 only 4 articles were published in the New York Times that mentioned hydraulic fracturing. Of those four articles, none contained negative news or tone about hydraulic fracturing. In contrast, by

2011, of the 85 articles containing the words “hydraulic fracturing” that year, 40% of those were negative in tone or news.[55]

The first reports of problems created by fracking in the mainstream media were concerned with spills and discharges of fracking fluids into the environment.[56] Negative news was reported when a particularly bad spill occurred in Dimock, PA in August, 2009, killing fish and polluting wetlands.[57] Another example of negative news appeared when the media covered New York's Department of Environmental Conservation's report that fracking flow-back samples[58] contained radiation levels 267 times the safe limit and a thousand times the safe limit for drinking water.[59] The gas industry countered by claiming that, “federal oversight of a controversial drilling technique would devastate the U.S. economy.”[60] As Kingdon indicates, such negative news calls attention to fracking and can create conditions that promote policy change. As fracking has increased, negative news also grew. There was no negative fracking news reported in 2008, yet in 2009 negative news increased to 43% of all fracking news reported by the New York Times.[61] In 2010, negative news dropped down to just 13% of news reported. This can be explained by the Gulf Oil Spill cutting down on negative news coverage. Finally in 2011 negative news coverage was a tad higher than the 2009 percentage at 44%. The spikes of negative news growth in the New York times coverage of fracking helps to indicate the presence of Kingdon's problem stream.

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[55]See table 2.
[56]Lustgarten, Abrahm. 2009. “Pa. authorities issue five violations following spills” *ProPublica*, (Sept. 23).
[57]Basler, George. 2009. “Pa. orders halt to fracturing after spills.” *Binghamton [N.Y.] Press & Sun-Bulletin* (Sept. 25).
[58]Flow-back is the fluid that returns to the surface after a well is fracked.
[59]Lustgarten and Shankman. 2009. “N.Y. Report finds drilling wastewater is radioactive.” , *ProPublica* (Nov. 9).
[60]Howell, Katie. 2009. “Drilling regulation would devastate economy -- API report.” *E&E Greenwire* (July 1).
[61]See Table 2

Of media that brought attention to fracking, perhaps one of the most significant attention getter was the documentary film *Gasland*. *Gasland* was released in the summer of 2010 against the backdrop of the BP oil spill.[62] In the most dramatic moment of the movie, Mike Markham of Fort Lupton, Colorado takes out a lighter, ignites water pouring out of his kitchen faucet, and his sink fills with flames. The film clearly indicates that this environmental inferno was caused by hydraulic fracturing. Whether the fiery sink was actually caused by nearby fracking is not pertinent to my research. What is pertinent is that the film identifies and communicates to its audience that hydraulic fracturing is a problem. *Gasland* helped launch hydraulic fracturing from a mostly unknown practice with barely a mention in mainstream news[63] to a nationally prominent issue which brings concern nationwide.

The film begins with Fox, the creator and narrator of the film, receiving an offer from a gas company to drill on his family's land in rural Pennsylvania for $100,000.[64] Fox is curious to know exactly what will take place on his land if he signs the lease agreement. He travels the country seeking information about this new extraction method, revealing the negative consequences of hydraulic fracturing. Assessing the influence of *Gasland* as a contributor to problem definition is difficult. To know exactly how many people have viewed and were influenced by the film is not easy to determine. However, I think that an analysis of the public's access to the film and its reception and notoriety in the media could help.

[62]Soraghan, Mike. 2010. "Company's disclosure decision could change fracking debate." *E&E Greenwire* (July 15).
[63]See table 2.
[64]*Gasland*, HBO. 2010.

The film aired originally on Home Box Office then was viewed in select settings to "sellout crowds."[65] The film has drawn critical attention and has received numerous awards, including a nomination for "The Best Documentary" Academy Award.[66] The film is also accessible through the internet film provider Netflix. Between HBO's 28 million subscribers and Netflix's 23 million subscribers, in addition to theater presentations and DVD rentals, it is quite possible for the film to have been seen by hundreds of thousands, if not millions, of viewers. A visit to the film's website, "gaslandthemovie.com," displays a vibrant page with a claim at the bottom of the page that over 115,000 "actions" have been taken.[67] According to the website, the actions are efforts made by visitors to the web page that have clicked on one of four options provided on the links: "Contact your elected officials," "Find out about local organizations," "Check out action alerts," and "Share your story." This is strong evidence that "Gasland" and the accompanying media surrounding it, had an important role in "problem definition" by articulating and disseminating information concerning the problems of hydraulic fracturing.

Through the film's hype and media surrounding it, Fox became a significant contributor to the definition of fracking as a significant danger to the public and the environment. Fox has lobbied Congress and the U.S. Army Corps of Engineers, with the help of actor Mark Ruffalo, to get more regulation of fracking.[68] In particular, the proposed Fracturing Responsibility and Awareness of Chemicals Act, or "FRAC Act", a piece of legislation introduced by Colorado Representative Diana DeGette and New York Senator Bob Casey, to remove the 2005 exemption of hydraulic fracturing from the Safe Drinking Water Act and require the disclosure of chemicals

[65]Fox, Josh. 2010. "Affirming Gasland." (Sept. 2010).
[66]Mulkern, Anne C. 2011. "Oscar-nominated director will lobby Congress for drilling reforms" *E&E Greenwire* (Feb. 15).
[67]"Gaslandthemovie.com" (Nov. 2011).
[68]Mulkem.

used in fracking to the EPA.[69] This legislation is considered the first attempt to address the fracking problem at the national level. As of March 2012, this act had not passed. Fox's involvement came to a dramatic climax; he was arrested for filming a hearing of the U.S. House of Representatives Science committee.[70] In what might have been an effort to forestall any negative public publicity, the committee voted to allow only Capitol Hill press corps to film the hearing.

Another important attack has been leveled at the filmmaker by the oil and gas industry. Shortly after the making of the film, the Independent Petroleum Association of America (IPAA), alleged many errors in Fox's reporting. IPAA's "Energy In Depth" campaign published an article rebutting the film, called *Debunking Gasland.*[71] The group also sent a letter to the Academy of Motion Picture Arts and Sciences claiming the filmmaker was "flat out making stuff up" and should not be considered for the Academy Award due to the lack of veracity in Fox's claims. Another significant piece of evidence showing industry's disdain for the film is the advertisement which the American Natural Gas Association placed in the Google search engine that directs Internet searches pertaining to *Gasland* immediately to their website "The Truth About Gasland" as the first listing on the subject. The website shows a short video criticizing *Gasland* for its "poor research."[72]

Although Fox could be identified as a policy entrepreneur at the national level, his activities and influence affect fracking policy at the national level and less so at the state level. Because of this I have not included him in my analysis of entrepreneurs for this study. What is

[69]Soraghan, Mike. 2011. "Groundtruthing 'Gasland'." *E&E Greenwire* (Feb. 24).
[70]Soraghan, Mike. 2012. "House panel bars filmmaker from Wyo. pollution hearing" *E&E Greenwire*, (Jan. 23).
[71]Soraghan.
[72] "Anga.us/thetruthaboutgasland" (Jan. 2012).

most significant about *Gasland* and the activities of Fox, is that it brought publicity to the issue of fracking and defined the problem, which entrepreneurs later used in their own activities.

Policy Stream

Kingdon describes the policy stream as a sort of "primeval soup" in which ideas float around and gestate, while policy communities "try out their ideas on others by going to lunch, circulating papers, publishing articles, holding hearings, presenting testimony, and drafting and pushing legislative proposals."[73] In the policy stream, actors contribute to problem identification and create solutions.[74] While the experts debate alternatives to problems, ideas float around in the policy stream and "there is a long process of 'softening up.'"[75] In the cases of New York and Pennsylvania, this slow "primeval soup" process has been replaced by speedy decision making and intense response as communities, and actors quickly arise to answer the issues at hand. Nevertheless, fracking policy stream communities are present in both states as natural gas companies and environmentalists have moved to tackle the issues of fracking. Communities of lobbyists, environmental research companies, public relations coordinators and others are participating in the battle of interests.

Policy Entrepreneurs

The actors who most actively seek change in the policy stream are known as policy entrepreneurs. In their study, "Policy Entrepreneurship and Policy Change," Michael Mintrom

[73]Kingdon, 116.
[74]Kingdon, 116.
[75]Kingdon, 117.

and Phillipa Norman address the dynamics of policy entrepreneurs. In their research policy entrepreneurs are more effective when they demonstrate the following attributes:

1. Social acuity or perceptiveness in understanding others and engage in political conversations.[76]

2. Defining problems by paying attention to the issue and highlighting current failures and proposing solutions and drawing support from actors beyond the immediate scope of the problem.[77]

3. Building teams by making use of personal and professional networks and creating a tight-knit team of individuals with a variety of knowledge and skills.[78]

4. Leading by example is when the entrepreneur takes an idea and turns it into action.[79]

I found four policy entrepreneurs active within state regulatory politics in Pennsylvania and New York over the past four years. The four actors I have identified are two governors from each state, one serving before the 2010 election and one after. These are, David Paterson, who served as governor of New York from 2008-2010, and current governor Andrew Cuomo. In Pennsylvania, Ed Rendell served as governor from 2006-2010, and Tom Corbett is the current governor. Each of these actors has played a visible and active role in problem definition and influencing policies for hydraulic fracturing.

New York

David Paterson, became governor of the third most populous state of the union, when while serving as lieutenant governor to Eliot Spitzer, Spitzer became entangled in a prostitution scandal and resigned from office. Paterson engaged the issue of fracking when he vetoed

[76]Mintrom and Norman, 652.
[77]Mintrom and Norman, 652.
[78]Mintrom and Norman, 653.
[79]Mintrom and Norman, 653.

legislation passed by New York's legislative branch that would ban all new natural gas permits in the state until May 15, 2011.[80] After vetoing the bill, he enacted an executive order banning permits for horizontal drilling and fracturing, thereby leaving vertical wells free to operate under permit. Had the legislation passed it would have severely limited a multitude of existing vertical drilling operations and would have cost the state jobs and money. Paterson explained his action, saying "Enacting this legislation would put people out of work -- work that is permitted by the Department of Environmental Conservation and causes no demonstrated environmental harm, in order to effectuate a moratorium that is principally symbolic."[81] The fact that Peterson called the ban "principally symbolic" is peculiar because it has, during its implementation, prevented the use of an extraction tool that has significantly increased natural gas production in many other states (including Pennsylvania.) Craig Michael, of Riverkeeper, an environmental interest group, criticized the move saying,

> By carving out an exception for vertical wells that do not even exist yet… [he does] not assure the proper protection of water quality statewide.... The environmental community will be watching closely to assure that industry does not side-step environmental review by conducting an onslaught of vertical drilling and then converting those vertical wells to horizontal wells[82]

It should also be noted that permitting of fractured gas wells had already been on hold for two years at the time of the horizontal drilling moratorium as the state Department of Environmental Conservation reviewed its potential effects on the environment.[83]

[80]Esch, Mary. 2010. "NY 'Fracking' Ban: Governor David Paterson Orders Natural Gas Hydraulic Fracturing Moratorium For Seven Months In New York" *Associated Press* (Dec. 12).
[81]Zeller, Tom . 2010. "N.Y. governor vetoes bill that would limit fracking" *New York Times* (Dec. 11).
[82]Zeller.
[83]Esch.

So, although he did receive some criticism from environmentalists for not stopping all forms of fracking in the state, most environmentalists, especially with memory of what happened in Pennsylvania shortly after the Republicans took control, came to appreciate the maneuver as a shrewd and effective compromise. Governor Paterson drew the praise of the natural gas industry by allowing the continuations of conventional drilling, but his action also stopped the implementation of further permitting for horizontal drilling coupled with fracturing for about seven months.[84] Mintrom and Norman call this strategy social acuity. Patterson made good use of his policy networks by acquiring information concerning the issue and attempting to understand the ideas, motives and concerns of both the natural gas industry and the concerns of environmentalists. Paterson came up with an effective response that came as close as possible to meeting both sides' needs.[85] In addition, as part of the executive order, Paterson implemented an environmental assessment to be completed by the New York Department of environmental protection on fracking that would guide future regulation when the moratorium expired. In this action, we see successful policy action made by a lame duck governor with less than a month to serve that proved effective.

When Governor Paterson left office in 2011, the former New York attorney general, Andrew Cuomo, became governor. Cuomo extended the moratorium another several months due to pressure from environmental interest groups who were still not satisfied that the Department of Environmental Conservation would make appropriate decisions about if and when fracking would begin. Environmentalists argued that other states had better regulations on setbacks, home

[84]Zeller, Tom . 2011. “Future Of New York's Fracking Moratorium In Question” *New York Times* (Aug. 30).
[85]Mintrom and Norman, 652.

rule and taxation.[86] Critics also said that economic benefits were not guaranteed and that supporters used false projections of the amount of gas reserves the state actually had were made.[87]

Cuomo devised a compromise plan which would block fracking near public water resources but allow the practice in approved lands.[88] Cuomo's actions were examples of risk aversion in which the state would lead by example. When Cuomo extended the ban and then pushed for additional safety measures, such as blocking development close to major watersheds and aquifers, he was averting risk and leading by example.

Pennsylvania

Perhaps the most influential actors have come from the Pennsylvanian Governors. Ed Rendell a Democrat, and Tom Corbett, a Republican each played a major role in the fracking debate. First, I will discuss the actions of Ed Rendell followed by Tom Corbet.

The first news in 2009 surrounding Rendell's views on fracking policy put him in the pro-development category, although later actions would classify him as a moderate friend to the environment, despite the fact there was a revolving door through which many of his staff joined the gas industry. For example, earlier that year Rendell withdrew his support for an extraction tax on the gas industry. The tax had been proposed by Democrats in the state legislature as a way to generate revenue from the growing industry, but at the last minute Rendell withdrew his

[86]Sullivan, Colin. 2011. "Enviros urge N.Y. regulators to delay fracking rules" *E&E Greenwire* (Nov. 17).
[87]Sullivan.
[88]Sullivan.

support for it. Environmentalists feared that the he had been captured by industry.[89] Sierra Club representative Jeff Schmidt said, "There is a huge amount of money being spent to influence decision-making on these issues in Harrisburg." He added that the governor might be receiving advice from cabinet members with strong ties to the industry and not from someone concerned with "...what was best public policy."[90] In October 2009, Rendell's deputy chief of staff resigned to become Vice President of Government Relations and Regulatory Affairs for a gas company called Range Resources Corp. of Texas.[91] Wayward staff members continued to erode Rendell's credibility when two more left top positions in his administration for jobs in by the natural gas industry the following summer.[92] State house representative Rep. Greg Vitali (D) noted that this was an example of "the same old influential interest groups getting their way…it was just another day in Harrisburg."[93] Perhaps because of industry lobbying influence, Rendell dropped a proposed tax on the natural gas industry, arguing that he still faced a Republican dominated Senate that would not have passed the tax anyway.[94] As noted by Mintrom and Norman,[95] the presence of so many staffers willing to leave and work for the industry demonstrates a weakness in Rendell's advising team.

Pennsylvania's government was divided during this same time period. Republicans still controlled the Senate while Democrats controlled the House of Representatives. The limitations of divided government were evident when the governor was asked why he would not impose a moratorium in Pennsylvania similar to the one Paterson created in New York. His first reason

[89]Cattabiani/Worden. 2009."Industry insiders persuaded Rendell to kill tax proposal" *Philadelphia Inquirer* (Oct. 25).
[90]Cattabiani, Mario F. 2009. "Aide to governor resigns to join gas driller." *Philadelphia Inquirer* (Oct. 7).
[91]Cattabiani.
[92]Maykuth/Couloumbis, 2010. "Pa. officials jumping ship for industry jobs" *Philadelphia Inquirer* (Jul. 13).
[93]Cattabiani.
[94]Cattabiani/Worden.
[95]Mintrom and Norman, 652.

was that he felt that growth of the natural gas industry could be coupled with environmental protections.[96]

Rendell's next statement revealed his frustration with his political realities, "The second reason is because it doesn't matter what I think. The Legislature will never vote for a moratorium."[97] Seeing the futility of passing a moratorium with a Republican dominated Senate, Rendell displayed social acuity. Kingdon notes that a policy entrepreneur takes advantage of opportunities when windows open to enact policy change.[98] Mintrom and Norman expand on this by describing entrepreneurial actions based on "understanding the ideas, motives, and concerns of others in their local policy context and responding effectively."[99] In this case, Rendell understood the opposition he faced in the Senate and he was keenly aware of his inability to enact a moratorium.

One of the last things that Rendell did in October 2010 was make a second attempt to pass the gas tax, but the Republican Senate would not accept the governor's proposal for the five percent severance tax on natural gas. Rendell commented that "They clearly desire[d] to put the costs of natural-gas drilling on the backs of Pennsylvania taxpayers, rather than on the large multinational oil and gas corporations who stand to reap enormous wealth from our state's resources"[100]

[96]Hamill, Sean. 2010 "No Marcellus Shale drilling moratorium in Pa. – Rendell" *Pittsburgh Post-Gazette* (Sept. 22).
[97]Hamill.
[98]Kingdon, 168.
[99]Mintrom and Norman, 652.
[100]Couloumis, Angela. 2010. "Pa. governor says tax on Marcellus Shale drilling 'dead'" *Philadelphia Inquirer*, (Oct. 22).

The loss of this severance tax limited Rendell's entrepreneurial activities by eliminating a potential funding source for the creation of a Marcellus Shale Development Task Force.[101] The task force was recommended by a report from the Pennsylvania Environmental Council (the PEC chairman was appointed by Rendell) as a way of researching and implementing a best practices model similar to actions taken by other states, such as Colorado.[102] "The PEC called on the Legislature to ensure that any taxes derived from the Marcellus Shale would be used to regulate the industry and study the environment. A proposed severance tax could generate approximately $200 million a year."[103] The death of the tax spelled the death of many of Rendell's plans. Although unsuccessful, Rendell demonstrated an effort to build a team, one of the elements of entrepreneurship Mintrom and Norman identified.[104] Turning to an alternative means of achieving his goal after the Senate killed his tax proposal, Rendell banned fracking on public land.[105] Though not discussed by Kingdon, Mintrom and Norman, the use of an alternative administrative strategy is another example of entrepreneurial activity. In their study of mountaintop removal coal mining, Charles Davis and Robert Duffy discuss George Bush's use of alternative executive strategies in the face of an uncooperative Congress to allow the extensive use of MRM throughout Appalachian states with little Congressional support[106]. Rendell faced a similar situation and employed a strategic tool which banned fracking on public lands through executive order. However, if policy change can be made with executive tools that do not require the presence of all of the streams, then how does this affect the model? This question is addressed in my conclusion.

[101]Hopey, Don. 2010. "Tighter regulation needed in Marcellus Shale – report" *Pittsburgh Post-Gazette* (July 13).
[102]Hopey.
[103]Hopey.
[104]See pg. 16-17
[105]Rendell, Ed. "Executive order concerning the Leasing of State Forest and State Park Land for Oil and Gas Development" *Pennsylvania office of Governor* Number: 2010-5 (Oct. 26).
[106]Davis and Duffy, 675.

But with Rendell's tenure in office coming to an end, his ability to effect change was soon diminished. And although many criticized Rendell for inaction or catering to gas interests, hindsight would prove his efforts to control fracking were more extensive than those undertaken by his replacement, Tom Corbett.

Rendell's entrepreneurial activity continued after leaving the governorship. In March 2011, Rendell and the state's former secretary of the Department of Environmental Protection, John Hanger, wrote a scathing letter to the New York Times critical of the newspaper's depiction of Pennsylvania's handling of its natural gas boom. They commented:

> If the goal of your report about natural gas drilling was to gratuitously frighten Pennsylvanians, then congratulations on a job well done. If it was to deliver an evenhanded examination of the critical balance that must be achieved between job creation, energy independence and environmental protection in regions with large natural gas deposits, then it was a mighty swing and a miss.[107]

The letter went on to claim that "Pennsylvania has the strongest enforcement program of any state with gas drilling. Period."[108] From there, the letter points out that from January 2008 to June 2010 the DEP issued 1,400 violations to drilling companies, in addition to 5,000 inspections of drilling sights, "a 100 percent increase from 2009."[109] A few months after the letter, Rendell took the spotlight again by addressing protesters at the Marcellus Shale Coalition's inaugural conference, urging industry to fix things by agreeing to pay taxes after it had been permitted to "screw up"(sic) for so long.[110] These examples demonstrate Rendell's continued entrepreneurial

[107]Rendell, Ed and Hanger, John. 2011. "Re ""Regulation Lax as Gas Wells' Tainted Water Hits Rivers ("Drilling Down" series, front page, Feb. 27)" *New York Times* (Mar. 5).
[108]Rendell and Hanger.
[109]Rendell.
[110] Olson, Laura. 2011. "Former Pa. governor calls for tax on drillers" *Pittsburgh Post-Gazette* (Sept. 8).

activity after his actual authority and responsibilities had expired. Rendell's criticism of the media and participation in an active protest show his continued social acuity.[111]

Tom Corbett was elected in 2010. In Pennsylvania's State Legislature, thirteen seats switched from Democrats to Republicans, with the GOP ending up with 112 seats to the Democrats remaining 91 seats. The Tea Party, a coalition supporting lower taxes and less government, dominated the rhetoric of the election and many Republican candidates. Tom Corbett was one of these Republican leaders. After taking office, with Republicans dominating each chamber of the General Assembly in Harrisburg, Corbett quickly began to dismantle any semblance of a regulatory burden on the natural gas industry in the Keystone State.

One of the first things that Corbett made clear was that there would be no extraction tax on natural gas drilling while he was in office. In addition, he immediately prepared to reverse the order by Rendell that banned fracking on state lands. This would open up 1.5 million acres of state forest to the gas industry.[112] Corbett succeeded in reversing the ban and his vow to keep the industry tax free endured until 2012. In February 2012, an impact fee was passed in the state legislature and was approved by Governor Corbett, an act that may seem contrary to his anti-tax stance. Public opinion favored some sort of excise on natural gas[113] thus, Corbett gave into pressure to do something to help balance the state budget, and in particular, help the communities that were feeling some of the negative externalities of the gas boom[114]. The fee is negligible, however, compared to those which were proposed by the Rendell administration. In

[111]Mintrom and Norman, 652.
[112]Mauriello/Olson. 2011. "All-out war' expected on Marcellus extraction tax, state-lands drilling" *Pittsburgh Post-Gazette* (March 10).
[113]Associated Press. 2011. "Poll shows strong support for gas drilling among Pa. voters" *York [Pa.] Daily Record* (June 14).
[114]Unknown Author, 2012. "State closes in on deal over Marcellus drilling fee" *Philadelphia Inquirer* (Feb. 5).

addition, many have come forward point out that earlier action in passing some sort of fees or taxes could have fixed Pennsylvania's current budget crisis and saved the state from some major cutbacks in education and other state programs.[115]

The permitting process was expedited Under the Corbett administration. According to the Associated Press in 2011, less than 35 minutes is spent reviewing each permit and that "they do not give any additional scrutiny to requests to drill near high-quality rivers and streams, even though the waterways are protected under state and federal law."[116] These particular problems apparently existed during the Rendell administration as well, but even more permits were granted and less oversight was given under Corbett.[117] Perhaps the most telling statistic was the lack of enforcement in the first three months of Corbett's administration when only 36 actions were taken on 313 violations, which is one enforcement per 8.69 violations. The previous year, during the same three months, the number of actions was 122 enforcements for only 207 violations, an enforcement rate ration of one to 1.69 of violations.[118] Thus, Rendell's department of environmental protection enforced rules at five times the rate of enforcement in the Corbett administration.

The Corbett administration made even more accommodations to the gas industry. In responding to complaints from the industry, the state required inspectors to clear all Marcellus Shale drilling violations with Corbett's environmental secretary before proceeding with any action against the driller. This drew criticism from director of the DEP in the Rendell

[115]Olson, Laura. 2011. "Senate nears vote on drilling oversight bill" *Pittsburgh Post-Gazette* (Nov. 15).
[116]Rubinkam, Michael. 2011. "Some permits get only minutes of review, Pa. regulators say" *AP/MSNBC* (April 13).
[117]Hopey, Don. 2011. "Marcellus Shale drillers see fewer fines in new Pa. Administration" *Pittsburgh Post-Gazette*, (May 15).
[118]Hopey.

administration, John Hanger, who said the order was a “complete intrusion into the independence of the inspection process… It's extraordinarily unwise. It's going to cause the public in droves to lose confidence in the inspection process."[119]

Finally, the advisory panel put together by the governor was criticized by environmental interest groups when some of the appointed members came from the industry that the panel was to regulate.[120] In one case, a representative on the commission worked for Chief Oil & Gas, which led the state in 2010 with 174 violations.[121] Critics have also pointed out that Corbett, an obscure candidate for Pennsylvanian attorney general won the position with $450,000 in campaign donations given by Chesapeake Energy CEO, Aubrey McClendon.[122] It should also be noted that one of Rendell’s executive deputy secretaries of environmental protection left the post to lobby for the same corporation a year before.[123]

Corbett acted as an entrepreneur by keeping gas affordable, energy companies happy, and jobs plentiful for Pennsylvanian citizens. In describing his motivation for such a gas friendly policy, Corbett frequently defined his policies as creating energy independence and economic prosperity. Corbett said that the natural gas industry companies "…are businesses that have come to Pennsylvania, who've hired [20,000 or 30,000] people up in the areas that have been hard hit over these last 30 years.”[124] Corbett, acted as a policy defender, not a policy changer.

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[119]Tanfani/McCoy, 2011. “Pa. enviro chief must approve all Marcellus Shale drilling citations” *Philadelphia Inquirer* (March 31).
[120]Gilliland, Donald. 2011. “Marcellus Shale advisory panel's members racked up violations” *Harrisburg [Pa.] Patriot-News* (April 27).
[121]Gilliland.
[122]Bunch, Will. 2011. “Chesapeake CEO's 2004 donation helped change Pa. political direction” *Philadelphia Daily News* (June 29).
[123]Cattabiani.
[124]Mauriello/Olson, 2011. “All-out war' expected on Marcellus extraction tax, state-lands drilling” *Pittsburgh Post-Gazette* (March 10).

Unlike some of the other entrepreneurs we have seen, Corbett defended the status quo by canceling protective policies in favor of expansive policies.

Political Stream

In Kingdon's streams, the political stream flows independently of the problem or policy stream. It is made up of certain things like national mood, interest group pressure campaigns, and congressional or gubernatorial turnover. The political stream is perhaps the most visible to the casual observer and consequently receives the most attention from the press and other media outlets. These changes also have some of the greatest impacts on agendas for public policy. With changes in legislative bodies and executives come opportunities that were previously unlikely while other ideas fade.

Partisan control

Partisan control is relevant because research reports that Republicans support environmental laws less frequently than Democrats.[125] This is particularly important in the executive branch where a more responsive and environmentally conscious Governor appoints supporters to the Department of Environmental Protection, which has authority to affect the stringency of environmental enforcement in the state. In so many state and national elections in 2006 and 2008, there was a marked a movement to the left for the country. In Pennsylvania, this change appeared in the 2006 election of a Democratic majority in the House with Democrats winning one more seat than Republicans. Two years later, the Democrats increased their advantage to three seats. Democrat Ed Rendall was also re-elected in 2006. During this time, the

[125]Shipman, Charles and Lowry, William. 2001. "Environmental Policy and Party Divergence in Congress" *Political Research Quarterly*, Vol. 54, No. 2. pp. 245-263.

Senate remained in Republican hands, as it had for the previous decade. In 2010, the Republican Party regained control of the House and the Governorship. Considerations for environmental protections took a backseat to energy development and economic expansion. As stated earlier, this partisan turnover was punctuated by a measurable change in stringency concerning fracking regulation.

In New York, a similar change in partisan control took place when for the first time in decades, Republicans lost control of the state Senate while the State House and Governorship remained in Democrats hands after the 2008 elections. During this time, the Democratic government in New York appears to almost immediately limit the use of hydraulic fracturing with horizontal drilling. Initially the states Department of Environmental Conservation put a hold on "high volume" hydraulic fracturing while it completed its environmental impact study of the practice.[126] The bill was vetoed and replaced by a more moderate moratorium enacted by Governor Paterson in December 2010.

Since the initial moratorium was enacted, it had been extended twice by Governor Andrew Cuomo a Democrat. At the time of this writing, the moratorium is still in place, and it will be re-evaluated early in summer 2012. At the same time, the New York House of Representatives proposed a bill which would ban hydraulic fracturing in all forms, similar to the bill it pushed forward in 2010, but the New York Senate, now back in Republican hands, did not pass it.[127]

[126]Zeller Jr., Tom. 2011. "Future Of New York's Fracking Moratorium In Question" *New York Times* (Jun. 30).
[127]Zeller.

Consistent with Kingdon's model the changes in New York and Pennsylvania fracking policy occurred as partisan control of state government shifted, suggesting that party dominance is an important factor in the political stream.

National Mood

National/state mood is another important part of Kingdon's political stream. Since hydraulic fracturing has only very recently obtained newsworthy status, it is impossible to find evidence of changes in public opinion over time. Recent studies only provide a current snapshot of public opinion. At best, the public has only recently become sufficiently aware of fracking to form an opinion.

In this section, I will look at how the citizens of the states of New York and Pennsylvania view hydraulic fracturing. In a study done by the Civil Society Institute, approximately 62 percent of New York residents and 70 percent of those in Pennsylvania were aware of fracking.[128] Of those aware 88 percent in New York and 82 percent in Pennsylvania had concerns that fracking would contaminate watersheds.[129] Thus a majority of citizens in New York and Pennsylvania were aware of fracking and its potential dangers.

If both states are similarly concerned about fracking, why is there difference in policy stringency from their representative governments? One interesting difference is that when the question was asked: "Is fracking contamination of water acceptable if heating bills are lower?"[130]

[128]Survey by Civil Society Institute. Methodology: Conducted by Infogroup, Opinion Research Corporation, November 26-November 28, 2010 and based on telephone interviews with a national adult sample of 1,012. There were parallel surveys conducted in New York and Pennsylvania.
[129]"Fracking and Clean Water: A Survey of Pennsylvania Residents." *Civil Society Institute* (Dec. 21, 2010).
[130]"Fracking and Clean Water: A Survey of New York Residents." *Civil Society Institute* (Dec. 21, 2010).

65 percent of New Yorkers polled and 47 percent of Pennsylvanians felt it was unacceptable. About 18 percent more Pennsylvanians would tolerate the environmental impacts if it meant cheaper energy than their New Yorker counterparts. The governments of the two states are controlled by opposing parties, and these two parties diverge when it comes to environmental regulation. This can account for these differences in public opinion.

Public opinion can also vary depending on news coverage. As the news dies down concerning hydraulic fracking and fewer media outlets are providing significant coverage a drop in the concern of the public could occur. For example, when news concerning the Horizon Deep Water oil rig spill increased in 2010, public concern for offshore drilling also increased. Once the news died down the public went back to supporting offshore drilling.[131] Because of the rise and fall of national polls with little correlation to fracking policy, this suggests that public opinion concerning fracking does not seem to have a major effect on fracking policy, or perhaps the poll in Pennsylvania that showed that a narrow majority of 53 percent favored cheap gas over protecting water from contamination, might explain the differences in policy between the two states. I find it difficult to correlate public opinion accurately within the streams model. Kingdon mentions this difficulty[132] and points out that interpretation of national mood by policy actors can be just as powerful as actual measurable evidence concerning national mood such as polling data.[133] Given the lack of data on this factor in this study, one must assume that the actors themselves perceived the public's mood and that elected officials responded to it. Corbet's election indicated that Pennsylvanians desired less regulation while Andrew Cuomo's election indicated New York's desire for a continued moratorium on fracking.

[131]Pew Research Center, March 17-20 2011, Pew27a.
[132]Kingdon, 147.
[133]Kingdon, 147.

Window of Opportunity

In Kingdon's model, the window of opportunity is the time when all of the different streams come together. The problem is identified, entrepreneurs mobilize resources, and a political environment exists for change to occur. It is the ideal time for policy change.[134] In the case of Pennsylvania and New York hydraulic fracturing policy, each stream was present and this convergence created a window of opportunity. The problem stream developed through problem definition in both states by media coverage of hydraulic fracturing that increased every year by a substantial percentage from 2008 through 2011. Unfortunately, lack of research on public awareness of fracking prior to 2010 limits any definitive conclusions, but polling data from that year concerning public awareness of fracking in both New York and Pennsylvania can provide some evidence of a trend. The policy stream was present through policy entrepreneurs, four of which are identified here and followed through the policy process. These entrepreneurs demonstrated different aspects of Mintrom and Norman's elements of an entrepreneur.

The political stream was present in the partisan makeup of each state's government. In Pennsylvania, Democrats held a majority in the state House from 2008 to 2010 and they also had a Democratic Governor. In 2010, both the House and the governorship in Pennsylvania turned over to the Republicans, thereby changing the political stream in that state and contributing to the opening of a window of opportunity for a change in policy stringency in that state. In New York, 2008 to 2010 was a time when the State House, the Senate and Governor were in the hands of the Democratic Party. Party control of government institutions is one important factor in the political

[134]Agendas, Alternatives and Public Policies, 202.

stream.[135] Because of the presence of all the streams, a window of opportunity opened in Pennsylvania and New York for changes in policy concerning hydraulic fracturing.

Summary of Findings

This study focuses on changes in hydraulic fracturing policy and regulation in Pennsylvania and New York from 2008 through 2011. Hydraulic fracturing policy was operationalized by looking at changes in policy stringency such as permitting processes, bans or moratoriums, extraction taxes, and enforcement of regulations.

In New York, an initial ban on hydraulic fracturing in 2009 was followed by a moratorium enacted in late 2010 initiated by Governor Paterson and continued through 2011 by Andrew Cuomo. In Pennsylvania, there were significantly more changes in hydraulic fracking policy than in New York. First, a ban of fracking on state lands was enacted by Governor Rendell in 2010 and then canceled by Tom Corbet in 2011.[136] An extraction tax on natural gas was resisted in Pennsylvania despite the fact that Rendell voiced a desire to enact one during his administration.[137] His successor, Tom Corbet successfully fought to prevent any additional taxes through 2011. Finally, during the first three months of Corbet's administration, natural gas regulation enforcement declined drastically to roughly one fifth of the enforcement under Rendell's Department of Environmental Protection during the same three months.[138]

[135]Kingdon, 154.
[136]Levy, Marc. 2011. “Pa. governor takes step to reopen state lands to drilling” *Bloomberg Business Week* (Feb. 22).
[137]Hamill, Sean. 2010. “No Marcellus Shale drilling moratorium in Pa. – Rendell” *Pittsburgh Post-Gazette* (Sept. 8).
[138]Hopey, Don. 2011. “Marcellus Shale drillers see fewer fines in new Pa. Admin” *Pittsburgh Post-Gazette* (May 15).

All three of Kingdon's policy streams were present in both New York and Pennsylvania. In the problem stream, an increase in news coverage and an increasingly negative tone were present. Furthermore, focusing events such as spills and water contamination were reported, thus fulfilling my second expectation. The release of the film *Gasland* had a significant impact in defining fracking as a problem. Within the policy stream, four entrepreneurs took part in fracking policy. As a result of all of these factors, my first expectation was fulfilled and fracking became problematic and required some sort of action on behalf of those who were involved.

Mintrom and Norman's four elements of a policy entrepreneur were helpful in identifying and analyzing the different activities of the four entrepreneurs in fracking policy. In addition their activities helped fulfill my third expectation. The three Democratic Governors demonstrated different parts of the four elements of social acuity, defining problems, building teams and leading by example when they implemented regulations of fracking in the two states.

In the political stream, and in accordance with my fourth expectation, the effect of partisan control of government and the national mood on hydraulic fracturing policy played an important role. Most, notably, Pennsylvania policy was weakened after the change in government from Democrat dominated to Republican dominated. In New York, stringent regulation in the form of a moratorium was continued as Democrats retained a majority in the New York House of Representatives and the governorship.

National mood was measured through public opinion polls in New York, Pennsylvania, and nationally. The polling in Pennsylvania and New York indicated that a majority of the population in both states was concerned with the dangers that fracking posed to the environment.

Of course, public opinion responds to trends in the media and the presence of focusing events; thus, public concern will vary over time.

Finally, in these cases, the presence of all three streams led to a window of opportunity in which the entrepreneurs acted to cause the changes in hydraulic fracturing policy, as I identified as my fifth expectation. The window of opportunity was the ideal point in time for policy change.

Conclusion

This final section evaluates how well Kingdon's model applies to this case, areas where Kingdon's and Mintrom and Norman's models fell short, and finally, what additional research needs to be done. The Kingdon model was selected due to its intuitive appeal and its ability to organize different facets of a complicated policy process. Kingdon's model helped identify the questions to answer and the evidence that would provide answers. Consistent with Kingdon's model, problem definition was important. News coverage portraying fracking in a negative light had increased public awareness of the issue and was congruent with Kingdon's model. Once the process began, policy stream entrepreneurs demonstrated aspects of Mintrom and Norman's model. Changes in party control of government in Pennsylvania provided an opportunity to examine the political stream. Changes in regulation occurred when the aforementioned streams converged, opening a window of opportunity for policy entrepreneurs to maneuver.

The one area in which Kingdon's model failed to explain fracking policy changes was the portrayal of policy entrepreneurs as conscientious and patient actors just waiting for their window to open after years of planning. Entrepreneurs in New York and Pennsylvania had little

time to prepare for fracking; the gas industry boomed in their states and they had to make decisions in reaction to it. Entrepreneurs in New York were surprised by the appearance of a window of opportunity and acted in a reactive rather than proactive way. This difference by no means damages the application of the model; in fact, in some ways it shows that Kingdon created a more versatile tool that can be applied to a variety of circumstances. This study shows that Kingdon's model can be applied to a situation which has emerged and gained prominence within a time span of just a few years.

Another issue related to entrepreneurs is that neither Kingdon nor Mintrom and Norman suggested that variation in policy commitment and duplicity of actors are important factors to consider. In the case of fracking, entrepreneurs were divided, supporting change or the status quo. In the model, all the streams come together, a window opens and entrepreneurs enter the window and attempt policy change or not. Rendell's case, however, involved numerous and complicated actors and actions. While in office, his administration was criticized for its close relations with the gas industry.[139] He also came under scrutiny for not implementing a moratorium on fracking, such as that enacted by Paterson in New York.[140] In addition Rendell was accused of giving into industry pressure and not implementing an extraction tax on natural gas.[141]

At the same time, Rendell also implemented a ban on fracking on public lands through executive order[142] and his Department of Environmental Protection had a much higher rate of

[139]Cattabiani.
[140]Hamill.
[141]Cattabiani/Worden.
[142]Rendell.

enforcement actions than his predecessor.[143] These contrasting activities do not describe entrepreneurial action in the same way that Kingdon, Mintrom and Norman do. Rendell's actions seem to indicate that Kingdon's model is not structured to recognize that an entrepreneur's action may foster both more and less environmental protection simultaneously. The model should be expanded to include some sort of way to recognize this inconsistency.

Finally Kingdon's model fails to recognize the array of policy decisions that may occur. In Kingdon's model, policy change either occurs or does not occur. This is appropriate when examining the passage of legislation, but the decision making in this analysis depends in part on gubernatorial decisions. Governors have an array of decision tools they can adopt. They seek legislation from their state legislatures, but when that fails, they have additional avenues, such as moratoria and bans, that do not depend on legislative approval. It is possible that some of these actions may provide for less stringent or less complete policy change, without convergence of all three streams into a policy window. For example, part of the political stream was missing in Pennsylvania from 2008 to 2010 because of the Republican-dominated Senate. Enough of the political stream was present with a Democratic governor and also a Democratic State House to accomplish some policy goals concerning fracking regulation.

An example of this occurred when Rendell enacted a ban on fracking on public lands just days after the Republican dominated Pennsylvania State Senate had killed his proposed excise tax on natural gas. Rendell side stepped the legislature and used an executive order to increase the stringency of fracking policy by banning its practice on public land. Despite the fact that action was hindered in the case of an excise tax, fracking on 2.4 million acres of public lands was

[143]Hopey.

stopped with an executive order (even if fracking continued on private land). According to this information, policy stringency also depends more on the policy values and political strategy of the governors who move into and out of office with regularity than Kingdon's model might reveal.

In addition to modifying elements of Kingdon's model, additional research should be done in other states. A similar study could be done for other gas producing states to see if the independent variables present in New York and Pennsylvania are also present in other states. If so, did they lead to similar policy outcomes? Of particular note is Wyoming, which has been using hydraulic fracturing for decades in coal bed methane extraction and was the first state to require industry to disclose the contents of fracking fluids.[144] This energy abundant state has a reputation for lenient rules regarding extraction of natural resources; however, some observers believe it might seem puzzling that it would be among the first states to self-regulate. Former Democratic Governor Dave Freudenthal implemented the regulations as a way of preempting the federal government.[145]

Louisiana may provide another comparative case. Louisiana is experiencing large increases in hydraulic fracking in its Hanesville shale formation. This state experienced devastating losses as a result of Hurricane Katrina and the Gulf Oil Spill, so a good question for future research is whether or not these focusing events changed the way in which gas development through hydraulic fracturing has been treated in the state's politics. A detailed look at its fracking policy by using Kingdon's policy streams could be useful in adding studies in both these states to the fairly limited research that has been done concerning fracking regulation.

[144]Howell, Katie. 2010. "Wyo. becomes first state to require disclosure of fracking chemicals" *E&E* (June 9).
[145]Howell.

Finally, the EPA and some members of Congress have turned their attention toward fracking in recent times through studies and proposed legislation at the national level. Although the current President of the United States supports the use of fracking, he has also indicated that some sort of national regulation is needed. A study which looked at the progress and future of these national actions could also be very important to the fracking discussion as a whole.

Table 1

Dependent variable	**Indicator**
Changes in hydraulic fracturing policy and regulation at the state level in Pennsylvania and New York State from 2008 through 2011	Changes in permitting processes, the ending or enacting specific bans or moratoriums, implementation or non-implementation of extraction taxes, and enforcement of regulations
Independent variables	**Indicator**
Focusing events	Events such as aquifer contamination or stories about increased natural gas production. The events may be positive or negative.
Increase in negative news coverage	Coding of New York Times articles related to fracking according positive, negative or neutral content
Presence of policy entrepreneurs	Analysis of their actions and how well they match the elements of policy entrepreneurship explained by Kingdon, Mintrom and Norman 1.Social acuity is an entrepreneur's ability to make use of policy networks and understand the ideas, motivations and concerns of others in their policy context and then respond effectively.[146] 2.Problem definition pertains to entrepreneurs' ability to pay attention to problem definition and then reiterate it to others in a poignant manner.[147] 3.Team building consists of an entrepreneur ability to organize close knit groups of like minded experts that bring a diverse skill-set and background to address the issue.[148] 4when entrepreneurs lead by example they turn their ideas into actions.[149]
Changes in national mood	Civil Society Institute poll NY and PA Nov. 26-30, 2010. Questions: "Prior to this survey, how aware would you say you were about this issue?" "Still thinking about the natural gas drilling process sometimes referred to as fracking, howconcerned are you about this issue as it relates to water quality?" Also opinions concerning offshore drilling will also be used to determine publics acceptance of extraction policies in general. Pew research Sept. 2008, Apr. 2009, Feb. 2010, June 2010, Oct. 2010, Mar. 2011. Question: "Would you favor or oppose the government allowing more offshore oil and gas drilling in US (United States) waters?"
Changes in partisan control	Changes in party control of legislative and executive offices of PA and NY from 2008 to 2011.

[146]Mintrom and Norman, 652.
[147]Mintrom and Norman, 652.
[148]Mintrom and Norman, 653.
[149]Mintrom and Norman, 653.

Table 2: Summary of Regulatory Stringency in Pennsylvania and New York, 2008-2011

Regulations	PA 2008-2010	NY 2008-2010	PA 2011	NY2011
Expedition of permiting	Yes	No	Yes[150]	No
Moratorium or ban	Partial (public lands)	Yes-by executive order Dec. 2010[151]	No (public lands ban dropped)[152]	Yes-extended to early 2012[153]
Extraction tax	Proposed[154]	Proposed (after moratorium)	No	Proposed (after moratorium)
Enforcement of policy	122 actions for 207 violations 1-1.69 ratio 1st qtr. 2010[155]	None moratorium	36 actions for 313 violations 1-8.69 ratio 1st qtr. 2011	None moratorium
DCNR review for approval of applications for drilling in state parks and forests	Yes	Moratorium	No[156]	Moratorium

Source: see footnotes

[150]Rubinkam, Michael. 2011. "Some permits get only minutes of review, Pa. regulators say" *AP/MSNBC* (April 13).
[151]Esch, Mary. 2010. "NY 'Fracking' Ban: Governor David Paterson Orders Natural Gas Hydraulic Fracturing Moratorium For Seven Months In New York" *Associated Press* (Dec. 12).
[152]Levy, Marc. 2011. "Pa. governor takes step to reopen state lands to drilling" *Bloomberg Business Week* (Feb. 22).
[153]Wiessner, Dan. 2011."N.Y. lawmakers extend fracking ban" *Reuters* (June 6).
[154]Hamill, Sean. 2010. "No Marcellus Shale drilling moratorium in Pa. – Rendell" *Pittsburgh Post-Gazette* (Sept. 22).
[155]Hopey, Don. 2011. "Marcellus Shale drillers see fewer fines in new Pa. Admin" *Pittsburgh Post-Gazette* (May 15).
[156]Levy, Marc. 2011. "Pa. governor takes step to reopen state lands to drilling" *Bloomberg Business Week* (Feb. 22).

Table 3: New York times Articles Containing the Work Hydraulic Fracturing, 2008-2011

	2008	2009	2010	2011
Positive	2	3	3	9
Negative	0	6	3	38
Negative news as a percentage of total for that year	0.00%	43.00%	13.00%	45.00%
Neutral	2	5	17	38
Total	4	14	23	85
Total news % increase over previous year		350.00%	164.00%	370.00%

Source: Lexis Nexis search of New York Times articles containing the word hydraulic fracturing

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