DISSERTATION

FRACKING AND GOLDILOCKS FEDERALISM: THE TOO LOUD, TOO QUIET AND JUST RIGHT POLITICS OF STATES AND CITIES

Submitted by

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ABSTRACT

FRACKING AND GOLDILOCKS FEDERALISM: THE TOO LOUD, TOO QUIET AND JUST RIGHT POLITICS OF STATES AND CITIES

Wicked environmental and energy challenges often originate where energy, the environment and economics intersect (Rittel and Webber 1973). Fracking is one such example. As a practice, it has prompted a certain amount of political debate at both the state and municipal levels. Proponents argue that natural gas extraction creates well-paying jobs, helps grow and revive stagnant economies and that it provides a 'cleaner' burning energy source. Its opponents counter that the technique produces a number of environmental harms such as air pollution, surface and groundwater contamination, places new demands on infrastructure and causes geological instability (Davis 2012).

Ranging from intergovernmental battles to cooperative relationships, the politics of fracking are reshaping the relations between neighborhoods, city hall and the statehouse. To explore the 'second order' dynamics of fracking, this dissertation asks several interrelated questions. What are the state and local institutions, rules and informal norms governing state-municipal relationships when it comes to hydraulic fracturing? To what extent do municipalities regulate fracking and what are the types of city-level regulation? Finally, why are some cities willing to pass land use policies that challenge their state's natural gas extraction goals and preemptive authority and others are not?

To answer the questions above, I consider the second order dynamics in the context of Colorado, Texas and Ohio and a sample of cities in each state. Each state has a high number of citizens living near gas wells, but offers cities and towns varying degrees of land use authority.

To elucidate their second-order relationships and dynamics, each chapter tests potential explanatory variables originating from studies of environmental policy, democratic theory and urban governance. Results suggest that both macro level (environmentalism and mobilization) and micro level concerns (percentage of owner occupied homes and median home values) can affect second order relations and the willingness of local communities to exert more municipal autonomy and challenge their state. My findings offer a more complete picture of second order federalism and strengthen the scholarly and applied understanding of two key American political institutions.

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Fracking and Goldilocks Federalism: The Too Loud, Too Soft and Just Right Politics of States and Cities?

How states and municipal governments govern natural resources is an important intergovernmental question and one that has profound implications for environmental quality, economic development, public safety and federalism. Their shifting relationships, or second order federalism/devolution, reflects the evolving application of formal statutes/ordinances/police powers, the dynamic nature of political contests, the rhetorical and legal strategies employed by intergovernmental actors and the informal norms and operating procedures that influence institutional behaviors and goals. Second order relationships and outcomes are also diverse. They may be positive and collaborative, or beset by inter-organizational and intra-organizational conflict. Extant research has identified these dynamics in foreign policy, welfare reform and fiscal federalism and enforcement of the Clean Air Act. Noticeably absent, however, are projects addressing natural resource governance and hydraulic fracking.[1]

The picture of second order relationships is incomplete. First, fracking is considerably different than the topics traditionally studied by second order scholars. The practice generates real, unpredictable and tangible costs and benefits to state and city governments. Effects are not uniform and are location-specific. Some cities experience significant, dangerous and widespread quality of life disruptions via spills, accidents and the presence of new industrial development in residential neighborhoods and near schools. Communities also do not receive benefits equally. Job growth and rising home values due to extraction can only take place in specific locales. Applicable state structures, the municipal government's historical experiences, its expertise, access to information and its environmental and economic goals further shape fracking's real and

[1] Especially the state-local working relationships that have governed hydraulic fracturing since 2008.

perceived costs. The unequal distribution of costs/risks, capacities, receptiveness and benefits add another layer of complication that likely contributes to episodes of second order conflict, avoidance and cooperation. Each relationship 'type' speaks to the complexities of contemporary intergovernmental environmental management.

What follows in this chapter is a broad overview of fracking's politics in the second-order context. It begins with an introduction of the legal principles that govern the relationship between states and local governments: Dillon's Rule, the Cooley Doctrine and the legal space in between (Hodos 2009). It then pivots to an overview of fracking. Particular attention is paid to where this activity is occurring and the locations of future development, its frequently cited justifications and benefits and the most prevalent critiques. The chapter then takes a sharp turn towards applicable national, state and local regulations that address natural gas extraction and development. It concludes by addressing state-local relationship drivers in selected states. As will be explicated throughout, state and city relationships exist within a web of applicable and often ambiguous state laws and state organizational structures, but also locally centered concerns related to water supply and quality, air pollution, infrastructure, public safety and residents' quality of life and a nascent but powerful notion of community rights.

Problem Background

The federal-state-local system is inherently intergovernmental (Zimmerman 1995; Walker 1995). The participation of state and local governments in environmental policy implementation, however, is relatively recent. Beginning in the 1980s, many federal environmental regulatory regimes shifted power from Washington D.C. to the various statehouses and city halls across the country (Kenney 1999; Scheberle 2004). This represented a change from a top-down and hierarchical system, which according to critics, stifled innovation,

drove up transaction costs and failed to effectively address emerging environmental issues (Fiorino 2001, 2006; Klyza and Sousa 2007). Devolution supporters argued that new actors, including city and county governments, were better positioned to address stubborn environmental problems like climate change, biodiversity and non-point sources of pollution (Fiorino 2006). Advocates also insisted that by transforming the respective roles of the private and public sectors, new organizational paradigms could better manage the complex and cross-jurisdictional reality of many environmental issues (Betsill and Rabe 2009; Davis 2014; Krause 2011; Hempel 2009; Opp and Saunders 2013; Rabe 2006, 2010; Stoker 1998; Vig and Kraft 2009).

Today, the inclusion of state and local policymakers in environmental protection is becoming the preferred method of environmental regulation and policy implementation (Scholz and Wang 2006). As sub-national units of governments become more involved, they are developing new resources, competencies/skills and levels of technical expertise. Despite the overall growth of organizational capacities, city and county entities still vary in their knowledge, staffing, willingness/commitment, funding levels, historical experiences, constraints and opportunities relative to environmental policy and protection (Rabe 2004, 2006; Betsill and Rabe 2006). The intergovernmental administration of environmental programs is further complicated because many federal laws require the participation, coordination and organization of multiple levels and units of government (McGuire 2006). For some issues and in some states, the reaction to growing environmental commitments and responsibilities is cooperative and collaborative working second order relationships. In others, mistrust and conflict dominate state-municipal interactions and ‘loud’ relationships result.

Much like the more frequently studied federal-state connection, state-municipal relationships are not immune to conflict and contestation. Krane, Ebdon, and Bartle (2004) argue that state-local conflicts are as old as the United States. Recent studies of bottom-up activism have found municipalities weighing in on national debates include the U.S. Patriot Act, U.S. Policy towards South Africa during Apartheid, U.S. policy towards the Contra rebels, the second Iraq War and protests against corporate food (Hobbs 1994; Riverstone-Newell 2012; Shuman 1992). And, in many of these cases, cities have not hesitated in symbolically criticizing and tangibly challenging the policies of higher levels of government.

The Legal Environment

Municipal activism exists in a murky legal environment. Unlike states and the federal government, which both have some constitutionally grounded authority; city governments are creations of their states. They typically lack the constitutional and legal authority to force higher levels of government to consider their interests and policy preferences. Yet, they are not bereft of political tools to promote and protect their interests. Riverstone-Newell (2012) likens them to interest groups, who, after failing to successfully bargain and negotiate with state elected or regulatory officials, can resort to outsider strategies such as protests, press releases and press conferences to assert their preferences. Locals might also opt to use their own authority to pass local land use or health and safety ordinances that can facilitate or impede federal and state environmental/energy related goals (Berman 2003; Kincaid 1999; Sherman 2011; Wright 1978; Zimmerman 1995; 2012).

Legal Doctrines: Dillons and Cooley Rule(s)

Through the intergovernmental management and implementation of environmental policies substate governments have developed new resources, capacities and levels of technical expertise (Berman 2003; Betsill 2001; Krause 2011; Rabe 2006). Despite these developments, they still operate in a legal environment established, legislated and oftentimes dominated by the state. While states vary in the discretion and autonomy they grant to city and county governments, each has retained the authority to determine the power and scope of second order relations. States also typically establish the scope of municipal powers and responsibilities including the powers to regulate land use (zoning), natural resources, environmental protection and public health/safety (Bowman and Kearney 2011).

Two legal doctrines define the allocation of powers between states and municipal governments. Each can be placed on a continuum according to the degree it categorizes centralized or decentralized legal power. Dillon's Rule argues that power is centralized at the state level (Bowman and Kearney 2011; Hodos 2009). Under this legal doctrine, cities do not have inherent powers and must seek state legislative approval or authorization before acting. Conversely, under the Cooley doctrine, power between state and municipal governments is shared and legislative authority is often exercised concurrently. States operating with the latter are more likely to imbue their local communities with some inherent powers, especially over issues that have local-only impacts and interests (Berman 2003; Bowman and Kearney 2011; Krueger and Bernick 2012).

Judge Dillon in an 1868 case best articulated the theory of state supremacy by declaring: "municipal corporations owe their origin to, and derive their powers and rights wholly from, the legislature. It breathes into them the breath of life, without which they cannot exist…as it creates,

so it may destroy" (cited by Hodos 2009, 52). This conception of power places the state as preeminent and controlling of local units of government. Under this regime, city governments may regulate in policy areas only after the State specifically authorizes them to do so. Scholars have documented several impacts on municipal operations. City budgets, for example, are under the auspices of the state, constraining locals' ability to raise and collect revenues (Benton et al. 2007). Dillon's Rule also places an expensive intergovernmental burden on local governments. City officials must expend time and other resources lobbying state lawmakers to approve bills that authorize local authority and to reject legislation that restricts this authority. The National League of Cities (2013) reported that in a typical year in an average centralized state, cities and counties file up to 2,000 special acts, requests and exemptions by and from state government. Dillon's Rule is guiding unless there is a constitutional or specific legal limitation that restricts State power.

Because of Dillon's inflexibility and rigidity, many local governments pushed for an alternative legal relationship with the state, best articulated by the Cooley Doctrine. Under it, substate governments enjoy greater "home rule" provisions, more autonomy from the state and the right 'to be left alone' by the state. The framework also expresses an inherent right of local self-government and determination, i.e. home rule that is absent in states adhering to Dillon's Rule (Berman 2003). The National League of Cities (2013, NP) defines this right as the "delegation of [self-determination] power from the state to its sub-units of governments (including counties, municipalities, towns or townships or villages)," often known as home rule. In practice, however, municipal powers and authority can be restricted by the State to cities of a certain class or size and by field/subject area. The Cooley framework is likely to lead to numerous legal challenges and uncertainty as time is needed to sort out a variety of questions

such as what constitutes solely a "state" issue, what is inherently a local one and what is a joint "state-local" issue (Berman 2003).

Dillon's Rule and Cooley Doctrine in Practice

The Cooley-Dillon dichotomy oversimplifies a complex and shifting set of second order relationships. In practice, only 31 of the 39 Dillon's Rule states apply the rule uniformly.[2] The remaining states use the rule more selectively based on the size, class, policy, the jurisdictional type or the location of the community (Boscarino 2013; Bowman and Kearney 2012; Richardson 2011). A similar dynamic is evident with Cooley states (Richardson 2011). Thus, to portray centralization and decentralization as a political 'dyad' fails to account for the rich diversity of power allocations between sub-national and local units of government. No state has completely centralized decision-making authority nor has any devolved authority completely to its local governments. Conversely, all city governments have retained some authority to control their own affairs (through both regulatory enactments and strategies of persuasion) and each state has kept enough authority to establish boundaries for local action (Berman 2003; Bowman and Kearney 2011; 2012; Krueger and Bernick 2012; Zimmerman 1995; 2012).

Less formal mechanisms also shape state-local relations. State and city officials interact with one another through managerial and stakeholder networks and develop personal and working relationships. They also collect and receive information that affect one another albeit they attach differing levels of saliency to pieces of information. Finally, each adopts rhetorical and political strategies to redefine problems, influence others to set each other's agendas, to establish issue boundaries and to achieve policy goals (Berry 1989; Browne 1996; Heclo 1978; Krueger and Bernick 2012; O'Toole 1997; Shipan and Volden 2006).

[2] The application of either doctrine is typically established in State Statute or articulated by a State Court decision (National League of Cities 2013, NP).

Why Fracking?

The politics of hydraulic fracturing offer an ideal lens to study state-local environmental governance and management for several reasons. First, support and opposition do not fall neatly into traditional ideological categories. Davis and Fisk (2014) found that while Democrats more inclined to register opposition when compared to Republicans, partisan elites are bucking their parties relative to natural gas development and issues related to second order federalism. Despite this nascent polarization, Democratic elites, including the governors of Colorado, Wyoming and Illinois support the practice. Part of its appeal is that both economic developers and some environmentalists view natural gas as a solution to economic malaise and climate change (Boudet, Bugden, Maibach, Roser-Renouf, Leiserowitz 2014; Davis 2012; Vig and Kraft 2009). Third, whether because of inability, obduracy or the lack of legal authority, the federal government is not the principal legal and political actor regulating fracking. This void enables states and cities substantial policy latitude and creates a political environment conducive to the study and evaluation of second order dynamics.

Hydraulic Fracturing in the United States

According to the Energy Information Administration estimates, the United States holds 2,119 trillion cubic feet (TCF) of recoverable natural gas. Of this, 60 percent is unconventional gas and trapped in underground shale rock or coal bed formations. Although fracking has been in practice for over fifty years, recent advances in horizontal drilling and extraction technology have made recovering large amounts of unconventional gas economically feasible. Technological advancements, alongside strong price signals and favorable federal policies have

led to substantial increases in natural gas production, often in urban and suburban communities, mostly via fracking (Lucas 2011).[3]

Below is a map of shale plays in the lower 48 states – there are three major regional shale plays – the West (Colorado, Wyoming and New Mexico), the South (Texas, Louisiana and Oklahoma) and the Mid-Atlantic (Pennsylvania, Ohio, New York, Michigan and Illinois) (EIA 2009).

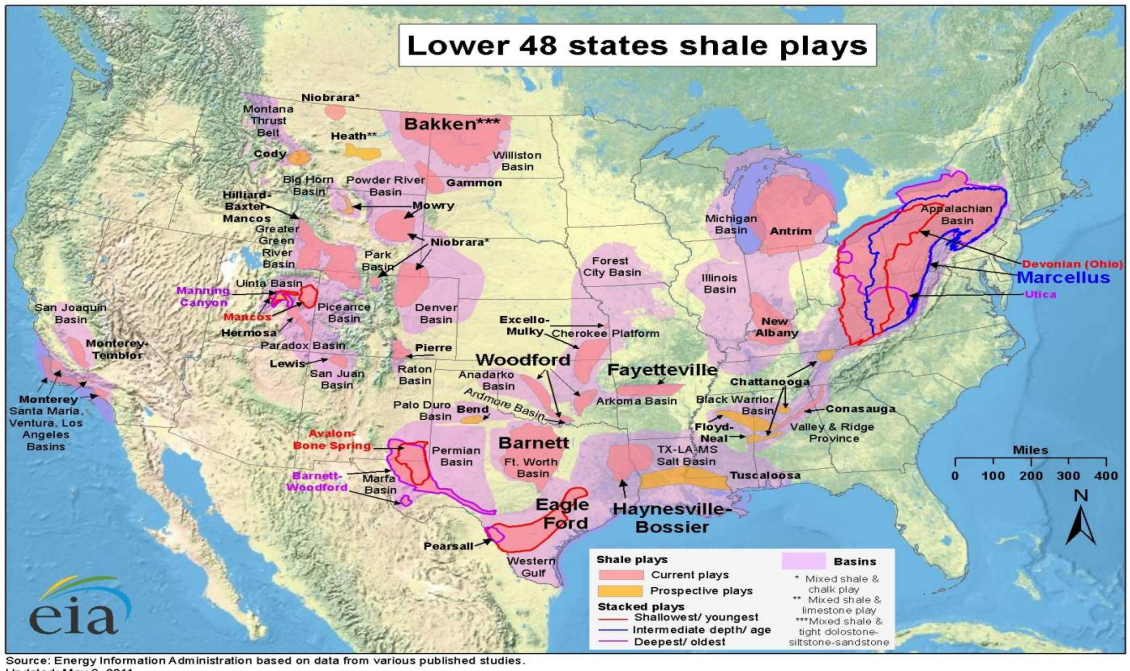

Figure 1.1 U.S Shale Plays

Source: EIA 2009

As an extraction technique, hydraulic fracking is simple. Preparations begin with site/well identification and an application for the requisite permits and licenses. Once state regulators issue the applicable permits, drilling usually begins (a typical site includes a 10,000 foot vertical well with attendant horizontal drilling). Next, drillers concoct a high-pressure blend of sand, water and a unique chemical cocktail and inject it into shale formations, which fracture

[3] Fracking can triple the output of a traditional vertical well and is currently being used to increase production in more than 90 percent of all U.S. gas wells (Lucas 2011).

and release the trapped gas. While the exact composition and volume is related to the well type, geologic formation and ecology, its typical composition is approximately 90% water, 9.5% sand and 0.5% proprietary/trade-secreted chemicals (Davis 2012; EPA 2011; Fisk 2013; National Conference of State Legislatures 2010). Eventually much of what is injected returns to the surface; it can include radioactive chemicals such as radium and barium. This can be stored in above ground tanks, surface frackwater pits or injected into underground wells (Haluszczak, Rose and Kump 2013).

Prospective Benefits

Natural gas production and consumption are nearing a golden age. As an energy source, it comes with a number of advantages. First, natural gas production generates economic benefits including job creation, infrastructure and new revenues. Second, natural gas generates millions of dollars in revenues in the form of severance taxes and impact fees for state and local governments (Davis 2012; EIA 2012; EIA 2012a; EIA 2011). The third benefit is environmental. Relative to fossil fuels, natural gas burns cleaner and its use in place of other fossil fuels can slow down the effects of anthropogenic climate change (EPA 2012, 2011; Tomain and Cuhady 2004).[4]

Economic

State and local governments often charge severance taxes or collect impact fees to mitigate the infrastructure and environmental effects of natural gas mining. For many states and local governments, these additional revenues are vital, as many states have cut income and property tax rates in recent years (Davis 2012; Warner and Shapiro 2013). Utah, for example,

[4] Scientists and environmentalists dispute fracking's benefits. Howarth, Santoro and Ingraffea (2011) for example, noted that fracking's greenhouse gas footprint is much larger than conventionally drilled wells and can be 20 percent greater than coal when it is measured on a 20 year timeline.

collects a severance tax ranging from three percent to five percent and a .2 percent conservation fee (in FY 2011). The fees generated over $65 million for the state's general fund (Salt Lake 2012). In 2012, North Dakota, the State's 11.5 percent severance tax generated $1.9 billion dollars, up from $83,000 dollars before the discovery and subsequent drilling in the Bakken Formation. Even in industry friendly Texas, the State collects revenue from oil and gas extraction. In 2011, state oil and gas revenues generated $2.7 billion (Prah 2013).[5,6] Gas development also decreases high capital costs by taking advantage of a ready-made infrastructure in terms of distribution and transportation. Natural gas, for example, already powers nearly half of all U.S. households, meaning that if production continues to grow, much of the pipelines and delivery systems are in place (EIA 2012b).

Local governments also benefit from hydraulic fracturing. Since 2010, the Pennsylvania counties of Bradford, Washington, Tioga, Lycoming and Susquehanna, for example, each have collected over $4 million dollars in impact fees. In Colorado, of the $175 million collected in state severance taxes, approximately 50% went to the Department of Local Affairs in fiscal year 2012. Of this allocation, the department distributed 70% of these collections to local government via funded projects, with the remaining dollars distributed directly to local governments (COGA 2013a).

Proponents of fracking also cite job creation as a reason for expanded urban drilling.[7] The job creation 'frame' is particularly attractive to state and municipal policymakers in rust belt states (Davis 2012). In Pennsylvania and West Virginia, drilling in the Marcellus Shale has created upwards of 57,000 jobs already (Jackson 2011). In Colorado and New Mexico, oil and

[5] The state levies a tax of 7.5 percent on natural gas and 4.6 percent on oil.
[6] The authors point to a number of variables that impact price including demand of natural gas as a transportation fuel, pipeline costs, environmental regulations and even export markets (assuming no requisite increase in supply). Boersma and Johnson (2012) caution that despite some market elasticity and regulatory uncertainty, current prices are expected to remain low, depressing the demand for new investments.
[7] Much like its environmental benefits, natural gas's overall employment impacts are disputed territory.

gas jobs total over 137,000 and 105,000, respectively (Haythorn 2013; Noon 2013). Ohio's natural gas industry claims that it will create over 200,000 new jobs by 2015, although a study by the Ohio State University places that number closer to 20,000 (Louis 2012). Industry jobs are well paying. The average job in New Mexico, for example, pays $39,525 but the mean for an oil and natural gas job is approximately $86,000 (Noon 2013; Warner and Shapiro 2013).[8] Advocates, in short, highlight favorable economics as reasons to support expanded natural gas production.

The employment benefits of fracking extend to non-producing states. A single well requires more than 2,000 tons of sand throughout its lifetime, leading to job growth in industrial frack sand operations and sectors. Wisconsin's job creation efforts, exemplify the potential economic benefits to non-producing states. Prior to 2008, the State had fewer than ten sites in which industry mined sand; today, the state reports over 100 such facilities, supporting over 2,000 jobs (Redden 2013). Opponents, however, warn that industrial frack sand operations are subject to the boom and bust cycles and risks endemic to energy development and economics (Gazette Editorial Board 2014).

Environmental and Security Benefits

Supporters also extol natural gas's purported environmental and national security benefits. Expanded natural gas production contributes to American national security by supplying end-users with domestically produced energy. Domestic gas adds the ancillary economic benefit of smoothing fluctuations in price because it is less vulnerable to geopolitical security risks and may help prevent future oil wars (Tomain and Cudahy 2004). Natural gas is

[8] Nationally, the expansion of fracking has supported 2.1 million jobs (projected to reach 3.5 million by 2035), raised household income by nearly $1,200 and has generated over $283 billion of economic output as measured by gross domestic product (GDP) (Efstathiou Jr. 2012).

also environmentally friendlier when compared to other fossil fuels. When burned, it emits less pollution and climate change causing greenhouse gases. By refining it, operators may convert it into future and current uses. In the future, natural gas processed into pure hydrogen may power fuel cell vehicles. Current technologies can also benefit. Both power plants and gas-powered vehicles (municipal cars and buses) and even some taxi operators use liquefied natural gas as their primary fuel source (Roberts 2004).

Natural Gas Renaissance

Due to the economic, environmental or security benefits, natural gas has enjoyed a renaissance in recent years (Warner and Shapiro 2013). In 2010, total gas extraction totaled over 25 million cubic feet (MMcf). The EIA expects this number to reach 40 million MMcf by 2020.

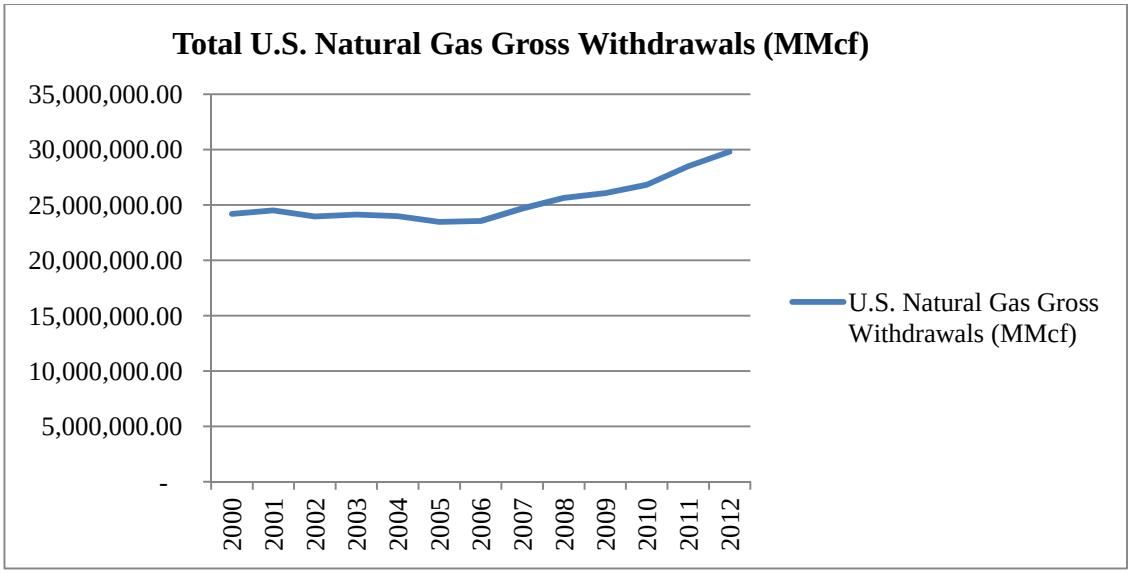

Figure 1.2 Total Gas Withdrawals

Source: EIA 2013a

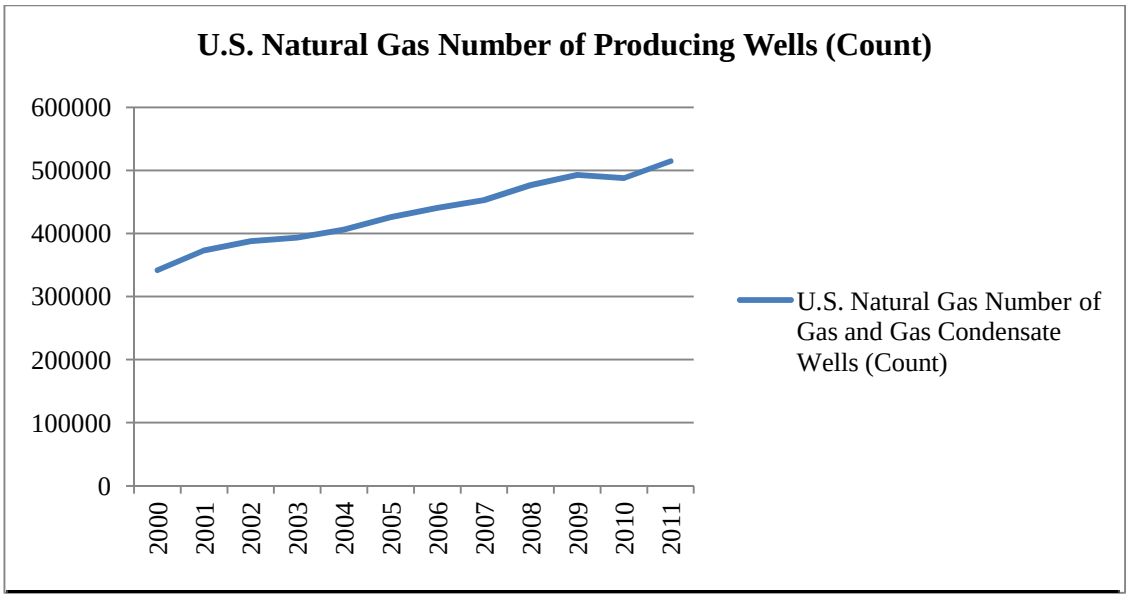

Figure 1.3 Total Gas Wells – Count

Source: EIA 2013b

Driving the upsurge in natural gas production and the number of wells is most certainly hydraulic fracturing. Analysts at the EIA expect that natural gas consumption will continue to grow and will account for at least half of all U.S. natural gas production by 2035.

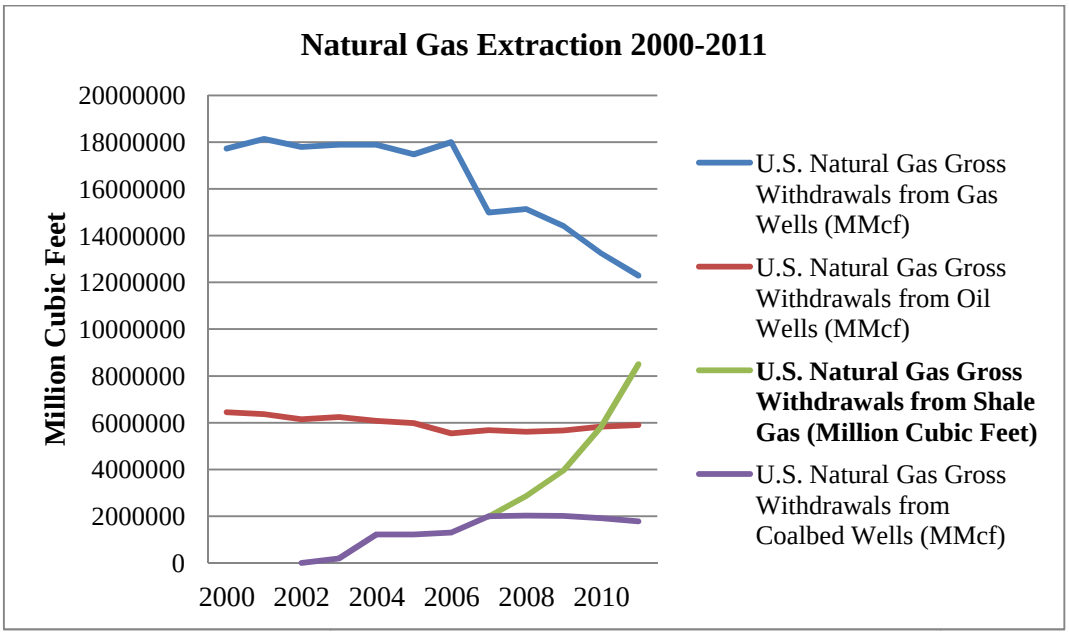

Figure 1.4 The Growth of Unconventional Natural Gas

Source: EIA 2013a

To summarize, proponents of fracking argue that it creates well-paying jobs, generates badly needed revenues for state and local governments, reduces the need to import oil and gas from geopolitically unstable regions and produces a 'cleaner' energy source. Recognizing these benefits, state and municipal policymakers continue to turn to natural gas as a likely solution to achieving multiple goals: satisfying the country's energy appetite, mitigating the emissions of climate change causing gas and as a way out of the current economic malaise (Boersma and Johnson 2012; Davis 2012).

Environmental Costs

Opponents counter that fracking is a source for a number of environmental and social ills (Davis 2012). Critics claim that it threatens air quality in terms of releasing dangerous air particulates and methane, a potent greenhouse gas. They add that fracking threatens concerns for surface and groundwater quality and adds a new demand on scarce water supplies. Finally, fracking can disrupt quality of life through increases in dust contamination, truck traffic and noise and by placing new pressures on local services (Fisk 2013).

Public Health and Air Quality

Fracking releases air pollutants including methane and other air particulates that have detrimental public health impacts including nervous system, immune and cardiovascular systems, skin, respiratory, kidney gastro-intestinal, eyes and cell health (Colborn, Kwuiatkowski, Schultz and Bachran 2011). A Colorado study found that drill sites were associated with increases in acute and chronic health impacts including respiratory ailments and the presence of cancer clusters (Kelly 2012). In Garfield County, Colorado, for example, approximately 460 gas wells released approximately 30 tons of benzene, an amount twenty times greater than the volume emitted by large-scale oil refineries (EGWG 2013). Other studies point to a link between

fracking and poor air quality. Sites located near Pinedale, Wyoming, reported ozone pollution at 124 parts per billion (ppb), 67 percent higher than the EPA's maximum daily limit and giving the rural area air quality worse than Los Angeles (Associated Press 2011; Kuster 2012).

Water

The practice is associated with perturbations in water quality. Drilling operations, deep well injection (a method of disposing of flow back), spills and poor well integrity each can threaten ground and surface water quality (Rabe and Borick 2013; Wiseman 2009). [9] Recent research downstream from a fracking wastewater plant in Western Pennsylvania, for example, detected unusually high levels of harmful and radioactive elements (bromide and radium), salts and metallic compounds. Radium, which can enter the food chain, is linked to leukemia clusters. Bromide rates are also concerning because it reacts with chlorine to form toxic compounds (Main 2013, N.P.). Finally, salinity concentrations were 200 times the legal limit established in the Clean Water Act (CWA).

Quality of Life

Fracking can disrupt quality of life and strain local infrastructure, especially in rural areas (Jacquet 2014; Kuster 2012; Ladd 2013). Rabe and Borick (2013) catalog fracking's localized impacts to include truck traffic, dust contamination, noise and distrust between citizens and governments (*See also* Wiseman 2009). Unincorporated areas or communities without zoning restrictions often face even more intense land use/quality of life impacts. Even when robust and restrictive zoning rules are in place, land use planning cannot abrogate a firm's property rights or its right to access the mineral estate. These intrusions have the potential to disturb nearby neighborhoods and communities with additional dust and noise and pollution (Wiseman 2009). Impacts to local transportation infrastructure can be much more costly. New York State, for

[9] Up to seven million gallons of water for each fracking operation (Groat and Grimshaw 2012).

example, estimated that if it were to permit fracking, the costs for road repairs and enhancements would reach between $211 and $378 million dollars. In Texas, the state's Transportation Commission has already authorized an additional $40 million in road repairs for areas within the Barnett and the Eagle Ford shale plays (Efstathiou Jr. 2012).

Resident quality of life can also be impacted by sudden industrialization brought about by gas drilling (Davis 2012; Opsal and O'Connor Shelley 2014). Jacquet (2014) observed that high rates of gas development contribute to poorly planned and vulnerable development patterns. During the height of extraction, resulting industrialization contributes to overtaxed local infrastructure, second-rate construction of new homes and businesses, higher costs and demands for services and uncoordinated land uses and building sites. The cumulative effect, Jacquet contends is that residents, whose quality of life has diminished, look to move elsewhere. Long-term effects can be even more pernicious and harmful to quality of life, especially once the 'boom' subsides. Many of the new buildings, for example, are likely to be vacant or left incomplete, which can contribute to increasing crime rates. Workers may also be left unemployed and seeking to relocate to the next 'boom' town, exacerbating budgetary pressures.

Employment Realities

The expectation of job growth due to natural gas production is hotly contested territory. Critics argue that employment estimates are inflated and that actual employment number are much lower. They argue that broader recovery effects have, rather than expanded natural gas production, remains behind the small gains in manufacturing jobs (Songer 2014). Challenges in measuring employment impacts are further complicated by the intense politics surrounding natural gas. In the Pennsylvania gubernatorial race, for example, incumbent Republican Governor Tom Corbett's campaign claimed that fracking employs over 200,000 people, a

number that includes both direct and indirect jobs. The State's own Department of Labor and Industry, however, reports slightly over 30,000 industry jobs. Foran (2014) explained that the gap may be the result of different ways to measure job creation. The smaller figure are those individuals directly employed by industry (natural-gas extraction, well drilling, and pipeline transportation). The larger number by comparison includes jobs created or supported in the supply chain and includes occupations ranging from freight trucking to street and road construction.

The Policymaking Environment

The following sections offer an overview of the policymaking environment enveloping fracking. It begins with a discussion of the federal policy towards fracking and natural gas. The latter and more substantive portion delineates the typical roles and environmental responsibilities of state and municipal governments and their intergovernmental dynamics.

National Regulation

Sub-national units of government are responsible for the bulk of natural gas regulation with some federal statutory and regulatory participation, as shown in Table 1.4.

Table 1.1 The Federal Role and Fracking

Law	Effect
Federal Resource Conservation and Recovery Act (RCRA)	Approximately 270,000 oil and natural gas wells drilled in the West since 1980. The Resource Conservation and Recovery Act exempted these wells superfund designation (RCRA History).[10] In 1988, the EPA and Congress agreed not to apply RCRA to oil and gas wastes, overriding objections from some officials at EPA, which had documented 62 cases in which oil and gas waste had caused environmental damage (EGWG 2013).
Emergency Planning and Community Right to Know	The bill requires companies to disclose the release of significant levels of toxic substances to the Toxics Release

Act of 1986	Inventory (TRI). The Oil and Gas Accountability Project, a reform organization argues that law should apply to benzene, toluene and xylene, chemicals often used in oil and gas drilling (EGWG 2013). TRI usually does not apply to fracking operations, under a rule that allows wells that produce less than 2,000 releases to avoid the reporting requirements (EGWG 2013).
Clean Water Act	In the 2005 Energy Bill, Congress exempted all oil and gas construction facilities from the requirements of the National Pollutant Discharge Elimination System (EGWG 2013).
National Environmental Policy Act	Exempts certain oil and gas drilling activities. The exemption, enacted in 2005, shifts the burden of proof to the public to prove that such activities are unsafe. In 2006 and 2007, the BLM granted this exemption to about 25 percent of all wells approved on public land in the West (EGWG 2013).
Safe Water Drinking Act	Under the 2005 Energy Policy Act, the Bush Administration exempted natural gas/fracking operations from disclosing the chemicals used in fracking fluids (EGWG 2013).
Clean Air Act	Recent EPA actions included the issuance of cost-effective regulations intended to reduce harmful air pollution. Regulation is aimed at "reduced emissions completion" or "green completion," which is designed to capture gas that is emitted during fracking operations. It goes into full effect in 2015.

The Energy Policy Act of 2005 (EPACT2005) is the federal law that most directly addresses hydraulic fracking and its environmental impacts. The law exempted the process from the Safe Drinking Water Act's underground injection controls and from its chemical disclosure requirements. While, the EPACT2005 is still the law of the land, the Obama Administration has proposed more rigorous disclosure programs and water-management plans and is moving issuing new rules governing fracking (Mufson 2013). Despite these narrow federal interventions and exemptions, natural gas management remains mostly a state and local issue (Klyza and Sousa 2007).

The State, Cities and the Natural Gas Industry

A common theme throughout this dissertation is that state-municipal interactions have never been immune to conflict. Regardless of whether the relationship is collaborative (just right) or oppositional (too loud), state and municipal policymakers are actively weighing into the second order debates that concern fracking and the enforcement of environmental protections. The relationship can turn on a variety of causes such as revenue sharing or lack thereof, withholding impact fees, water availability and quality, air emissions, impacts to housing costs (both price increases and decreases) and the environment. Despite this burgeoning bottom-up action that can lead to challenges to states' preemptive authority, many cities share their states' goals of increasing development. In other cases, states seek to limit municipal activism, helping to set the stage for second order devolutionary conflict.

Davis (2012) argued that the development of politically powerful state level sub-governments (comprised of industry and trade officials, regulatory departments and state legislators) have favored oil and gas operations. These closed networks protect industrial expansion at the expense of environmental protection and public safety.[11] Industry backed sub-governments have effectively precluded and rejected local activism and other grassroots efforts designed to disrupt the status quo. Cobb and Elder (1972) have suggested that this agenda denial power is especially pronounced when the policy domain is complex, requires technical expertise and when industry possesses ample capital and financial resources.

States, however, are not monolithic supporters of fracking. State lawmakers from Colorado and Wyoming have passed more stringent fracking disclosure rules (Fisk 2013). Other

[11] Davis (2012) noted that oil and gas sub-governments included firms that engaged in exploration, production and distribution, such as pipeline companies, as well as state legislative committees with exclusive jurisdiction and a friendly regulatory agency.

states vary in the extent to which they protect ground and surface water. Illinois mandates that fracked water be stored in above ground storage pits, while in other states, surface pits are an acceptable disposal technique. Finally, in other states such as Vermont and New York, policymakers have effectively blocked fracking through the implementation of statewide bans and moratoria (Davis 2012).

A number of statewide laws and fairly centralized processes govern most natural gas operations (Davis 2012; EPA 2011; National Conference of State Legislatures 2010). Operators begin by applying for a state permit and while specific regulations and requirements vary, states usually require that operators disclose and document their surface and subsurface activities, spill protocols and well construction procedures. Once received, operations begin, subject to state enforcement and oversight, which can be fairly lax in some states. In some states, a public hearing is required prior to the permit's issuance (Davis 2012).

In most jurisdictions, municipal involvement relative to natural gas operations and urban drilling is limited. State oil and gas commissions may authorize municipal officials to participate in other administrative aspects of fracking policymaking. Colorado, for example, gives local governments a role in its decision making process. The commission permits the appointment of a local governmental designee (LGD) during hearings and other administrative procedures. The LGD or a city official may also seek a local public forum (LPF) when a permit applicant seeks to increase well density or to change processes that may affect the welfare, safety and public health of nearby communities (COGCC 2008). Illinois also provides local governments an 'administrative' voice as they may call for a public hearing before the State Department of Natural Resources issues a drilling permit.

State-Local Fracking Battle Lines

The state and local relationship relative to fracking has until recently been fairly uneventful. In the context of state-local relations and hydraulic fracturing, state law usually determines the extent of municipal authority and the ability of municipal governments to intervene in natural gas development and siting decisions. While states have retained much of their authority to oversee drillings, locals can influence development patterns. Municipalities and counties, contingent upon state law, may promulgate general zoning ordinances and public safety laws that may indirectly impact where wells are located, their appearance and security and other ancillary effects of urban drilling (Warner and Shapiro 2013).

Recent second order challenges have erupted in a variety of states often over setback distances land use and infrastructure reimbursements (Davis 2014). Setbacks are considered by which public officials can balance public health and safety, the welfare of residents and environmental protection with the rights of property owners by establishing minimum distances between development and occupied structures. State law varies in the land use discretion afforded to communities. In Pennsylvania, as it does in Colorado, and Michigan, state law establishes uniform minimum setbacks between wells and streams, schools, buildings and water sources, leaving city government little recourse in terms of protecting their citizens' quality of life (NPR 2013). In Ohio, cities may create environmental or conservation zones that block all development and in Texas, municipalities may decide their own setback distances.

Industry argues that setbacks must occur in specific locations that are adjacent or at least proximate to the underground resource. By eliminating options, local governments (and in some cases states) restrict the locations available for firms to recover the mineral. Conversely, locals want flexibility and the ability to protect residents, other occupied structures, green spaces and

bodies of water. Municipal action, however, can decrease the firms' economic efficiencies, preclude opportunities for industry to centralize facilities and reduce revenues sent to the Statehouse and city hall (COGA 2012a).

State Perspectives

The case against bottom up action and for centralized state control is fairly consistent across the States. The Colorado Oil and Gas Association (COGA) typify a highly centralized viewpoint in its setback policy position "drilling practices vary according to the unique geological characteristics of the region…and ensures that agency officials understand the operations in each basin" (COGA 2012c, NP).[12] Regulators in Pennsylvania, Ohio and Michigan also justify centralized state power in a similar manner and explain that without it, a patchwork of local reactions/regulations would result and weaken state policy by imposing an undue burden on businesses, depress revenues, discourage future investment and dampen economic growth (Phillips 2012).

Local Regulatory Attempts

Despite, the strong and nearly monopolistic role states hold in regulating natural gas, locals are increasingly injecting themselves into the political discussions of fracking. In the following, I provide several brief anecdotes of state-local fracking debates.

The West (Colorado and New Mexico)

The Colorado State Oil and Gas Conservation Commission pre-empts local regulation in regulatory areas dedicated to well intensity, location and well concentration and construction. Despite this centralized authority, local anti-fracking campaigns have experienced several political victories. Numerous cities, including Longmont, Lafayette, Boulder, Broomfield and

[12] These regulations must meet or exceed as federal standards.

Fort Collins have passed bans on the practice inside their corporate limits. In Longmont and Fort Collins, municipal bans have been struck down by the State Judiciary but are being appealed. The Counties of Gunnison, Garfield, La Plata and Pitkin have also considered enacting additional standards and rules governing natural gas development. Finally, there have multiple statewide ballot initiatives intending to grant locals more authority to regulate the shape, location and character of natural gas development (Rochat 2012, 2012a).

Substate actions stand on precarious legal grounds and industry has already filed lawsuits against the Cities of Fort Collins and Longmont (Rochat 2012; 2012a). In 1992, the Colorado Supreme Court held that the City of Greeley "could not impose a total ban on the drilling of any oil, gas, or hydrocarbon wells within the city limits" (Denver Post Staff Editorial 2012). Yet, other major Colorado cities, such as the Cities of Greeley, Grand Junction and Colorado Springs are taking no action or have embraced the practice and the revenues fracking will likely generate (Colorado Oil and Gas Association 2012a-b; CBS Denver 2012).

Southern

In Texas, similar state-local tensions have percolated up through the state judicial system. Texas cities enjoy home rule authority and "have, under their police power, authority to regulate the drilling for and production of oil and gas within their corporate limits" (Goho, 2013, 7). Texas Courts have upheld municipal zoning regulations that establish city wide minimum night and day noise levels for well sites, deliveries and repairs and setbacks. In Dallas, the City succeeded in temporarily banning fracking. In August 2013, the City Council rejected the three natural gas permits and, while the city is still in the process of promulgating a drilling ordinance, for the time being, the City will not be issuing any drilling permits (Mosqueda 2013). Setbacks also range in Texas with Cities like Denton pushing for setbacks of 1500 feet while communities,

such as Fort Worth support a much closer setback standard of 600 feet (Heinkel-Wolfe and Brown 2012).[13] City and county actions, however, still may not directly conflict with state law or constitute a 'regulatory takings' of the mineral estate.

New Mexico has also experienced local pushback. The City of Las Vegas adopted a resolution that called for a statewide fracking moratorium until state regulations are in place. In Mora County, county leaders banned the practice based on their concern that fracking would pollute already limited groundwater supplies. Mora County's fracking ban is considered as a "community rights" ordinance, in which local governments assert control over their health, safety and environment and thereby intentionally challenge the state's preemptive authority (Cart 2013).

Mid-Atlantic (Ohio, Pennsylvania, Illinois and Michigan)

Much like Colorado, local governments in Michigan, Ohio and Pennsylvania, ranging in size from Pittsburgh (306,000) to Highland Township (1200) have adopted ordinances that ban or restrict fracking. [14] Local opposition is not constant across any of the states. Voters in Youngstown, Ohio, for example, rejected a proposed fracking ban twice. In many other Pennsylvanian and Ohioan communities, local lawmakers have remained silent, leased excess water to operators and have permitted drilling on municipal property, suggesting an unwillingness to challenge their state's preemptive authority.[15] Much like Colorado, in these

[13] A recent court case involving the City of Grand Prairie, exemplifies the regulatory complexity in Texas. In the case, the court denied a preliminary injunction against the city's landscaping requirements and noise limits relative to frack sites but ruled in favor of the State that the city could not require fencing as the state held exclusive jurisdiction over that particular question (Goho 2013).

[14] Highland Township framed its ordinance in terms of civil and community rights rather than a more conventional zoning ban.

[15] Yet, local action is not limited to bans and moratoria. Collier, Pennsylvania passed a series of ordinances designed to balance between residents' quality of life concerns and industry by requiring companies to reduce odors for nearby properties (located within 500 feet of a drill site) (Negro 2012).

states, industry and state officials argue that local preemptive action violates state law and have sought judicial remedies (Phillips 2012).

State-local conflict has also erupted regarding how Pennsylvania distributes fracking related impact fees. A 2012 law circumvented municipal zoning powers and mandated that cities allow drill rigs in all 'zones' except for densely populated residential areas. Four Pennsylvania communities, which had their impact fee payments withheld by the state, sued the state on the grounds that the State did not have the right to withhold the impact fee money. The State Supreme Court ruled in favor of local governments, finding that the law's language prohibiting local governments from passing zoning rules relative to drilling activity violates the state constitution (Phillips 2012; Rabe and Borick 2013).

Local activism is also evident in Michigan. Following the discovery of the Antrim Shale Play – the state sold its mineral rights in 23 counties, including highly populated Oakland and Barry Counties (the location of a popular State Park). During the auction, natural gas firms outbid residents and other non-profits (EcoWatch 2012). Under the Michigan Zoning Enabling Act, state regulators have also succeeded in centralizing many of the responsibilities to regulate fracking including well design, location and intensity. The legislation also preempts local authorities from passing any zoning regulations that address natural gas wells setbacks (Solomon and Schindler 2012).

Recognizing that the Michigan House and Senate may not be a receptive venue, opponents have turned to alternative venues including city and county governments. In Thornapple, like the nearby communities of Yankee Springs, Detroit and Orangeville, the Township Board passed a resolution calling "our state representatives, Michigan congressional delegation and United States senators to ban fracking to safeguard our citizens from harmful

effects and to preserve our environment for generations to come" (Makarewicz 2012, NP). In other cases, local governments have opted for more coercive measures including bans and moratoriums. West Bloomfield, for example, passed a one year ban and has recently extended it through 2013 (Hopkins 2013).

In Illinois, state-local tensions are also surfacing. In rural Hardin County, Elizabeth Canfarelli (a local activist) suggested that drilling would cripple and overwhelm county services and that increasing revenues may not be enough to offset the immediate challenges brought on by an increase in drilling (Wernau 2013). Mark Haggerty, an analyst with Headwaters Economics in Montana, noted that additional revenues may not be enough to offset short-term costs associated with new drilling. He suggests that local governments can wait up to two years to "get the bulk of the tax revenue that comes from fracking...that's because production taxes don't kick in until a well is producing oil, long after a community is beset by transient workers and truck traffic…the same goes for severance taxes on oil and gas" (Wernau 2013). Citing many of these concerns, five counties in Southern Illinois (Johnson, Jackson, Union, Pope and Hardin) have banned or restricted the practice (SAFE 2013).

The local activism observed in Illinois, like in many other states, faces an uncertain legal future. Recently, Democratic Governor Quinn shepherded through legislation that required all firms interested in fracking to receive a permit from lawmakers prior to drilling, to collect and provide frackwater samples to state regulators throughout the drilling process and to store wastewater in aboveground storage tanks. The new law, moreover, requires open comment periods and hearings for all drilling applications. Yet, the law also centralizes authority and restricts city and county action. In short, local governments must accept fracking but they may

call for a hearing if they or any other entity believes that fracking may adversely affect the community or its surrounding environs (Yeagle 2013).

State-municipal disputes have erupted in several states and the preceding chapter shows many of the scenarios that can precipitate state-local conflict. The following map demonstrates geographically where municipalities have passed local bans and/or moratoria. Second order lawsuits are recent, ongoing or threatened in the following states: Colorado, Ohio, Pennsylvania, New York, Illinois, Michigan, Texas and New Mexico.

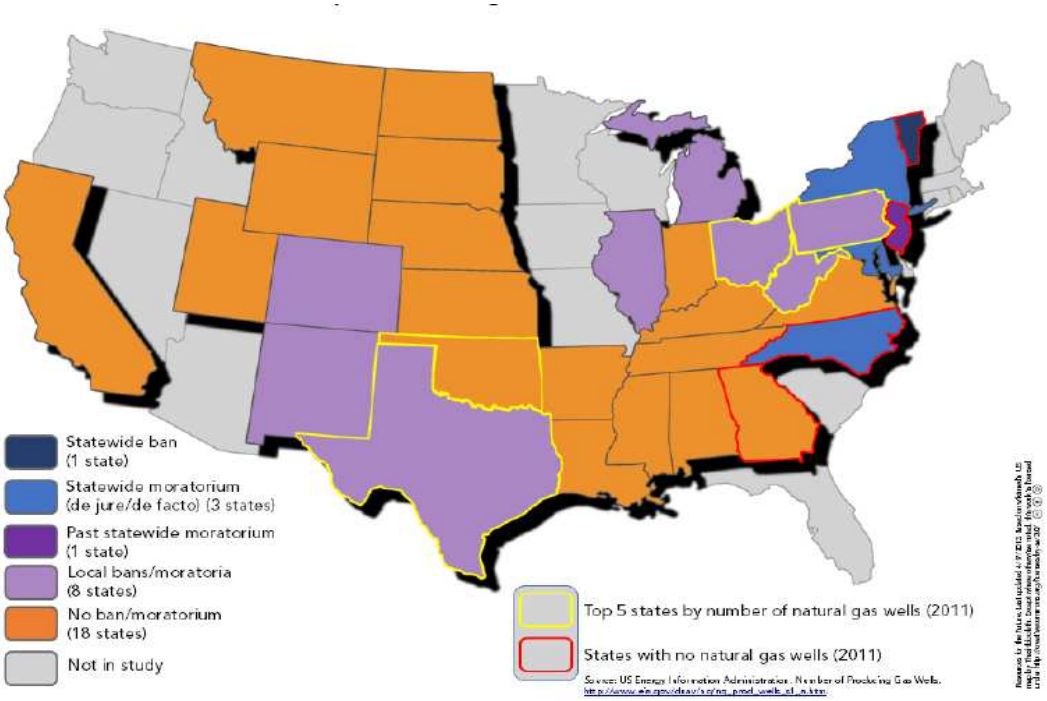

Figure 1.5 State-Local Conflicts

Source: Richardson et. al 2013

Concluding Thoughts

City governments may refuse, ignore, and impede the implementation of state and federal policies, especially when there are local costs and no direct benefits. They also may work cooperatively with higher levels of governments. They do so in an uncertain political environment. As the preceding demonstrates, the structures and decisions made by state and

local governments affect environmental policy and outcomes. A state, for example, may set GHG reduction goals only to see the zoning plans of local governments encourage more driving and low population densities (Bedsworth and Hanak 2013). Conversely, cities may supplement the work of the state by greening its operations and working to decrease emissions through smart growth, renewable energy use and by building bike lanes and walking paths. For fracking, while a state government may encourage extraction; local opposition may seek to ban or limit the practice within its jurisdiction. City governments could also encourage fracking locally in states that are much more skeptical of the practice (Warner and Shapiro 2013).

Plan for the Dissertation

This project began with an overview of fracking and examples of the circumstances that may influence supportive and positive state-local relationships and of the factors that influence a poor and oppositional relationship. It then shifts to the academic literature on second order devolution, a subset of the larger literature on American political institutions. The body of second order federalism research is fairly thin but when appropriate, it is supplemented by insights drawn from the public policy and public administration fields. Relying upon these literatures, Chapter 3 sets forth the research expectations and specifies the dissertation's methodological strategies and decisions. Chapters 4, 5 and 6 examine the second order federalism environment in three separate states (Colorado – Chapter 4, Ohio – Chapter 5 and Texas – Chapter 6). Each state is actively weighing the costs and benefits of urban fracking and has thousands of residents living within one mile of a fracking well. Each chapter is organized to best address and answer the dissertation's three major research questions:

- What are the state structures governing state-municipal relationships when it comes to hydraulic fracturing?

- To what extent do municipalities regulate fracking and what are the types of city-level regulation?
- What is the relationship between sustainable economic development and hydraulic fracturing?
- Why are some municipalities promulgating policies that exceed and/or oppose state-level goals associated with extraction i.e. challenging the state's preemptive authority and others are not?

Research Goals

Because neither states nor their local governments hold an absolute monopoly over fracking governance, the project's questions fit well into what Frederickson (1999) describes as one of the major functions of modern public administration - that is addressing the challenges caused by or associated with the fragmentation and disarticulation of the modern state.[16] The questions also complement each other and lead to a more complete picture of second order federalism politics in the context of natural resources and environmental governance.

The research goals here are both theoretical and practical. Practically, my dissertation aims to uncover the patterns, complexities and realities of modern state-municipal governing relationships. By improving the understanding of how state and local lawmakers address and then implement policy, a number of administrative benefits are possible such as more efficient program delivery, innovation, responsiveness and greater transparency (Kincaid 1998; Krane, Rigos, and Hill 2001; Ostrom 1976). Local solutions are also considered to be a widely supported and fundamental principle in American democracy. Krane, Rigos and Hill (2001, 1) point out that "local self-government is one of the most cherished and fiercely contested ideas in

[16] Frederickson (1999, 708) defines these solutions as conjunctive – which is similar to networking.

the pantheon of principles by which Americans organize their system of governance" (See also Schneider, Jacoby, and Lewis 2011).

The relationship between cities and their state government was an early interest of Deil Wright (1978, 228) who argued that one of the "a chief intergovernmental problem that confronts state legislatures is state-local relations." At a more theoretical level, this project continues the work of Wright and other scholarly activity concerned with intergovernmental management and second order relations. By including a variety of external and internal variables common to the policy and administration literatures, the dissertation supplements and deepens the current understanding of second order federalism and of American political institutions in general. It also offers and tests a typology in an attempt to introduce some predictive power to the second order federalism literature.

Chapter 2
Literature Review

First order federalism researchers center on the relationships, powers and legal arrangements of national and state governments. Interested in a similar set of dynamics, second order devolution or federalism research shifts the focus downward towards state-local governance and interactions. Little research asks and answers second order devolution questions directly. When it does, the literature addresses three major content areas: temporal dynamics, normative justifications for local control and implementation/outcomes. Devolution's foundational ideas, however, have long been the conceptual concern of public choice, public administration (new public management and governance) and public policy (venue shopping and implementation) scholars. When appropriate, these literatures supplement the work of second order federalism scholars and are included throughout.

This chapter is an overview of the devolution literature. It is organized into three major subsections: devolution over time, theoretical justifications for devolution and a discussion of the program outcomes of devolution (i.e. are there local variations and resultant state-local working relationships)? The first traces how subnational relationships vary across broad policy domains (i.e. education, healthcare, natural resources) and historically (Bowman and Kearney 2011, 2012; Stephens and Wikstrom 2000; Stephens 1974). A second category considers devolution's theoretical underpinnings (Kettl 2002; Kooiman 1993; Osborne and Gaebler 1992). From this perspective, the common question is why states and federal lawmakers would seek to devolve their authority to lower levels of government. The third category evaluates devolution's implementation outcomes, i.e. the resulting intergovernmental working relationships and whether or not local variation is present in second order federalism (Cho et al. 2005; Davis 2014; Harvey

2013; Lipsky 1980; Long and Franklin 2004). The chapter concludes by identifying a series of research gaps present in both the second order devolution and environmental federalism literatures and why such gaps are problematic relative to the study of American political institutions.

Category 1 – Broad Measures and Perceptions

Stephen's 1974 work was one of the earliest efforts to directly measure the temporal aspects of second-order devolution. His work identified a general trend towards state fiscal centralization. Updating Stephen's work, Stephens and Wikstrom (2000) concluded that state centralization scores peaked in the mid-1980s and moved towards more decentralization through 1995. Updating Stephens and Wikstom's work, Bowman and Kearney (2011) observed a comparable set of historical state-local power dynamics. Through 2008, they found that public expenditures and revenue collection remained highly centralized with labor more decentralized.[17] Their study showed that all states collected 60 percent or more of total public revenues (within the state). For public spending, state centralization was again the norm, with 41 states classified as "centralized" with the remaining nine states being more balanced. The third measure, public employment, ranked as the most decentralized area of state-local dynamics.[18] Bowman and Kearney (2011) also averaged the three scores into a 'second order composite' rating.[19] The

[17]The authors' consolidated his fifteen categories into eleven (police, corrections, health, hospitals, natural resource, economic development, highways, education, parks and recreation, land use and planning, financial administration and public welfare). Five functions are identical to Stephens: police, corrections, health, hospitals, and natural resources. Stephens' two public welfare categories are collapsed into one. Elementary and secondary education categories are combined into a single ''education'' category as well.

[18] Approximated by calculating a ratio between full time equivalent (FTE) state employment and FTE local employment.

[19] The authors considered States that scored a 100 as completely centralized while a score of zero represents full decentralization.

scores reaffirmed the general trend of increasing state centralization. In 1957, for example, the average state score was 47.1 and by 1995, it increased to 58.[20]

Devolution patterns were far from uniform across the States (Bowman and Kearney 2011). They did note, however, several relationships between basic socio-demographic, geographic variables and the degree of second order devolution. Smaller states in terms of geography and population (e.g., Alaska, Delaware, Hawaii, and Rhode Island) tended to be more centralized as compared to more populous urban states (California, Florida, New York, and Texas). They reasoned that it is easier and more cost-effective for geographically small and rural states to coordinate, centralize and consolidate programs in the state capital as compared to larger and more populous states. Smaller states also confront less 'diversity' in terms of local needs and are more amenable to one-size fits all state policies, which would be problematic in more heterogeneous states (Bowman and Kearney 2011).

Perceptions of Authority

Perceptions of authority, goals and 'interference' shape city-state working relationships. Cho et al.'s (2005) work suggested that bureaucrats perceive their effectiveness as related to levels of professionalization, staff capacity and feelings of empowerment. Goal clarity also affected actors' perceptions of organizational effectiveness and the utility of more localized control. When survey respondents were unsure about what lawmakers meant by 'quality of life' (employment, working conditions, family support services, housing etc.), they were less likely to feel effective at meeting organizational goals (Bardach 1977; Goggin et al. 1990; Sabatier 1986; Scheberle 2004).

[20] Other scholars examine state-local temporal trends through the lens of fiscal federalism (Berman 1998; Krane, Ebdon and Bartle 2004; Watson and Gold 1997). Krane, Ebdon and Bartle (2004) find as a portion of state spending, state aid to local governments peaked in the late 1970s and has slowly diminished as a percentage of state expenditures ever since.

Bowman and Kearney's (2011) data showed that perceptions are related to one's intergovernmental professional position and to the issue area. Data indicated that city managers felt that state lawmakers were the most frequent intruders into local affairs (by appropriating local revenue streams and through unfunded mandates) followed closely by state courts. Conversely, managers considered voter referenda and citizen initiatives as much less likely to interfere with local affairs. Despite broad agreement that municipalities have lost some of their autonomy, perceptions also varied by issue area. Over 50 percent of city managers perceived a substantial or modest loss of autonomy in local finance as compared to less than 40 percent of state lawmakers. Managers also believed that state laws had a harmful effect on city operations although this shifted based on issue area (less severe - parks and recreation to more severe financial administration) (Bowman and Kearney 2011).

Comparatively, state officials were much more sanguine in their assessment of state-local power sharing. Finally, state lawmakers and city managers differed on the significance of state mandates on local government. Data showed that state legislators were generally more positive towards state-directed mandates (believed they were necessary and unobtrusive) while city managers saw them as an unnecessary hindrance to local operations.

Interest in state-local relations has led researchers to also assess whether prior service in municipal, county or special district government shapes how state lawmakers perceive and evaluate local concerns. Lovrich and Newman (2004) found that, overall, Washington state lawmakers possessed lower levels of information about local affairs as compared to other topics. They were also less inclined to prioritize local government matters when compared to other public problems. The authors, however, detected a relationship between experience in local affairs and sensitivity to municipal and county concerns. State lawmakers with previous local

government experience were significantly more likely to prioritize local affairs and be receptive to their interests as compared to their peers without local service.

Hays' (1988) study of perceptions of local personnel relative to Iowa's highway transportation policies similarly detected a complex set of contingent relationships. The study showed state-local perceptions to be generally positive, which he attributed multiple points of local input and to the expertise of state transportation officials. First, the state created a formal role for localities in the planning process by offering them opportunities to express their preferences to Department of Transportation staff. Second, while the agency held an informational and data advantage over municipalities, it simultaneously cultivated a reputation of rationality and technical competence among local policymakers. Its reputation enhanced the department's legitimacy and convinced local stakeholders that their priorities were consistent with statewide needs. [21] Such processes and reputation building, according to Hays (1988), were especially important when IDOT chose to reject a local project. After learning of a rejection, local perceptions of the agency did drop, but over half of Iowa's municipalities still viewed the department as efficiently administered and responsive to local needs.

Category 2 - Why Devolve? Theoretical Justifications

The second category of research attempts to answer the question of 'why devolve or decentralize?' As one of the more venerable questions in political science, public policy and public administration, scholars have offered a myriad of potential answers.

Economic Justifications

Some of the earliest theoretical calls for devolution originated from within the public choice and administrative rationalist movements (Tiebout 1956; Ostrom, Tiebout and Warren 1961). As a set of policy and managerial prescriptions, 'public choice' subscribers rely on a

[21] Data collection includes physical condition, traffic volume and safety hazards.

number of assumptions regarding citizens and governments. It presupposes that citizens are rational and capable of maximizing their utility through their choice of municipal goods and services. Adherents also contend that individuals possess the requisite ability, information and means to achieve their goals. Relative to cities, public choice scholars presume that substate governments possess enough institutional and political flexibility to adjust their taxes and service levels in such a way that they are able to attract some citizens and repel others. When 'scaled up' to a metropolitan or region, the theory/approach suggests that, by competing over tax and service levels, an equilibrium emerges that produces the optimal allocation of public services and taxes (Tiebout 1956; Weimer and Vining 2011).

Scholars have utilized public choice methodologies to identify the economically optimal loci of authority for various government services. In their seminal work, Ostrom, Tiebout and Warren (1961) examined whether or not decentralized networks of public and private agencies govern as efficiently and as effectively when compared to more centralized systems. Their results indicated that small to medium size cities managed water service delivery as effectively as more centralized organizations (Ostrom 1962; Ostrom, Tiebout and Warren 1961; Ostrom 2009, 2010). Later research by Weschler (1968) affirmed that decentralized water agencies were capable of performing just as efficiently and effectively as their larger counterparts. Ostrom (2010) noted that by the 1970s, public choice researchers extended their work into municipal law enforcement and issues of public safety. Much like the previous work on water governance, they were unable to find evidence that suggested larger and more centralized organizations outperformed their smaller peers.[22]

[22] Ostrom's (2010) work summarizes a series of studies conducted in Indianapolis and St. Louis (Ostrom and Parks 1973), Chicago (Ostrom and Whitaker 1974), and St. Louis (Ostrom 1976) and then replicated elsewhere.

Shifting to a more explicit environmental focus, Owens and Zimmerman (2013) examined organizational 'size' and wetland protection. Data indicated that decentralized governance and networks offered citizens and policymakers numerous social and environmental benefits. Citizens enjoyed more opportunities to shape wetland decisions and were more likely to support more robust wetland protection efforts. Institutions also benefitted. Owens and Zimmerman (2013) also found social and administrative benefits (increasing local flexibility and responsiveness to new data and focusing events, finding cost reductions and generating citizen support), which they credited to second order devolution.

Cautions

Despite the optimistic tone of the authors above, Feiock (2013, 398) cautioned that decentralized organizations still cannot resolve collective action dilemmas because "outcomes of individual decisions [are] collectively inefficient in the absence of mechanisms to integrate decisions across policies and/or jurisdictions." Even if the performance of decentralized agencies is comparable or more efficient, when communities fail to consider the decisions of their neighbors, they inevitably run the risk of programmatic overlap, duplication, redundancies and inefficiencies.

The lack of regional coordination has contributed to a multitude of environmental and urban development challenges. Savitch and Vogel (2000), for example, pointed out that suburban development patterns have contributed to growing levels of social and economic segregation between 'central city' minority groups and more affluent middle-class suburban whites. Uncoordinated suburbanization has also led to environmentally destructive land use patterns. New suburban growth has replaced millions of acres of open space, wetlands and farmland, hastening soil erosion and contributing to the increasing prevalence of urban flooding (Savitch

and Vogel 2000). Arguing that land use patterns have serious financial implications, Yin and Sun's (2007) work examined the financial impacts of sprawl and found that by failing to coordinate growth, substate governments have spent millions of 'avoidable' tax dollars largely through redundancies and overlap.

*N*ew *Public Management*

Relying on their public choice orientation, adherents of New Public Management (NPM) support managerial and policy devolution (Barzelay 1992; 2001; Hood 1991; Kettl 2005; Osborne and Gaebler 1992). To solve problems, NPM challenges conventional top-down administrative systems by advocating for managerial flexibility and empowerment of lower level governments and actors. By imbuing actors with greater discretion, managers may then creatively and effectively address complicated public problems with improved economic efficiency and responsiveness (Barzelay 2001; Eggers and O'Leary 1995; Gainsborough 2003; Sunley, Martin and Nativel 2001).

Governance

Public governance literature provides a second tangential linkage to second order federalism. Kooiman (1993) defined governance as a system in which clients, suppliers and producers work together to develop and implement policy. Proponents assume that no single sector or agency holds a monopoly on the production and consumption of goods or on topical expertise. By working together as co-producers and consumers, each may leverage each other's strengths and deliver better public policy.

Governance manifests itself in fluid inter-organizational networks and other public-private arrangements. Fattore, Dubois and Lapenta (2012) contended that interactive relationships and learning opportunities form the foundation of effective governance networks.

Networks are necessary because multiple levels of government and sectors must participate and communicate with each another to address contemporary challenges (See also Kettl 2002). Actors must also learn because the paradigm calls upon public managers to recognize and rely upon the expertise and skills of other actors. By recognizing co-dependencies and each actor's expertise, participants learn and work together to create, design and execute effective public policy (Feldman and Khademian 2002, 534). Ostrom's 2009 polycentric governance approach to climate change documented additional organizational benefits. Through their participation, subnational and substate agencies could build new organizational capacities and competencies (See also May 1992). Innovations may also be 'scaled up' leading to regional and national programs and benefits.[23]

Summary

Financial benefits and programmatic flexibility are the foundations of economic approaches justifying devolution. Grounded in the language of new public management and governance, devolution incents higher levels of government to authorize greater levels of lower i.e. local and managerial autonomy. They do so because devolution is seen as a vehicle to promote innovation, policy responsiveness, programmatic flexibility and policy experimentation., which lead to more effective solutions to pressing public problems. Ultimately, devolution gives local governing bodies the capacity to customize solutions that fit their unique policymaking context in a way that reduces overall costs.

[23] Lindblom (1959) identifies a critical benefit of incremental policy change. In short, through incrementalism policymakers are less likely to pass policies that generate negative economic consequences because change only occurs in small adjustments and leading to successful programs quickly diffusing outward to other governmental entities

Political Justifications

Institutional and political factors also contribute to decisions to devolve power (Kincaid 1999; Riccucci 2005). Policy scholars note that the selection of a municipal or county institution instead of a state agency may be unrelated to finding economic efficiencies but because of strategic partisan preferences. Devolution, here, takes place after actors strategically select institutions (Baumgartner and Jones 2009; Pralle 2006; Sherman 2011). It may also result from state lawmakers seeking to avoid politically damaging votes.

Legislative Incentives

Peterson's 1995 work identified political rationales behind state level decisions to devolve powers to local governments. Elected state lawmakers, according to Peterson (1995), devolved power to avoid showing support for less popular redistributive and regulatory programs. Devolution, according to Peterson generated two benefits for state elected officials. First, they avoid being on record as supporting programs likely to mobilize opposition and to give credence to future talking points (See also McCabe 2000). A second benefit is less nefarious. Peterson (1995) argued that lawmakers' desire to frame their decision to devolve can also be treated as one made in support of local empowerment and self-determination, which "is one of the most cherished and fiercely contested ideas in the pantheon of principles by which Americans organize their system of governance" (Krane, Rigos and Hill 2001, 1). Political incentives are particularly high when state budgets are as tight as they have been in recent years (Berman 2003; Kincaid 1999).

Kincaid's (1999) research pointed to political motivations behind second order devolution decisions as well. He found that state legislators began to devolve power in the 1980s, less out of a concern for local innovation, experimentation or tailoring solutions, but because

they were confronting intransigent budget deficits. Devolving programmatic power to local governments forces them to generate monies for implementation rather than the state, alleviating state budgetary pressures. A 2003 report by the National League of Cities (NLC) echoed many of Kincaid's findings and concluded that states reduced their budget woes by pushing a variety of programs down to local governments in the form of unfunded mandates (Pagano and Hoene 2003).

Woods and Potoski (2010) also viewed state decisions to devolve authority to local governments as politically motivated. Their data shows that states, which are more open to devolution (i.e. its history and willingness to support greater degrees of local autonomy), are more likely to empower locals to regulate air quality. Interest groups also mattered in their study. Such groups, Woods and Potoski write, were strategic venue shoppers and believed that local governments would be more sympathetic to their cause as compared to state and federal policymakers (See also Abel, Stephan and Kraft 2007; Daley and Garand 2005; Matisoff 2008; Pralle 2006, 2006a; Ringquist and Garand 1999; Schattschneider 1960). Finally, air quality second order devolution decisions were tied to states with greater concentrations of city dwellers, which are more likely to have dedicated intergovernmental officials (Bowman and Kearney 2011; Woods and Potoski 2010).

Empirical research has also examined second order federalism and the degree of local government empowerment in relation to traditional socio-demographic, opinion and institutional variables. Wood (2011) found that state lawmakers typically allot more autonomy to larger, more populated and full-service municipalities. The presence of more educated citizens, according to Wood (2011) also contributed to more autonomous and self-governing municipalities. Likewise institutional i.e. legislative professionalism characteristics shape decisions to devolve power.

States with more professional legislatures (more staff, longer sessions, higher salaries) are more likely to centralize authority as compared to less centralized jurisdictions (Bowman and Kearney 2010).

The decision to devolve may also be partially a function of public opinion of and trust in state/local institutions. Alm, Buschmany and Sjoquist (2011) observed a relationship between higher levels of citizen trust in local government and a greater reliance on local governments for education spending and setting policy. Conversely, when citizens report greater trust and confidence in state government, the state is typically responsible for a larger proportion of public education financing and planning.

Venue Shopping

Defined by Pralle (2006, 2006a) as a search by actors for alternative institutions followed by a deliberate effort to shift control of an issue from one institution to another, venue shopping is another political mechanism by which local governments can become active in regional, state or national affairs (See also Schattschneider 1960). Venues, however, are idiosyncratic. Their symbols, participants, rules, norms and competitive environments are unique and produce different opportunities, values, agendas, goals and obstacles for stakeholders. Problem definitions and strategies, for example, that may be well accepted in one venue and congruent with its values (a city), can fail in another (a state agency) (Houston and Richardson Jr. 2000). Aware of these institutional differences, actors shape their strategies accordingly and select the venues and rhetorical/ideational frames, which they believe are the most likely to generate support. The nature of distinctive venues, when considered in the context of a structural reality where power is incomplete, means that actors can identify and seek out the institutions

predisposed to favor their policies/goals and open up multiple policy 'fronts' (Long 1949; Riverstone-Newell 2013).

The type of problem further drives state-local venue assignment and selection (Cobb and Elder 1972; Lowi 1972). Woods and Potoski (2010) contended that second order devolution is particularly attractive to state policymakers when the nature of the problem varies significantly across the state. The varying sources and concentrations of air pollution, for example, incentivize devolution because neither its effects on public health nor its regulatory costs are felt equally throughout the state.

Civic Environmentalism

Civic environmentalism offers another set of justifications supporting second order devolution. Under the paradigm, decentralized and smaller units of government actively assist citizens wishing to act upon their environmental beliefs. The process involves negotiation, collaboration and learning, with the hope that citizens and stakeholders will find common ground and judiciously negotiate potential tradeoffs. Increasing citizen deliberation and better decision-making via civic environmentalism generates sizable social and environmental benefits. It enables participants to conceptualize and more completely understand environmental problems. Once understood, individuals are more likely to support policies and build social capital that significantly alter their behaviors, causing them to act in ways more conducive to robust environmental protection (John 1994).

Increasing social capital is the second product of civic environmentalism, which is especially noteworthy because of a rising level of disaffection with government and greater sensitivity to real and perceived environmental and public health risks (John 1994; Jacquet 2014; Perry 2012). Dense social networks, Putnam (2000) speculated are likely to include community

members who eschew apathy/conflict and favor working together to resolve collective action dilemmas (like urban drilling). Through the sharing of knowledge and facilitating deeper understandings, networks rich with social capital are more likely to act with the belief that meaningful policy change is possible (Hempel 2009; Lemos and Agrawal 2006).[24]

Category 3 – Second Order Federalism/Devolution and Outcomes

The third body of second order devolution literature addresses questions of political power and how it is shared among and between levels of government and with outside actors (Dahl 1961; Kantor and David 1988; Drabenstott 2006; Elkin 1987; Lindblom 1977; Peterson 1987; Stone 1980; 1993; 2006; Rast 2009).

Top-Down Implementation

Through a vertical hierarchy, the top-down approach holds that administrative and political superiors may effectively oversee, manage and coordinate the activities of subordinates (or lower units of government) (Birkland 2011; Sabatier 1986). Power and information flow down the organizational hierarchy to street and local level actors, who then implement the policy in a manner consistent with higher-level objectives. Despite acknowledging the presence and influence of street-level or local level politics, top-downers argued that principals have enough tools to constrain their agents' behavior (Elmore 1978; Lipsky 1980; Palumbo, Maynard-Moody and Wright 1984).

Top-downers identify a variety of forces that influence how street level agents deliver goods and services (Matland 1995). Ringquist's (1993) research identified four sets of factors

[24] Thinking about and engaging in environmental problem solving encourages a diversity of actors and outcomes. Discussion does not necessarily guarantee consensus or meaningful policies (John 1994). In some instances, civic environmentalism might produce incremental policies that do not recognize the exigency of environmental issues or that operates at scales that fail to overcome collective action dilemmas. It can also trigger a hostile response from higher levels of government.

that impact agent or agency discretion. The first set relates to how well lower level agents understand the statute, i.e. is it clear and unambiguous? The second group centers on the type and clarity of goals and whether there is agreement among top officials relative to how to best achieve those goals (See also Mazmanian and Sabatier 1986). Third, internal and political organizational factors shape the actions and decision-making of street-level implementers. If elected officials and key agency leaders fail to provide the requisite technical, managerial, and financial resources to street-level staff, it is likely that implementation efforts will fail. Lastly, external factors, such as socioeconomic variables, population and education shape implementation effectiveness and outcomes.

Bottom up Implementation

Bottom up scholars adopt the view that effective implementation research begins by studying the lowest level implementers (Birkland 2011; Elmore 1980; Lipsky 1970). They argue that 'street-level' variables related to organizational routines and capacities, expertise, process internalization and networking are influential determinants of implementation effectiveness and to second order variation (Allison and Zelikow 1971; Hjern and Porter 1981; Matland 1995; Maynard-Moody, Musheno and Palumbo 1990; Wright 1978; Yanow 1993). Through these processes and their superior knowledge, lower level agents and institutions possess enough discretion and informational advantages to engineer strategies so that their preferences will likely triumph (Matland 1995).

Implementation and Devolution

Although, the second-order devolution/federalism literature does not resolve bottom up and top down implementation debates, its findings and conclusions do fit nicely within the uncertain nature of second-order implementation outcomes (Clingermayer and Feiock

2001). Some studies have found that substate governments respond to local needs after being empowered by their states (Fording, Soss and Schram 2007). Other studies described harmonious relationships with the State, but suggest that local outcomes and administrative procedures do not vary significantly. In these scenarios, the presence of professional norms was sufficient enough to overcome the motivation and authority to innovate (Harvey 2013; Pegues et al. 2012; Sheely 2013). In other scenarios, there is a clear conflict between substate and state actors.

State-Substate Implementation Conflict

Turner (1990) examined Florida's 1975 Local Government Comprehensive Planning Act (LGCPA) and its 1985 Growth Management Act. Data indicated that both acts strained the state-local relationship. The 1975 Act required local governments to incorporate two state goals: environmental protection and comprehensive planning to reduce urban sprawl. The act was largely ineffectual because legislators failed to include the requisite enforcement powers at the state level to compel local compliance. Without a state mandate, local governments avoided creating climates hostile to business interests (Turner 1990; See also Stone 1980, 2006). The 1985 Growth Management Act also failed during the implementation phase. Tensions surfaced once the state restricted local funding authority.

Bruhl, Linder and Sexton (2013) linked municipal policy strategies and tactics to the likelihood and intensity of second order conflict. The City of Houston used multiple policy tools (regulatory, evidentiary and persuasion) in an attempt to implement policy change at the State and Federal level. Regulatory tools included city ordinances, some zoning regulations (and other legal actions) and contributed to an antagonistic relationship with industry and the state. The city's nuisance ordinance, for example, (used only after less coercive measures failed) generated

the most intense reaction from state and industry elites and dramatically increased tensions between the city and state.

The city also utilized evidentiary tools like information disclosure, monitoring and investigations. Compared to regulatory tools, industry and state officials viewed these as less intrusive and combative. The City established its own air quality monitoring and data collection program and used the data as leverage during efforts to shame industry into improving its performance. It also incorporated the data into a prioritization framework that permitted the city to more efficiently and effectively target its limited resources and persuasive strategies on the dirtiest areas/industries (Bruhl, Linder and Sexton 2013).

A third set, persuasive tools, were the least likely to elicit an oppositional relationship. Tools included the use of moral persuasion and public appeals by city leaders. Mayor White employed this type of strategy throughout his tenure. He called for firms to be responsible for their air pollution and for the State to take on an increased role in protecting the region's air shed. Persuasive tools also formed the foundation of the City's Benzene Reduction Plan. The efforts were largely ineffective at changing industry behavior, but the plan did help the city form a working partnership with the national EPA (Bruhl, Linder and Sexton 2013).

State-Substate Implementation Detachment[25]

Devolution can also lead to local policy and administrative outcomes that do not vary. Sheely (2013) found that despite opportunities to exercise discretion and authority to make exceptions, California county governments' welfare payment patterns did not change. This

[25] While not incorporating the second order devolution explicitly, Pegues et al. (2012) did not detect much variation between states relative to air quality for ozone and NO2. Outside of California, states with worse air quality did not respond any differently from states with cleaner air even after states received primacy. In fact, the majority of emissions reductions were the result of federal standards and not state innovation.

pattern held even when the author included the Great Recession years (2007-2008).[26] In short, county welfare offices did not exercise flexibility and discretion to respond creatively to local economic conditions – one of the main justifications for devolution.

State-Substate Implementation Collaboration with Variation

Fording, Soss and Schram (2007), however, uncovered local variations in county welfare benefits distribution. They connected differences in county-level implementation practices to local political and ideological factors.[27] While, the authors refused to identify a causal mechanism explaining their findings, they did speculate that by devolving power to local agencies, state lawmakers facilitated new policymaking avenues for local bureaucrats. By creating new policymaking pathways for substate officials, local preferences, needs and values led to shifts in county welfare policy implementation.

Local variations also became evident in many of California's environmental policies. Since 2000, the State of California has passed several laws that limit local discretion via mandates relative to anthropogenic climate change. It established new baselines for regional planning, energy efficient building codes and waste reduction requirements. Despite the presence of unfunded mandates, the consequences/penalties for municipal non-compliance were not draconian. In fact, many programs were voluntary, leading Bedsworth and Hanak (2013) to

[26] Sheely (2013) identifies three ways that administrative exclusions could be used as a way to respond to local needs. First, caseworkers could increase their use of the practice when economic conditions are strong. By doing so, they could ensure that only individuals that truly need welfare will receive it. Second, during economic slowdowns, agents could decrease the number of exclusions so that more individuals can access public assistance. Second, during recessions and slow growth periods, exclusions may increase in an attempt to limit county expenditures. Finally, agent behavior may not be responsive to local economic needs but rather variation could be observed due to local political factors.

[27] After controlling for individual-level client characteristics

identify several examples of non-compliance among city governments but also of locals exceeding state-set standards.[28]

Bedsworth and Hanak (2013) embraced the idea of state-designed 'incubating' periods for local officials. During these periods, local governments have the time to develop the additional capacities and resources they need to meet impending mandates. The State's 'waiting period' approach seems to have had some success. By 2006, over 50 percent of jurisdictions met the state's waste diversion standard of 50 percent and have done so with little second order conflict. Krause (2010), however, cautioned that state rules that have 'teeth' must come after incubating periods. She found that because state-level climate policies do not have 'teeth' to them, municipal climate change policies were largely unrelated to the policies passed in their respective state capitals.

*State-Substate Implementation Collaboration with **NO** Devolutionary Variation*

Harvey (2013) concluded that devolution contributes to subnational and substate lawmakers' willingness to depart from Federal goals. In the Texas context, both states and local governments shared in the belief of reducing welfare availability. To meet state goals, locally based workforce investment boards applied two main strategies. First, they restricted access to workfare services and welfare assistance. Second, by using small block grant surpluses, WIBs rewarded supporters through patronage jobs and contracts. The results, according to Harvey (2013) adversely affected access for the politically powerless and poor families to education, daycare and transportation assistance.

[28] In some cases, non-compliers may be ineligible for positive incentives such as state grants (e.g., the new water conservation targets) or lower regulatory hurdles (e.g., easier environmental permitting, an incentive for infill and TOD projects under SB 375). Power utilities do face the prospect of fines for failing to meet renewable portfolio standards, but there is some compliance flexibility and the state has yet to issue any fines.

Second Order Federalism, the Environment and Problematic Gaps

Two literatures speak to dynamics observed in Chapter 1. The first category, second order devolution, directly studies state-local relationships and power allocation and sharing, oftentimes in the arena of welfare reform. The second literature, environmental federalism, examines the delegation and implementation of environmental policies, typically beginning at the federal level. A smaller group of studies combines the two and examines state-local devolution in the context of environmental issues and/or natural resources. Even when combined, interested academics have not drawn a complete picture of environmental/natural resource second order federalism. This gap is particularly vexing in light the growing popularity and reliance on hydrofracking, especially in urban/suburban communities. In response, the agendas' of state and local lawmakers are increasingly being occupied with fracking related questions and concerns.

Gaps in the Traditional Environmental Federalism Literature

Scholarly attention dedicated to U.S. environmental policy and federalism traditionally centers on interstate competition, policy implementation, enforcement and state-federal relationships (Davis 2014; Klyza and Sousa 2007; Scheberle 2004). This research continues to generate insights into the antecedents of state and federal environmental performance/commitment, governance, collaboration and policy formulation and diffusion (Abel, Stephan and Kraft 2007; Agrano• and McGuire 2001; Daley and Garand 2005; Duroy 2008; Kraft, Stephan and Abel 2011; Matisoff 2008; McCright and Dunlap 2011; Ringquist and Garand 1999; Scheberle 2004).

Despite important findings, the environmental federalism literature has failed to sufficiently account for state and local governing relationships. This oversight is problematic for

three reasons. First, state and city governments are recognizing and acting upon sustainable development discourses and policies, often doing so without federal leadership. Second, states have retained their traditional authority over land use (including oil and gas drilling), public health and public safety and are responsible for the administration of several federal environmental programs. Finally, through their decisions and powers, state and local entity policymakers shape the scale, scope and pace of environmental outcomes and their relationships with one another (Betsill and Rabe 2009; Davis 2012, 2014; Klyza and Sousa 2007).

State and Local Sustainable Development

Academic and professional discussions of sustainability have reshaped the between the public and private sector, but have yet to systematically address state-municipal relationships. The contemporary sustainability movement believes that public actions ought to reflect balance between environmental, economic and social equity concerns (Dryzek 2005; Hempel 2009; Keller 2009; Pralle 2007).

As the figure below shows, policies may be placed anywhere inside a triangle (Dryzek 2005). In some cases, state and local goals and policies relative to sustainable development may align with one another and, in other examples, might exist in opposition.

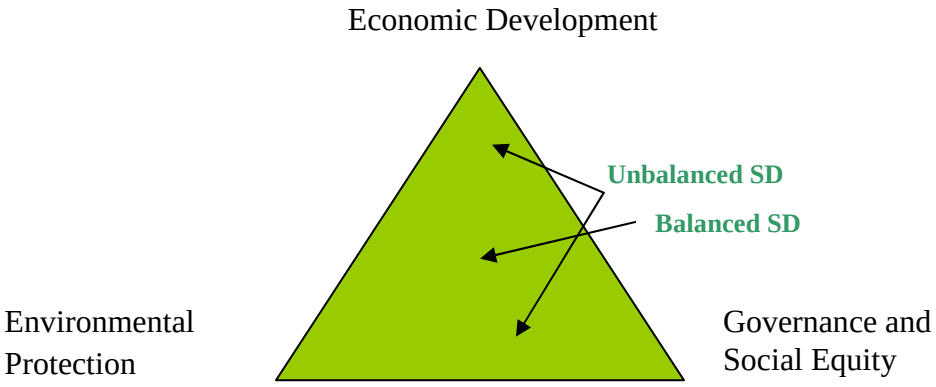

Figure 2.1 The Sustainable Development Triangle

By engendering a balance, sustainable development avoids ecological thresholds and mitigates contemporary environmental challenges (Adams 2006; Kates, Parris and Leiserowitz 2005; Meadows et al. 1972; Opp and Saunders 2013; Portney 2003; Saha and Paterson 2008; Zarsky 2010). Sustainability policies range in scale, i.e. local and national regimes, and in stringency such as policy steering to top-down coercion (Barry and Eckersley 2005; Vig and Kraft 2009; Ostrom 2007).

The empirical record shows that environmental protection efforts can contribute to state and local economic growth (Feiock and Kim 2001; Kamienicki 2006; Layzer 2002; Ringquist and Feiock 1998; Vig and Kraft 2009). Feiock and Stream (2001) identified a positive relationship between firms' performance and environmental regulation. Regulation, they conceded, can generate new costs for businesses, particularly by certain industries and underscores their opposition to environmental policies. But regulation, they found, was just as likely to produce economic benefits. First, by ensuring compliance, firms can compete on a level playing field and leading to fairer competition. Second, regulations provide investment and planning stability, leading to the potential of firms achieving a competitive advantage. Stability produces less erratic returns on investment and more predictable and higher profits. Third, state investments add to a firm's short-term expenses but public investment can also reduce its long-term liabilities, future compliance costs and waste disposal responsibilities – each improving the firm's bottom line. Fourth, by supporting more sustainable forms of economic development, the business community may discourage future regulation and may secure a seat at the table when state or local lawmakers are weighing new policies or programs (Gunningham, Kagan and Thornton 2003; Layzer 2002).

Recent literature recognizes the unique and powerful role that subnational and substate governments play in promoting more sustainable development public policies and protecting resident's quality of life. Portney (2003) broadened this literature to include research on municipal governments. His 23-city sustainability index suggested that wealthier, older and communities in Western U.S. States take sustainability more seriously as compared to those cities with higher levels of poverty and which are located in the East and South.[29] Citizen engagement, he added, explains differing levels of municipal sustainability commitment as well. In their study of twenty municipal climate action plans, Basset and Shandas (2010) also found that more successful plans fostered increased levels of citizen engagement and contributed to a greater number of climate-change learning opportunities for citizens. These relationships remained even when the researchers controlled for the education levels of the population, city size and political ideology.[30]

State and Local Historical and Current Roles

A changing regulatory and policymaking environment has contributed to lawmakers' recognition of the limits of a federal-centric approach and the benefits of first and second order devolution. Alternative regulatory approaches emerged in the 1980s that focused on decentralizing and devolving federal power (Kenney 1999; Scheberle 2004). New governing strategies emphasized flatter management styles, as well as the inclusion of private actors and of decision-makers from sub-national units of government. Contemporary environmental policymaking reflects this change as the federal government now shares many of its responsibilities with state, regional and local (city and county) governments (Scholz and Wang

[29] Higher median family incomes, unemployment rate and home values each produced coefficients that were not statistically significant.

[30] Other variables were conspicuous by their lack of statistical significance. Support for the Democratic Presidential nominee, for example, was unrelated to a city's commitment to sustainability.

2006; Woods and Potoski 2010). This recognition, however, has not translated into rigorous analyses of how states and cities engage one another to solve environmental collective action problems, such as urban drilling.

Under the partial preemption framework, command and control language permits the devolution of responsibility to state and local governments. Although Congress and federal managers still establish national standards, sub-national entities act as the primary enforcement agents (Konisky and Woods 2012; Scheberle 2004). Rabe (2006) estimated that the states issue over 90 percent of all environmental permits, complete approximately 75 percent of environmental enforcement actions, but rely on the federal government for less than a quarter of their funding. Continuing the downward movement of policy management, many states have formally devolved enforcement and administrative responsibilities to local officials (Woods and Potoski 2010). Woods' and Potoski's (2010) study added empirical evidence by noting the various forms that second order relationships may take. Their study identifies thirty-three states that have devolved aspects of the Federal Clean Air Act to city, county or regional bodies. Of those thirty-three:

- Two states provide local agencies the authority to establish air quality standards.
- Thirteen states allow locals to operate the majority of their ambient air quality monitoring stations.
- Six states place primary enforcement power with local regulators.

State and local governments, in addition to their federal responsibilities, promulgate a variety of their own environmental policies (Portney and Berry 2010). Like the federal government, state and local policies range from outright coercion to voluntary programs and market incentives (Hempel 2009; Vig and Kraft 2010). Lehner (1993) pointed out that state and

city governments provide a number of “dirty” services including: trash removal, recycling, waste management, wastewater/stormwater treatment and road building and maintenance. City governments also enact land use-management plans, pass ordinances and write and enforce zoning laws (Betstill 2001; Trisolini 2010). Other local governments provide electrical services to their citizens, giving residents some influence in the sources used for power generation. Through such powers, state and local governments influence the pace and location of development, neighborhood aesthetics, the availability of renewable power and access to recycling and waste diversion programs.

According to Busche (2010) state and local governments may further influence environmental outcomes because of their close proximity to citizens. By being closer and more accessible to citizens, state and local policymakers have more opportunities to learn of their preferences and, in consequence, pass laws that better reflect their community’s needs and concerns. Portney (2009) identified local councilmembers and staff as particularly well positioned to listen and respond to citizens. By doing so, city officials may create a political context supportive of democratic governance by fomenting stronger beliefs in political efficacy among citizens, encouraging the recognition of potential co-benefits between the environment and the economy and by improving citizen’ awareness and increasing their understanding of the severity, exigency and veracity of today’s environmental problems.

Stubborn Environmental Problems

There are normative reasons why research of state-local environmental federalism is needed. Enhanced levels of local capacity, managerial flexibility and knowledge reflect the complexity of ecological and natural resource questions (Bowman and Kearney 2012; Schneider, Jacoby and Lewis 2011). As problems become more diverse and intractable, governments are

also acknowledging their co-dependencies and shortcomings. Locals, for example, cannot effectively address environmental spillovers and externalities because ecological issues do not follow jurisdictional boundaries and impact multiple communities (Ostrom 2009). Conversely, States' policies that fail to recognize the localized impacts of environmental harms are typically ineffective at mitigating the problem, inefficiently administered and implemented and contribute to state-local frustrations (Krane, Rigos and Hill 2001; Zimmerman 2012).

Gaps in the Second Order Federalism/Devolution Literature

The gaps in the second order research lead to an incomplete understanding of state-local relationships. Researchers have primarily addressed the questions of whether or not devolution is taking place, the decision to devolve and the outcomes of second order devolution. Despite, the literature's infancy, it too, has produced key findings that form the foundation of this chapter. But, its missing pieces make ample room for more detailed accounts and for projects that begin the work of second order theory building.

Broad Trends

The first major question asked by devolution scholars is: 'is devolution occurring?' The general answer is that second order devolution is the least likely to occur in areas of revenue collections and expenditures (Bowman and Kearney 2010, 2011; Stephens 1974). These studies incorporate data on a wide variety of very broad policy areas including natural resources, education and public safety. This focus however, misses critical jurisdictional, historical and issue specific variation. States, for example, may enlarge or restrict local governments' operational home rule and land use authority when it comes to fracking while leaving other natural resource issues alone. Courts may also employ various tests in order to determine what is an inherent local power (both in the historical and contemporary sense), what is a mixed state-

local issue, what constitutes a municipal police power and to what extent concurrent regulation is permissible (Krane, Rigos, and Hill 2001; Richardson 2011).

Broad measures also miss experiential and historical differences. States do not necessarily share similar experiences with natural gas extraction; they may hold differing understandings of fracking's costs and benefits and disagree on the proper role, scope and powers of local governments. On the other hand, states with long legacies of home rule authority may centralize natural gas policies because they perceive the alternative as risky or because they see statewide control as a way to encourage economic development while also protecting the environment.

Implementation and Outcomes

This line of research has identified multiple scenarios, i.e. variation and state-local relationships, but lacks consensus as to the factors and causes of such relationships. Below is a summary of the most current research's findings including the relationship between state-substate actors and whether devolution succeeded in local variation.

- **State-Substate Implementation Conflict with Devolutionary Variation**
    - Funding and Mandates (Bruhl, Linder and Sexton 2013; Turner 1990)
- **State-Substate Implementation Detachment with NO Devolutionary Variation**
    - California welfare distribution *(*Sheely 2013)
- **State-Substate Implementation Collaboration with Devolutionary Variation**
    - Florida welfare distribution (Fording, Soss and Schram 2007)
    - California Cities and Climate Change (Bedsworth and Hanak (2013)
- **State-Substate Implementation Collaboration with NO Devolutionary Variation**
    - Texas Workforce Training (Harvey 2013)

- North Carolina Welfare (Cho et al. 2005)

Such studies have produced a wide variety of findings and insights but fall short in two aspects. First, each lacks attention to theory building and to generating explanatory relationships relative to when oppositional/collaborative relationships are likely. Building more effective models of state-local interactions and of second order variations requires an expansion of the pool of policies and explanatory factors, such as hydraulic fracturing. The centralization/risk model, presented in Chapter 3, is an explanatory model that may provide a comprehensive and cogent understanding of the connection between institutional centralization/decentralization, risk and resulting second order relationships.

Second, the focus on welfare devolution has missed other potential second order relationship outcomes. Bowman and Kearney (2011), for instance, argue that outcomes are partially a function of municipal/local capacity and the community's willingness to support its new responsibilities. They go further to provide a number of expected outcomes relative to state policy, summarized in Table 1 below.

Table 2.1 Second Order Relationship Outcomes

Scenario	State-Local Relationship
Possess enough resources to perform new state-ordered tasks or lack the willingness to challenge the state	Little or no conflict, clarification
Possess enough expertise/willingness to go around the state) or to challenge the state's authority	Potential Conflict
Local refusal, failure, departure	Recentralization/Retrenchment or Conflict
Unexpected consequences	Unknown
Municipal Uncertainty about fracking's environmental and economic impacts	Conflict or Collaboration

Source: Bowman and Kearney 2011

The table details a number of possible actions and outcomes but does not incorporate an explanatory element, i.e. what circumstances lead to local refusal or failure to comply with the state. This focus also misses several potential outcomes. First, it does not sufficiently account for the role of outside factors such as the involvement of third party actors or the use of voluntary agreements that cities may sign with industry. Second, the literature does not include the potential for collaboration between states and city governments.

Concluding Thoughts

When viewed in their entirety, the literatures in this chapter paint a picture of intergovernmental dynamics that are ephemeral and tempered by a myriad of contemporary and historical forces. Whether it is through second order devolution or through their inherent powers, state and local governments are central actors in addressing current environmental challenges. Cities are sites of high-energy consumption and waste production, and through their land use and waste management functions they affect overall carbon emissions, renewable power options and natural gas drilling. Local authorities are often key actors in terms of coordinating action between the state, cities and citizens. Finally, the capacity of many state and municipal governments has grown in recent years and they possess a wealth of experiences in addressing environmental issues including climate change mitigation, bio-diversity, renewable power and natural gas exploration. Despite these growing and transforming roles, scholars have yet to systemically evaluate the factors associated with opposition, detached and collaborative state-municipal relationships.

In the U.S context, environmental challenges are ripe for state and local government involvement. In California, pressures to devolve power culminated in Proposition 31, a 2012 ballot question. The failed initiative would have allocated new powers to cities, counties and

schools to implement many of the state's environmental programs.[31] California's attempted devolution was not necessarily a partisan issue. The Natural Resources Defense Council announced "Prop 31 would allow local governments to override landmark state laws that ensure a healthy and clean environment for all Californians" (NRDC 2012a). They allied themselves with the League of Women Voters, California Tea Party Members and the California League of Conservation Voters to urge voters to vote against the plan (NRDC 2012a). In explaining his opposition, Tea Party writer Stanley Kurtz, warned of unelected and unaccountable regional governments circumventing the public will. He equated the act to "redistribution without representation, an Americanized version of the undemocratic financial and political arrangements currently killing the European Union" (Greene 2012).

Much like California's Prop 31, fracking has created a state and local political context replete with legal challenges/threats, heated rhetoric, the execution of political strategies but also examples of cooperation and collaboration. As detailed in Chapter 1, urban natural gas extraction is increasingly encroaching upon and impacting local governments by reducing their air quality, threatening drinking water and reducing residents' quality of life (Davis 2012; Fisk 2013; Rabe and Borick 2013; Wiseman 2009). At the same time, the extraction of natural gas generates state and local economic, tax and direct/indirect employment benefits. These tradeoffs underpin much of the dynamics enveloping second order fracking dynamics.

[31] The plan was financed through a percentage of state sales and property taxes (up to $200 million annually) (KCET 2012).

Chapter 3
Design and Methodology

Prior to engaging in quantitative or qualitative work, the researcher must make a number of design choices. He or she must formulate theoretically rich research questions, adopt the appropriate conceptual framework, operationalize the dependent and independent variables and determine the project's overall scope and logistical boundaries (Tannewald 2007; Yin 2009). This chapter aims to do that. It presents and explains the project's overall methodology and design decisions. It begins with a brief description of three significant research questions and an explanation of why a mixed-methods approach is appropriate for this project. The chapter transitions to a description of the 'operational details' of case selections of both the states and municipalities being assessed.

To explore the 'second order' dynamics of fracking, three major questions guide this dissertation.

- What state structures govern state-municipal relationships when it comes to hydraulic fracturing in urban and suburban communities?
- How and to what extent do municipalities regulate fracking, i.e. what are the types and popularity of city-level policy response to fracking?
- Why do some municipalities promulgate policies oppose state-level goals associated with extraction, i.e. challenge their state's preemptive authority while others do not?
- What is the relationship between 'sustainable economic development,' mobilization and municipal fracking regulation?

Using Mixed Methods

I utilize the comparative case study method to answer my three major research questions. Case studies offer a number of advantages for policy and administrative research (Bennett and Elman 2006; George and Bennett 2005; Gerring 2007; King, Keohane and Verba 1994; Mahoney 2010; Yin 2009). Yin (2009) argued that case studies are appropriate when the research goal is to understand a contextually driven, real-life social and/or political phenomenon in depth. Case studies, Yin continues, offer the opportunity for research to develop a more nuanced and detailed account of causal factors or influences. Insights can then inform alternative hypotheses to be tested in future research (George and Bennett 2005; Kaarbo and Beasley 1999). Finally, case studies are suitable when the state of applicable research is inchoate. This makes it difficult for researchers to draw upon a rich body of literature to test the plausibility of an expected relationship or set of relationships.

Mixed methods bring balance and rigor to a research project. Strictly qualitative work, for example, makes it difficult for a researcher to make generalizations about the sample's overall population and to identify explicit causal linkages between the variables (George and Bennett 2005; Yin 2009). Without qualitative work, however, research may miss out on key explanatory variables and more nuanced relationships. Statistical techniques, without regard to qualitative measures, are also problematic. There are limitations to effectively operationalizing variables and to accurately measuring the effects of potential explanatory factors such as: focusing events, interest group influence and communication, social capital and the political will necessary to challenge the state. Yet, quantitative methods improve the researcher's ability to make statistical inferences and probabilistic statements (George and Bennett 2005; Yin 2009).

The ephemeral nature of intergovernmental relations and the exploratory nature of this project also limit the utility of relying on just one methodology. Intergovernmental relationships change rapidly and build upon existing working relationships (Anderson 1960; Klyza and Sousa 2007; Wright 1978). As evidenced in Chapters 4-6, new dynamics, unforeseen challenges and random focusing events can further complicate measuring second order and intergovernmental relationships (Davis 2014; Frederickson et al. 2012; McGuire 2005; Stever 2005; Wright 1978).

Units of Analysis

City-state relationships exist within a multi-dimensional web of multiple governing relationships (McGuire 2005). States and municipal governments operate within this web while concurrently confronting and debating the costs and benefits of hydraulic fracturing. States are typically the dominant actor but their power is incomplete. They set broad parameters by which state regulators and municipal officials make drilling and related land use decisions (Bowman and Kearney 2011; Woods and Potoski 2010). City governments also play a critical role in second order relations. They often implement state decisions and regulations and make decisions that can impede or facilitate state policy goals. Communities also experience, first-hand, the environmental and economic impacts of many state level decisions (Bowman and Kearney 2012). Recognizing the pivotal role in fracking land-use politics, this dissertation focuses on cities/towns (that have land-use and zoning authority) as the unit of analysis.

State Involvement

Second order natural gas politics exemplify the powerful role of state institutions (Cremer and Palfrey 2002; Davis 2014, 2012; Mashaw 2006; McGarity1991; Rabe and Borick 2013, Riccucci 1995). Even in states with strong home rule provisions, State Oil and Gas Commissions or Departments of Natural Resources often establish and enforce the protocols and procedures

that operators follow (e.g. well intensity and siting, information disclosure, environmental health and safety regulations, setbacks, impacts to wildlife (if any), public notifications and waste management). They do in varying degrees of stringency for both municipalities and industry.[32,33] Many of the policies favored by industry and protected by the sub-government's hegemonic position limit opportunities for opponents to achieve non-incremental policy changes (Hayes 2001).

State policymakers can also establish policies that lead to collaborative relationships with city governments. Finally, the state may remain on the 'sidelines' and permit municipalities a large role in setting rules for the land use impacts of urban drilling and fracking (Barnes 2013; Boscarino 2013; Goho 2012). Conversely, state leaders may adopt an antagonistic position towards local governments by participating in lawsuits against local entities.

Municipal Roles

Cities play a critical role in the environmental governance puzzle (Boscarino 2013). According to Bowman and Kearney (2012), states are the dominant actors in establishing the jurisdictional boundaries of second order federalism. Yet, the parties responsible for devolution's outcomes are less clear (Bowman and Kearney 2012). Second order outcomes are a function of municipal governing capacity and the willingness of city leaders to support their new policy responsibilities (See also Gargan 1997; Kodras 2001). Bowman and Kearney's (2011) study depicted several scenarios and an expected outcome, as shown in the table 3.1 below.

Table 3.1 Devolution's Potential Outcomes

Municipal Centric Scenario	State-City Relationship Outcome
1. The city possesses enough resources to perform new state-ordered tasks or it lacks the willingness to challenge the state	Little or no conflict

[32] This is discussed in greater detail in Chapter 1 – with the descriptions of both the Dillon and Cooley Doctrines.
[33] Specific permit requirements will be discussed in greater depth during the presentation of the case studies.

2. A city refuses or fails from the state's goals	Recentralization/Retrenchment or Conflict
3. A city circumvents the state and but does so in a way that does not challenge the state's preemptive authority	Unknown
4. A city action that leads to unexpected consequences i.e. third way or a departure from state policy/goals	Unknown

In the first relationship scenario, cities possess enough resources and organizational capacity to adequately perform state-ordered tasks and to implement policies effectively. This can be accomplished with or without state assistance. Bowman and Kearney (2011) expect that under such a scenario, little to no second order conflict is likely. The authors' second scenario examines attempts to devolve power that fail. The most likely result is the state (re)centralizing authority and to exacerbate second order tensions. The third outcome, non-purposive and unexpected, contributes to expected and unforeseen political consequences, which Bowman and Kearney (2011, 577) describe, "as having the potential to be unpleasant."

Municipal governments possess formal and informal powers that shape the politics of second order fracking and the larger issue of policy implementation. They pass and enforce zoning ordinances, abate nuisances and enact other laws that protect the public's health and safety. Like interest groups, municipal political strategies include issue avoidance or expansion, and negotiation with state officials and industry. Cities might also adopt outsider strategies such as protest tactics, press releases and conferences to advocate for their claims (Baumgartner and Jones 1991; Berman 2003; Bruhl, Linder and Sexton. 2013; Kincaid 1999; Pralle 2006; Riverstone-Newell 2012; Sherman 2011; Zimmerman 1995; 2012). Whether it is through formal or informal actions, municipalities can and do shape second order outcomes and the relationships with state leaders.

Dependent Variable

How do city governments make decisions about environmental policy? Are choices between economic development and environmental protection mutually exclusive? Does this dichotomy extend to decisions about urban natural gas drilling? With regard to municipal decision-making, I ask several questions: what actions are municipalities taking towards fracking? And, do certain predictors influence the type of policy actions adopted or taken by city governments? The dependent variable therefore consists of municipal policy actions taken to either impede or facilitate natural gas development.

I placed each sampled (discussed on pages 77-83) city's policy (substantive and symbolic) on a municipal response 'table', placement of which offers a number of methodological advantages. First, as a heuristic, it captures the range of second order dynamics and is particularly useful in categorizing municipal actions and understanding how state and industry officials will likely respond, i.e. will the municipal actions lead to a supportive (collaborative), indifferent (too soft) or oppositional (too loud) second order relationship (Bruhl, Linder and Sexton 2013). Application of a policy scale also helps answer the dissertation's second major research questions by providing a descriptive and explanatory account of how municipalities are responding (ranging from symbolic resolution and more coercive measures banning fracking) to increasing urban drilling.

Finally, the small number of cities per state and their distribution pattern preclude using an ordered probit model. By scaling the municipal responses, however, it is possible to group them into new dichotomous dependent variables that address the third question (challenging the state's preemptive authority) via logistic regression. For each case study, I recode municipal

policy (or policies) as a 'yes/no' variable as to whether or not the municipality exceeds the state's policies and whether city policy challenges the state's preemptive authority.

Opposition (From a state centric perspective that supports fracking)			
Bans and/or Moratoria	Zoning regulations that exceed the state standards and limit where development may occur	Banned on municipal owned property	Resolutions against the practice

Circumventing the State (Exceeds State – No Challenge to State Authority	**Support (From a state centric perspective that supports fracking)**	
Voluntary agreements with industry that still permit development	No Action, special use permits or resolution in support of development	Ancillary actions i.e. selling/ leasing excess water

Figure 3.1 Municipal Governments' Hydraulic Fracturing Policy Action Scale

Outright bans and longer-term moratoriums on natural gas development are likely the most severe policy options that a municipality can enact. Moving towards the center and less likely to raise the ire of industry are policies that restrict oil and gas development to areas zoned specifically for development (or restrict it in certain zoned areas i.e. residential) and bans on public spaces such as parks. Despite permitting development, zoning regulations are considered 'opposition' since they restrict company autonomy, limit where drilling may take place and typically exceed state setback/buffer zone policies. Further on the continuum are resolutions against the practice. These actions are not legally enforceable but are indicative of the municipality registering its opinion on fracking or second order policies and going on record for or against some policy (Barnes 2013).

Municipal actions may also restrict industrial development without challenging the state's preemptive authority. Closest to the middle of the scale are voluntary agreements between cities and industry with terms that generally exceed state standards. Voluntary agreements can vary in their scope, applicability and even the actors involved. Despite wide variation, their genesis is

often precipitated by a desire to increase participants' (local government, state government and oil and natural gas industry) flexibility, improve effectiveness (protect the environment and public safety while permitting development) and to decrease transaction costs (Carmin, Darnall and Mil-Homens 2003).

Voluntary agreements can be a considered a 'third way.' They are legal documents that permit more restricted forms and locations of development but are not at the scale of comprehensive zoning regulations. As compared to zoning schemes, they are more ad-hoc, do not necessarily involve the state and indicative of a local community's recognition of the state's legal authority but simultaneously demonstrating dissatisfaction with the state's regulatory regime relative to fracking. Voluntary agreements between cities and industry are typically focused on providing the city legal protections, incorporating citizen concerns about air and water quality, emergency and disaster planning, enforcement and information sharing and regulatory stability for industry by filling in gaps in state language.

Municipal governments may also opt to remain silent and rely on applicable state law and policy to guide development. Finally, city governments can voice their support for fracking by promoting additional development within their limits or by passing industry-favored legislation (Barnes 2013). I code these approaches in the table below:

Table 3.2 Municipal Policy Position Coding Schematic

Policy Action	Coding Value
Bans or Moratoria	0
Zoning Regulations (more stringent than state laws)	1
Bans on municipal owned spaces (parks, easements)	2
Resolutions against the practice	3
Voluntary Agreements (stricter than state standards) but permitted under state law	4
No Action/resolutions favoring industry/special use permits (that do not conflict with state law)	5
Actions increasing development (oil and gas) including leasing excess water and/or leasing public spaces for oil and gas development	6

Methods for Selection

I use multiple mechanisms to identify and select cases for inclusion. I began by excluding all jurisdictions that currently do not have and/or will be unlikely to have future drilling activities.[34] The second and third mechanisms used to identify appropriate cases are based on a state centralization continuum and on a case selection technique known as diverse cases. By maximizing the variance along the major independent variable (the state centralization/ decentralization continuum) I selected the states of Colorado, Ohio and Texas. These states represent a high, middle and low degree of state centralization (diverse cases) relative to fracking and have hundreds of thousands of citizens living within one mile of a fracking well. The logic for each is addressed in the following paragraphs.

Identifying the States

A number of possible measures and organizational schemes can be used to identify states, appropriate for consideration. One possible way to organize these relationships is to classify them according to a continuum based on degree of centralization of natural gas policies and the

[34] I accomplished this by examining where fracking operations are currently ongoing and where the Energy Information Administration has located oil and gas reserves. The logic for this filter is that state and substate governments that currently do not have fracking and likely will not in the future are unlikely to be engaged in the intergovernmental management of fracking.

proximity of natural gas wells to citizens. Under this framework, I place the degree of centralization (state control) on the X-axis. In an attempt to approximate proximity and exposure to development, a second dimension (Y-Axis) ranks the number of residents located within one mile of a frack site. Once eligible states are identified, I use the state's political leanings and geographic region as additional natural break points and as ways to ensure that the selected states are diverse (Patton 2002; Seawright and Gerring 2008).

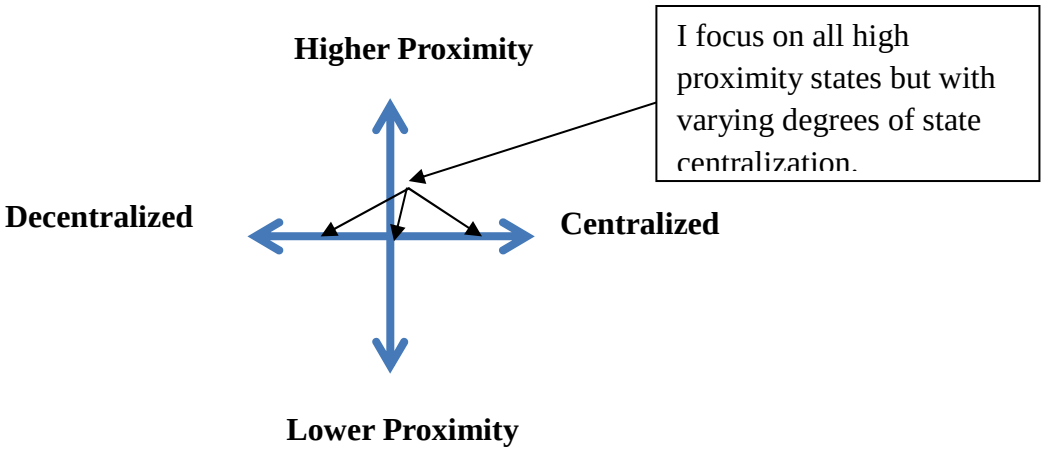

Figure 3.2 State Filters

Why Proximity?

There are a variety of mechanisms that identify the sources responsible for causing the public to perceive something as risky – both involuntary and voluntary.[35] While the particular source causing a citizen or institution to evaluate something as risky is certainly interesting, it is not necessary for understanding why it is an important antecedent to understanding citizen behavior and the working relationships between states and city governments. Rather, it is the effects of unwanted proximity and its motivational impacts on citizens and municipal actors that

[35] The psychometric model grounds risk evaluation in the activity's characteristics (number of people exposed or wells, or acres, etc), its novelty and the severity of potential accidents i.e. a spill (Slimak and Dietz 2006). A second model, the value-belief-norm theory (VBN) argues that that risk is more related to characteristics of the individual evaluating the activity rather than the activity itself. According to this latter approach, variables such as partisanship filter new information and organize the degree of risk that the individual associates with the project (Dietz, Fitzgerald and Shwom 2005; Sjoberg 2000; Slimak and Dietz 2006).

are essential to understanding interactions between states and city governments. The selection of states based on citizens' proximity to wells rather than overall production recognizes the role proximity plays in site-based political disputes and limits this analysis to states in which fracking may be occupying a place on state and local institutional agendas.

Viewing something (like a frack site) as an unnecessary intrusion on quality of life can act as a motivational factor. They interact with other perceptual factors such as ideology and beliefs about a policy or specific problem. Their combined impact shapes an individual's behavior and intentions, i.e. his or her motivation to act (Ajzen 1991). Highly motivated individuals, Ajzen (1991) found are more likely to push for a desired outcome and more willing to spend the time and energy necessary to carry out goals as compared to less motivated individuals. Place-based disputes, such as those associated with fracking well sites or underground injection wells, typically originate because of how nearby populations understand and perceive (tempered by ideology, etc.) the costs and rewards of the facility or project (Bidwell 2013; Davis and Fisk 2014; Hamilton, Colocousis and Duncan 2010; Schlosberg 2007; Sherman 2011; Slovic 1987; Tierney et al 2001).

Elevated levels of unwanted proximity or closeness to wells among citizens contribute to a number of possible second order dynamics. Municipal officials, who believe that fracking threatens their environment or citizens are likely to be more receptive to a grassroots group seeking to build a citizen initiative restricting development than those city officials who do not see fracking as encroaching too close to the community. They may also be more motivated themselves to pass a ban or to seek out a memorandum of understanding (voluntary) agreement with a developer. Concerned citizens and elected leaders may also utilize their municipality's zoning and public health power to restrict fracking. Focusing events like a spill, accident or a

water-well running dry can further sharpen citizens' or city councilmembers' perceptions (Birkland 2011). Following a focusing event, citizens living or working close to the frack site or underground injection well may activate even more citizens in support of municipal challenges to the state's preemptive authority.

This first dimension reduces the number of possible states to eleven. The following table shows each of these states along with the number of individuals living within one mile of a natural gas well (Gold 2013). Residents in these states are more likely to feel the impacts of development, to be exposed to potential environmental risks and to experience infrastructure strains of fracking. They are also more likely to encounter air and water pollution and to face exposure to dangerous chemicals should there be a spill of fracking fluids or wastes. I also list other factors such as the state's ideological predisposition, its overall production of natural gas, its region and the state's economic dependency on oil and natural gas extraction.

Table 3.3 Selected State Level Characteristics for Natural Gas Producing States

State	Pop within 1 mile of a site after 1999 (in millions)	Natural Gas Production	Total GDP (Avg. 2008-2011)	2012 Politics*	Region
Texas	6.09	8	7.42 percent	Red	Oil Patch
Ohio	2.63	20	0.12 percent	Blue	Rust Belt
Pennsylvania	1.78	12	0.27 percent	Blue	Rust Belt
California	1.62	21	0.81 percent	Blue	West
Oklahoma	1.17	4	7.86 percent	Red	Oil Patch
Louisiana	1.06	2	8.13 percent	Red	Oil Patch
Colorado	0.34	7	2.57 percent	Blue	Mountain West
Michigan	0.25	19	0.05 percent	Blue	Rust Belt
New Mexico	0.19	3	5.85 percent	Blue	Mountain West
Wyoming	0.07	1	15.81 percent	Red	Mountain West
North Dakota	0.04	11	1.96 percent	Red	Plains

Sources: (Gold 2013; EIA 2014; CBS Election Center 2012)

Why Centralization?

To further refine the set of states, I applied a case selection strategy known as diverse cases. The strategy seeks to maximize variation along a chosen variable, state-city centralization (George and Bennett 2005). Seawright and Gerring (2008) contend that the approach is ideal for exploratory and hypothesis seeking studies because it capitalizes on the variation present in at least two cases that represent the full range of the hypothesized causal relationship. Finally, the strategy forces a researcher to specifically identify and select a diverse array of cases, thereby helping to improve the researcher's ability to draw generalizations (Seawright and Gerring 2008).[36] Among the list of higher-proximity states, I selected a highly centralized, a moderately centralized state and a decentralized state.

Following the second order federalism literature, I place relative degrees of power allocation on a continuum from highly state centric to decentralized and locally-centered (Bowman and Kearney 2012; Richardson 2011). Specifically, I evaluate centralization by examining municipal authority relative to well siting, setbacks and land use authority, the policy areas Davis (2012, 2014) identified as being important to municipal governments.

With this second major filter, I identify three cases, two of which represent extreme values (centralized and decentralized) and a third that is an average case. This dimension of interest (centralization) is supplemented with other natural breakpoints including region, the state's economic dependency on oil and natural gas extraction and the state's political leanings, as shown in Table 3.3 (Collier, LaPorte, and Seawright 2007; Elman 2005). Each breakpoint helped achieve maximum variation so that the project's results may better represent all states and

[36] The inclusion of all states may distort the actual distribution of cases, especially if there are more centralized states than decentralized or vice versa. Despite this weakness, Seawright and Gerring (2008) write that this selection technique is among the most representative case study technique and offers the researcher the ability to make some generalized claims.

municipal governments. The states selected, Colorado, Ohio and Texas differ along the most pertinent dimension, the state centralization of natural gas regulatory and land use power. These states also vary along regional, political, and economic dimensions.

An issue specific scale can better reflect the dynamic nature of intergovernmental management. In other words, the state-local legal relationship when portrayed using the Dillon-Cooley dichotomy is overly reductionist. Even when organized along broad categories, such as public safety or natural resources, researchers may miss critical state-level differences. A state may be highly centralized for the purpose of revenues and collections but still authorize local governments to establish zoning, public health and safety ordinances and to promulgate comprehensive land use regulations. Cities in centralized states may deliver water and power to citizens, further shaping the character of second order relations. Conversely, in decentralized states with a long history of home rule, natural gas regulatory power may be centralized in an effort to achieve state goals, even at the expense of local control (Berman 2003; Bowman and Kearney 2011; 2012; Krueger and Bernick 2012; Zimmerman 1995; 2012).

Table 3.4 State Differences and Fracking

State	Pertinent Dimension (Regulatory Authority)	Control Variable (Proximity)	Natural Break Points		
			Region	Politics	Oil and Gas percent of GDP
Colorado	Centralized	High	Mountain West	Blue	2.5percent
Ohio	Middle Ground	High	East/Rust Belt	Purple	.12percent
Texas	Decentralized	High	Oil Patch	Red	7.5percent

The Selected States

Colorado: A Centralized State

Colorado is an ideal example of a centralized state. First, the legislature, through passage of applicable statutes, and reaffirmed by the State Supreme Court, has centralized natural gas regulatory power in the Colorado Oil and Gas Conservation Commission (COGCC) and Colorado Department of Public Health and Environment (CDPHE). State regulation preempts cities from regulating any portion of the natural gas life cycle process including the drilling, completion, operation, abandonment and the location of wells, setback distances and air and water quality standards. This power has been upheld in recent State Supreme Court decisions, which clarified that local regulations are only lawful when they do not materially conflict with COGCC regulations and when they do not impede upon the state's goal of orderly natural gas development (Davis 2014; 2012). Local governments' participation is limited to a public hearing or sharing information. Some cities, working within constraints of state law, have signed voluntary agreements with operators that exceed state setback standards.

Colorado also represents the intermountain west region. While the state's politics reflect a bluish hue, it has a long history of promoting natural gas production. This legacy is similar to other Western states such as Wyoming, Montana and New Mexico. And until recently, these states were fairly similar in the powerful role that oil and gas operations played in their respective state's economies (Wyoming excluded) (Davis 2012).

Ohio: A Middle Ground Approach

Ohio represents a middle ground example for several reasons. House Bills HB 278 and HB 299 authorized the State Division of Mineral Resources Management to regulate natural gas permitting, siting and production. The State Constitution, however, tempers the ODNR's

authority, by authorizing municipalities to play an important role in environmental protection (water) and conservation (Ohio DNR 2014).

Positions of the legislature and State Courts are also indicative of a middle ground approach to second order federalism. The legislature vested Ohio's cities and townships with public health and safety and comprehensive land use planning authority. Cities may limit fracking by establishing conservation or environmental zones, which protect the public's health and safety and the environment (Nolon 2013). The Ohio State Supreme Court, however, in the *Newbury* case, also held that should cities adopt fracking restrictions, they must bear the burden of proof that they are doing so to accomplish local health and safety goals.

Ohio exemplifies some of the challenges in eastern and rust belt states such as New York, Michigan, West Virginia and Pennsylvania. For many of these states' policymakers, fracking is an attractive way to reinvigorate stagnant economies and to replenish local and state coffers. Ohio also represents one of the 'new players' in natural gas politics and its associated environmental costs. The discovery and mining of the Marcellus and Utica Shale Plays began in the 2000s and continues today. Finally, for most rust belt states, oil and natural gas operations occupy a small but growing role in the economy.

Texas: A Decentralized Approach

The most decentralized of the three states is Texas. At the state level, two agencies oversee fracking operations. The Railroad Commission of Texas (or RRC) develops and enforces rules relating to technical (and subsurface) aspects of drilling, well intensity, safety and groundwater protection. The Texas Commission on Environmental Quality oversees air quality and emissions, offsite environmental impacts and well casing and cement regulations (Wittmeyer 2013). Under Texas law, home rule cities still may promulgate regulations that directly impact

fracking operations (Negro 2012). They have the authority to issue and reject drilling permits, regulate site security and some operations (flaring), expand setback distances and to promulgate zoning regulations of just oil and gas development. The Dallas City Council went so far as to reject several drilling applications and to establish 1,500-foot setbacks (Henry 2013). Conversely, in nearby Fort Worth, the site of many wells, the City requires natural gas development to take place at least 600 feet away from residences (Baker 2013).

Texas is typical of the historical experiences and the policy expertise and goals of the oil patch states of Oklahoma and Louisiana. Expanded fracking, in these states, is attractive to lawmakers as the region is historically accepting of widespread development of its financial benefits to other public programs. Like other producing states, natural gas plays a key part in these economies.

Municipal Governments

In order to identify local governments that differ relative to the dependent variable (municipal policies towards fracking) I apply a purposive quota sampling technique. The strategy requires the researcher to intentionally select certain units or cases ‘‘based on a specific purpose rather than randomly’’ (Tashakkori and Teddlie 2003, 713; Patton 2002). This method aims at generating the maximum heterogeneity within a study’s chosen sample (Miles and Huberman 1994). In order to maximize variation, I created a two-by-two typology, which the case studies (Chapters 4-6) test. In each quadrant for the three states, I identified twelve to fifteen cities (depending on state population) that met the inclusion criteria.

Filters

I apply multiple filters to limit the number of city governments. The first filter excludes all municipalities located in a county that is without ongoing natural gas extraction. Cities

located in areas far removed from extraction are unlikely to pass legislation or engage in other activities germane to this project (although they may be ripe for future research). Similar to state lawmakers, the close proximity to natural gas wells impacts how city leaders and residents perceive the risks and benefits that fracking poses to them.

Population size, the second filter, is necessary for two substantive reasons. In many states, including Texas, Colorado and Ohio, home rule is related to municipal size. Texas' cities with a population of more than 5,000 establish their own governing structures and enjoy a variety of regulatory powers.[37] A population of 5,000 or more is also the line of demarcation between being a city and a village/township in Ohio, although both types of governments may enact zoning plans and issue other land use regulations. Finally, in Colorado, communities must pass a charter ordinance and have a population greater than 2,000 citizens in order to be a home rule municipality (Colorado 2014).

The organizational and public management literature also identifies agency capacity as a major driver of effective organizations (Epstein and O'Halloran 1994; Frederickson et al. 2012; Lowry 2005; McGuire 2006; McGuire and Silvia 2010; Moe 1989; Scheberle 2004; Wang et al. 2012). Walker (1969) and Andrews (2000), moreover, link capacity to policy/organizational innovation. Enhanced organizational capacities, Portney (2003) argued, enable cities to pursue more integrated development approaches and to incorporate a variety of new tools and management techniques sensitive to environmental goals while still promoting economic growth.

The Municipal Dimensions

The third filter relates to municipal typology (presented below). The second order federalism literature finds that local governments affect the implementation of state policies

[37] City voters must also pass a charter ordinance. Smaller cities can be Type C and still possess land use authority.

(Bowman and Kearney 2012). Yet, it does not identify the requisite municipal characteristics that may explain oppositional or supportive relationships.

To identify and select a filter, I turn to the environmental policy and fracking research. One possible organizational scheme is a typology based on mobilization (x-axis) and receptiveness to environmental issues (y-axis) (Davis and Fisk 2014; Feiock 2013; Patton 2002; Seawright and Gerring 2008). The typology and selection criteria yielded over 160 cities (Colorado – 48 cities; Ohio – 60 cities; Texas – 60 cities).

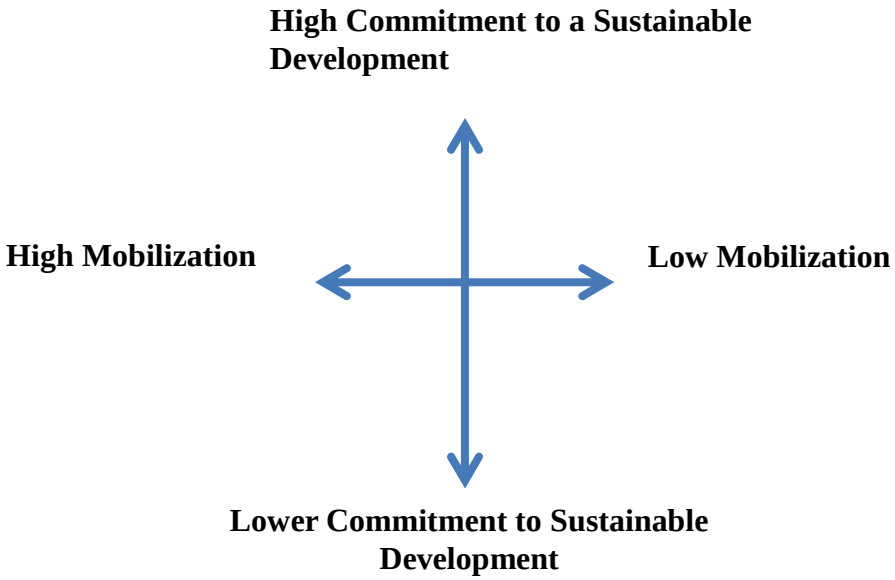

Figure 3.3 Municipal Filters

Mobilization (X-Axis)

Mobilization literature identifies the mechanisms by which more attentive and engaged citizens impact elite level decision-making (Baumgartner and Jones 1991; Johns 1994; Jones and Baumgartner 2012; Kingdon 1995; Selman 2004). Elites and policy entrepreneurs may seek to mobilize citizens to gain a political advantage, to engender a desired political change, to pass policies or to influence an institutional agenda. Effective leaders are strategic and will time their appeals to citizens to coincide with focusing events or a favorable political climate. Other

scholars examine the association between mobilization and a particular issue's dimensions. Mobilization results more readily when individuals see issues as important, salient and when a resolution is unknown (Baumgartner and Jones 1991; Rosenstone and Hansen 1993).

At the local level, leaders are beginning to strategically mobilize their publics. Deliberate citizen engagement efforts can help to diminish the resistance that surfaces during the implementation of climate change action plans and other environmental programs (Davis 2014; EPA 2010; Federal Register 2006; Leighninger 2006). Scholars have attributed a variety of causal mechanisms to decreasing resistance. Municipalities, for example, offer citizens more opportunities to participate and shape local policies through volunteer boards, visioning sessions, focus groups, surveys/polls and working groups. Research has also shown that because cities are closer and more accessible to citizens, citizens believe cities are more responsive to local concerns (Hempel 2009; Krause 2011a; Scheberle 2004).

Responses to environmental collective action dilemmas, such as urban drilling, may also relate to the ability or willingness of groups to act collectively. Hamilton (1995), for example, found that minority groups and poorer neighborhoods are less likely to overcome collective action problems. If regulatory inspections and attention occur more frequently in response to complaints and activism, then poorly organized neighborhoods, which are less likely to report violations, are likely to compel fewer inspections. A similar logic is observable relative to permitting and other siting issues. If negotiations between operators, the state and citizen groups include public input, differences in participation levels may result in lower standards for vulnerable populations (See also Hamilton and Viscusi 1999; Opp 2012). In these communities and neighborhoods, because organized opposition is weaker or non-existent; firms opt to locate in these neighborhoods.

With each state, I include the most recent and available voter activity statistics.

- In Ohio, I measure mobilization by the voter participation rates of the counties in the 2012 Presidential election.
- In Colorado, I measure the ease of mobilization by the percent of active registered voters per county in February 2014. Identification as an active voter in Colorado means that the individual voted in the last general election (Colorado Secretary of State 2014).
- In Texas, I consider the percent of voters who voted in the 2010 mid-terms Congressional elections (Texas Secretary of State 2014).

Sustainable Economic Development

A small but growing area of attitudinal research measures opinions relative to natural gas. Jacquet (2012) examined support for natural gas development and production through a temporal lens. His work offers insights into how attitudes change prior to and after development. The results showed that public attitudes are much more supportive of gas prior to development. Once development begins and residents experience more of the costs of development, attitudes sour. Davis and Fisk's (2014) analysis more explicitly links fracking support to ideological beliefs. Their work suggests that the most powerful predictor of support for fracking is whether or not the individual is inclined to support environmental protection efforts in general (11). They also suggested a fairly strong relationship between anti-fracking attitudes, Democratic Party identification and a willingness to pay for environmental protection.

Support for green job creation also reflects a commitment by public entities to promote more sustainable economic development. As defined by both Brookings Institution and the Bureau of Labor statistics, green jobs are those jobs "that produce goods and provide services that benefit the environment or preserve natural resources. These goods and services are sold to

customers, and include research and development, installation, and maintenance services" (BLS 2013, NP). The BLS identifies five functional areas of green jobs:

1. *Energy from renewable sources* – this includes electrical, heat or fuel generation from renewable sources[38]
2. *Energy efficiency* – including goods and services that increase energy efficiency; Products and services that improve energy efficiency[39]
3. *Pollution reduction and removal, greenhouse gas reduction, and recycling and reuse* -
4. *Natural resources conservation* – These include goods and services designed to conserve natural resources such as organic agriculture and sustainable forestry/products; land, soil, wildlife and water management
5. *Environmental compliance, education and training, and public awareness*

Green jobs, albeit a crude and imperfect approximation, does demonstrate concern for and commitment to environmental protection. Portney (2009) noted that a rising number of municipal governments are attempting to become more sustainable by balancing environmental protection, economic development often by seeking out green jobs for their communities (See also Opp and Saunders 2013).

Work by Svara, Watt and Jang (2013) further tied green jobs and municipal commitment to sustainability. Data indicated that local governments which prioritize green jobs achieve, on average, a 3.9-point higher sustainability rating than local governments that do not give the same importance to green jobs, holding all other variables at their mean. Finally, Yi's (2013) work showed a relationship between commitment to environmental protection and green job growth.

[38] The BLS defines renewable power as wind, biomass, geothermal, solar, ocean, hydropower, and landfill gas and municipal solid waste (BLS 2014).
[39] Energy efficiency goods and services include "equipment, appliances, buildings, and vehicles, as well as products and services that improve the energy efficiency of buildings and the efficiency of energy storage and distribution (BLS 2013a).

Acknowledging that the index was limited to larger MSAs, Li also noted a relationship between willingness to address climate change and a propensity to host a higher number of green jobs as compared to those communities without climate-change mitigation/adaptation policies or membership in climate networks.[40]

To approximate municipal receptiveness to sustainable economic development, I use several measures. The first measure is the number of green jobs within the county. The Brookings Institution organized 39 separate green job segment types within the five original BLS categories (Brookings Institution 2011). Here, I used 38 of the 39 categories (I drop jobs in nuclear energy production) as nuclear generation leads to a number of unresolved environmental challenges (Pew Charitable Trusts 2009).

I selected Brookings' data for several reasons. First, their approach and methodology produces results similar to earlier green job studies from Pew and the U.S. Department of Commerce (1,821,000 - 2,382,000 total green jobs) (Brookings 2011) suggesting some degree of reliability of their data. Second, other researchers have already used Brookings data in social science research. Bowen, Park and Elvery (2013), for example, applied it in their research and found a relationship between the duration of a state renewable portfolio standard and green job growth.[41] Finally, the 2011 Brookings data is the most recent and is the only set to break down the number of green jobs per county rather than by NAICS code.[42]

- Municipal receptiveness to form sustainable forms of economic development primarily through a dichotomous measure of green jobs in the region (high/low) excluding nuclear power related jobs.

[40] Yi (2013) documented that holding all other variables constant, ICLEI membership contributed to 12.3percent more green jobs than non-ICLEI members.
[41] Other models found no statistically significant relationship between green jobs and state RPS.
[42] In early 2013, the BLS eliminated all programs that measured green jobs (BLS 2013).

- The second filter to identify cities concerns to sustainability is: membership in the U.S. Mayor's Climate Protection Agreement.
- Finally, if the number of cities for possible analysis is still too large, I apply a third criterion: ranking as a top city to live in by CNN/Money Magazine anytime between 2009 and 2013. This latter measure serves as a proxy for neighborhood livability and the municipal government's commitment to promoting a high quality of life, both of which may be negatively affected by encroaching natural gas development (Money 2014; U.S. Mayors 2014).

Research Expectations

H1a: Cities, which are more inclined toward sustainable economic development, are more likely to be associated with challenges to the state's preemptive authority.

H1b: Cities, which are more easily mobilized, are more likely to be associated with challenges to the state's preemptive authority.

H2A-D:

A. *Wealthier cities are more likely to be associated with challenges to the state's preemptive authority.*
B. *More homogenous cities are more likely to be associated with challenges to the state's preemptive authority.*
C. *Better-educated cities are more likely to be associated with challenges to the state's preemptive authority (Hamilton 1995; Krause 2010; Opp 2012).*
D. *Cities with more institutional capacity are more likely to be associated with challenges to the state's preemptive authority.*

Both models include the typological categories, institutional and the most recent socioeconomic data from the American Community Survey (ACS) (2008-2012). Measures include median household value, per capita income, race, educational attainment and form of government. The adoption and enforcement of policies is often related to traditional socio-economic factors. The conceptual model, for example, offered by Abel, Stephan and Kraft (2007) suggests that affluence and education are associated with environmental awareness (Daley and Garand 2005; Howell and Laska 1992; Jones and Dunlap 1992; Matisoff 2008; Ringquist and Garand 1999; Wood 2010). Affluence may also be predictive of state environmental quality, capacity and municipal autonomy. Generally, as a state's income level increases, so does its commitment to and ability to spend resources on environmental protection (Duroy 2008; Lowry 1992; Wood 2011).

The policy and justice literatures typically analyze the connections between race, income and environmental risks or burdens (Hamilton 1995; Konisky 2009; Mohai, Pellow, and Roberts 2009; Opp 2012; Bullard 1990; Bullard and Johnson, 2000; Hird and Reese, 1998; Ringquist, 2006). Konisky (2009) documented evidence of income-based disparities in state enforcement of three federal environmental programs with poorer areas receiving less enforcement. Similarly, Opp (2012) found evidence of both racial and income based disparities with neighborhoods, which reported greater concentrations of African Americans or lower income individuals receiving fewer RCRA inspections.

The political capacity and economic fortunes of residents may also impact municipal fracking policies. Hamilton (1995) found evidence suggesting that communities with higher levels of political capacity face fewer environmental burdens (See Hamilton and Viscusi 1999). Relative to fracking, policymakers from both parties argue that fracking is a vehicle for

economic growth and industrial development. Recognizing its potential to generate new jobs and revenues, state and municipal policymakers have shown a willingness to embrace natural gas as a policy solution to slow economic growth (Davis 2012; EIA 2012; EIA 2012a; EIA 2011; Newcomer and Apt 2009). Davis and Fisk (2014), however, found no relationship between unemployment rates and support for fracking and/or ancillary regulations such as chemical disclosure programs.

Local environmental policy research has also documented how institutional structure mediates citizens' access to city officials' and effective local official responsiveness to constituent demands. Krause (2012) found that at-large elections and the presence of non-partisan elections reduce levels of responsiveness of local government to minority interests such as those of environmental groups (Bae and Feiock 2013; Sharp 2002). The logic of institutional analyses is fairly straightforward. In mayor-council jurisdictions, elected leaders' ability to satisfy citizens' preferences affects his or her reelection chances. Conversely, in council-manager cities, expertise and professional competence are more likely to be influential during municipal decision-making (Clingermayer and Feiock 2001).

Data Collection and Statistical Techniques

I apply statistical models to identify and then to estimate the net effect of each independent variable on the dependent variable (King, Keohane and Verba 1994).To ascertain the associations between the dependent and independent variables, I use multiple statistical techniques: measures of association, two-way factorial ANOVAs and logistic regressions. By using multiple statistics techniques, the dissertation more fully answers the research questions posed in this chapter (and in Chapter 1).

A city's willingness to impede or to facilitate state goals may be a result of a variety of other factors, accounted for through the ANOVA and regression models. ANOVA models primarily test the utility of the municipal typology through approximating whether there are differences among High Green-High Turnout cities, High Green-Low Turnout cities, Low Green-High Turnout cities and Low Green-Low Turnout cities. To further assess what outside factors are affecting the dependent variable, I recode data into dichotomous variables (yes, no), making logistic regression the preferred statistical technique.[43] For each state, I utilize two independent, but related models. The first distinguishes between cities, whose policies towards natural gas exceed, challenge or voice displeasure with their state's natural gas policies. The second model employs a more a narrow dependent variable. It limits it to only those communities, which have policies that challenge their state's preemptive authority.

Data Collection Strategies

I collect data from a variety of sources. Each case study includes a review of relevant documents (state and muniipcal statutory and regulatory provisions, judicial decisions, government and industry reports and news stories). These materials are frequently available through online resources and when necessary, by requests from agency personnel. Semi-structured interviews accompany the formal document review to further triangulate the findings, which Yin (2009) notes, are necessary for the researcher to make causal inferences (See also George and Bennett 2005).

[43] I recoded the data in dichotomous variables for two principal reasons, which are hinted at above. The first relates to the distribution of the dependent variable. Because of the small sample size, distribution would be poor and there would not be enough of a distribution in each category to find any statistically significant relationship. A second reason relates to my third major question – which asks about challenging and exceeding the state's preemptive authority. In each state, multiple policy options may encroach upon the state's turf and lead to oppositional relationships i.e. the goal of question.

Municipal Policies

I collected municipal policies from a variety of sources. Key words and phrases, such as fracking, hydraulic fracturing, drilling, home rule, moratoria, bans, community rights, local authority and zoning are used to search municipal websites when appropriate. A second step reviews applicable land use policies of each local government. If municipal policies towards drilling were undetermined, I searched LexisNexis News and Google News to identify news stories/data relative to the dependent variable. The search terms for news searches matched the city website inquiries. I then catalogued each city's policy into a database of municipal policy positions.

Document Review

To assess municipal policy positions, each case study incorporates data gathered from a review of formal sources including state statutes and agency regulations, state and local legislative reports, legislative actions and histories, press releases and State Court decisions. Other primary source materials include meeting minutes and reports, budgets, press releases and annual reports from applicable state and local regulatory divisions. I use non-primary source documents such as interest group white papers, law reviews, media and newspaper accounts, and position statements to further leverage the data collected from primary sources. In short, I review multiple documents in an effort to triangulate data and to corroborate any conclusions made (George and Alexander 2005; King, Keohane, and Verba 1994; Mahoney 2010; Yin 2009).

Interviews

Anderson (1960, 3-4) noted that while laws and statutes establish formal structures, roles and responsibilities; intergovernmental relationships are still shaped by "human beings clothed with office who are the real determiners of what the relations between units of governments will

be" (See also Long 1949). In order to triangulate my findings from the interviews, I utilize a other sources of data such as those described on Page 91 (Agterbosch et al. 2007; Wright 1978; Yin 2009).

Regulatory Officials Interviews

A variety of state regulatory agencies oversee fracking. Recognizing this diversity and when appropriate, I include the perspectives of state officials representing: oil and gas conservation commissions, departments of health and environment and natural resource departments. The views of appointed city managers/administrators or those designated to oversee municipal environmental programs are also included. First, these officials are the central actors in the enforcement and implementation of natural resource and environmental laws that shape ecological and public health (Davis 2012; Frederickson et al. 2012). Second, they routinely communicate with their counterparts and rely upon specific rhetorical, legal and political strategies or protocols to accomplish their goals. Third, they actively participate in the decisions relative to the legality and political fallout of state and municipal actions. Thus, chief administrative officials are in a unique position to ascertain the costs and benefits of fracking and how extraction might influence state-city relationships.

Other Targets

A snowball effect identified other interviewees, such as state lawmakers and pertinent interest group representatives. A snowball sampling technique is useful because it enables the researcher to gain access to other individuals who are also familiar and/or involved in state-municipal fracking dynamics (Lofland, Snow, Anderson and Logland 2006).[44] This type of sampling enables the researcher to better capture the elusive set of willing interviewees whose

[44] Once each interview had concluded, I asked if the interviewee knew of any additional contacts that would be willing to discuss his or her experiences. Snowball sampling was only used for the first and second set of interview participants (Lofland, Snow, Anderson and Logland 2006).

perceptions and experiences are critical to understanding the intergovernmental relationship between state and city policymakers.

Interview Questions

Questions are open-ended and the precise wording of each question is not predetermined (Lofland, Snow, Anderson and Logland 2006; Yin 2009).[45] I do, however, rely upon a flexible outline of topics related to second order devolution relationship types and the antecedents of those relationships. This flexibility enables me to find a balance between my overall research questions and the need to allow the interview to flow and mirror the interests of the interviewee. By retaining some flexibility and the ability to ask unscripted questions, Lofland, Snow, Anderson and Logland (2006) found that interviewees may reveal new and unexpected data. Question guides for both state and local government participants were developed and are available in Appendix 1.

[45] Interviews lasted between 30-45 minutes.

Chapter 4
Second Order Politics in Colorado

Colorado's second order experiences are important for several reasons. First, it is typical of a centralized state within the context of sub-state oil and natural gas policies where statewide concerns often dwarf local policy preferences. Second, new gas extraction is often located near urban and suburban communities unaccustomed to heavy industrial development and truck traffic. While some residents likely believe that such development leads to new jobs and revenues, others see extraction as a frightening enterprise, dangerous to their health, their immediate environment and to their quality of life. Third, significant tensions between the state and municipal governments are newsworthy and have culminated in citizen led municipal ballot initiatives, state-municipal lawsuits and a statewide petition to grant municipal government more control over development. Evidence of cooperation between the state, industry and municipal governments also exists.

To tell the Colorado second order story, this chapter adheres to the following organization scheme. It begins with a summary of the relevant statutory language and regulatory provisions and the case law that addresses natural gas extraction and the relationship between cities and the state of Colorado. A discussion of the costs and benefits of natural gas in Colorado follows. The chapter then provides a cursory description of current state-city relationships with regard to hydraulic fracturing and municipal policy options. It concludes with a series of statistical tests including a two-way ANOVA and logistic regressions, each designed to better understand why municipal governments enact policies that challenge and/or exceed the state's preemptive authority.

Colorado's Natural Gas Experiences and Context

Colorado continues to be a major (8th) producer of energy in the U.S. (U.S. Energy Information Office 2012). Its long legacy of energy development has favored institutions and lawmakers receptive to the concerns of industry (Common Cause 2012; Davis 2012). New technologies, including horizontal fracturing, have reinvigorated Colorado's natural gas industry, especially in areas located in the Niobrara shale play and the Piceance Basins (see Table 4.1), which collectively hold approximately 100 trillion cubic feet [TCF] in recoverable natural gas (EIA 2013).

Table 4.1 Recoverable Natural Gas in Colorado

Shale Play	Recoverable Natural Gas	Region
Niobara	57 TCF	Front Range
Piceance Basin	41 TCF	Western Slope

Source: EIA 2013c

Support for natural resource extraction has long been a reality in state economic and political circles and within the membership of the Colorado Oil and Gas Conservation Commission (COGCC), the state's main oil and gas regulatory oversight body. Recently, however, the State's economy has diversified to include more engineering, tourism/outdoor recreation and manufacturing firms (EIA 2013).[46]

A political transition has paralleled the economic one. Since 2008, state lawmakers have passed laws and regulations that require the gradual phasing out of coal-based electrical generation, the adoption of renewable portfolio standards and climate change goals and policies accelerating the development of wind and solar production facilities. The State's leaders have also reconfigured the COGCC to include greater public health, environmental and wildlife perspectives. Even though, environmentalists lauded many of these reforms, policy changes did

[46] Despite the inclusion of new jobs and revenue streams, oil and natural gas still contribute to millions to state and local economies (Davis 2012).

not resolve rising municipal and county concerns over gas setbacks and other local environmental impacts brought about by expanded suburban and urban natural gas drilling (Davis 2014).

Many state leaders, while still supportive of extraction, have also called for additional scrutiny and oversight of the industry. Democratic Representative Dianne Primavera, for example, in calling for a study on the effects of fracking observed, “fracking has been so controversial an issue in my district that it is important we get better information.” Rep. Joann Ginal, D-Fort Collins and the bill’s sponsor noted that “Fear is driving communities to bans and moratoriums, and fear shouldn't be the motivation” (Jaffe 2014). The COGCC has also passed new restrictions on fracking related methane emissions, which are some of the strictest in the nation.

Constitutional and Statutory Provisions

The majority of Colorado’s oil and gas regulation stems from the State’s Oil and Gas Conservation Commission (COGCC), which was created in 1951 under the to Oil and Gas Conservation Act (Colo. Rev. Stat. § 34-60-100, et seq.). Under the Act, the state established and began to enforce its basic parameters and standards (wildlife, habitat, and environmental protection requirements) for industry to follow. Its 2007 revisions (HB1298 and HB1341) included language that mandated that the COGCC work with the Colorado Wildlife Commission and the Department of Health and Environment to issue new environmental standards for industry (Getches-Wilkinson Center for Natural Resources, Energy, and the Environment 2013). Other pertinent laws include the Habitat Stewardship Act of 2007 (§34-60-128), the Air Pollution and Prevention Control Act (§25-7-100, et seq.) and the Water Quality Control Act (§ 25-8-100, et seq.). Each, according to supporters, reduces industry’s environmental footprint and

attempts to better balance industrial development with public health and environmental concerns (Getches-Wilkinson Center for Natural Resources, Energy, and the Environment 2013).

Finally, like many of its neighbors in the West, Colorado, is a split-estate state. Because each party (surface and mineral or subsurface owners) holds property rights, a holder of a mineral right may exercise his or her right to develop the underground estate. The right entitles the individual to the "reasonable use" of the surface estate to access the subsurface one (Getches-Wilkinson Center for Natural Resources, Energy, and the Environment 2013).

Colorado's home rule provisions further shape its second order relationships. Cities with over 2000 inhabitants at the time of the last census, under the Home-Rule Amendment, can opt to become home-rule communities. Home-rule cities pass and enforce their own ordinances, issue land use plans and zoning regulations and act without state authorization prior to municipal action (Col. Const. Art XX). The legal position of statutory (non-home rule) cities is reversed and they may only act when authorized to do so.[47]

Home rule powers are limited. First, local self-determination is available to the extent that the stakeholders consider the matter local. For mixed (state and local) and state issues (like natural resources), the state interest/statute prevails. Second, local government policies and procedures cannot be arbitrary or capricious with state law as guiding until the city adopts a charter ordinance. Third, home rule cities have no preemptive right, even when issues have a local impact or generate municipal interest (*Century Elec. Serv. & Repair, Inc. v. Stone,* 193 Colo. 181, 564 P.2d 953 (1977). Finally, home rule authority is malleable and as such, the state may reduce or expand areas of municipal regulatory authority (*City & County of Denver v. Sweet* 138 Colo. 41, 329 P.2d 441 (1958).

[47] Of the 271 communities: 98 are home rule municipalities, 160 are statutory towns, 12 are statutory cities and1 is a territorial charter city.

The 1974 Local Government Land Use Control Enabling Act established additional parameters of local land use authority. Under the 1974 law, land use authority (for both home rule communities and statutory cities/town) extends to:

- Development in hazardous areas
- Development that would cause "immediate or foreseeable danger to significant wildlife habitat or species, could lead to substantial changes in population density or that materially impacts the community (Community Development Office 2013)[48]

Regulatory Provisions

The State Legislature in 1951 established the COGCC and charged it with the promotion and responsible development of the state's natural resources. Organized within the Department of Natural Resources, the COGCC's mission is to facilitate the efficient exploration and production of the state's oil and natural gas resources while simultaneously protecting the public's health, safety and welfare. Its goals include preventing waste, protecting mineral owners' rights and reducing adverse environmental impacts caused by development (COGCC 2012). Operationally, the COGCC promulgates rules that govern the life cycle of natural gas and oil extraction (Davis 2012; Getches-Wilkinson Center for Natural Resources, Energy, and the Environment 2013).

Prior to 2008, The COGCC's composition included seven members, a majority of whom represented the oil and gas industry. Davis (2012) summarized the pre-2008 COGCC as a partner in an industry friendly sub-government, which was too receptive to the demands and interests of industry. Under HB 07-1341, then Governor Ritter, a Democrat, broadened the commission's membership and added a public health and environmental perspective. The new make-up enabled the Ritter Administration to re-write many of the rules regulating the natural gas industry

[48] The law also permits local regulation in areas of historical and archaeological importance.

such as information disclosure, air and water monitoring, air and water emissions and setbacks (Davis 2012; Hartman 2011).

Hydraulic fracturing is subject to a number of COGCC regulations and standards. Operators must apply for a permit requiring them to disclose and to describe all of their surface and subsurface activities. The COGCC defines activities as well design and location, spacing, operational procedures, water and waste management and disposal, air emissions, wildlife impacts, surface disruptions and disturbances and worker health and safety rule-making. A secondary function of the COGCC is the enforcement of its rules. The table below summarizes many of these rules, which preempt substate regulations/actions:

Table 4.2 A Snapshot of Colorado's Fracking Regulations

Regulatory Area	Colorado
Pre-Drilling Water Well Testing	Required for bodies of water .5 miles from a wellhead
Water Withdrawal Restrictions	Addressed in permit
Casing and Cementing Depth Requirements	50 feet below the water table
Intermediate and Production Casing Cement Circulation Regulations	200 feet above uppermost hydrocarbon zone
Surface Casing Cement Circulation	Cementing to surface required
Venting and Flaring	Notification and approval required
Fluid Storage	Pits allowed and regulated for all fluids including freeboard and liner requirements and five year tracking requirements.
Underground fluid injection	Allowed
Disclosure	Current law requires companies to disclose the concentrations of all chemicals used in hydraulic fracturing to state regulators. Colorado law protects industry's trade secrets. If their fracking fluids are a trade secret, industry must still disclose the ingredient's chemical family to state regulators but only in the case of an emergency, do they need to provide public health officials with a detailed accounting of their secret formula.

Air and Stormwater Quality	The State Department of Public Health and Environment with limited oversight power relative to issue air quality and stormwater permits (CDPHE 2014).
Local Issues	In Colorado, local officials may access the chemicals used in fracking processes through Fracfocus.org (Banda 2011; COGA 2012b; Davis 2012). Impact fees are set by the affected local government but cannot exceed the costs of development.

Source: Richardson et al. 2013

State law restricts local participation to mainly a procedural and informational role. Cities may appoint a local governmental designee (LGD) and contribute input during COGCC rulemaking proceedings. The LGD receives information relative to all oil and gas activities within his or her geographic area and may request a hearing to evaluate any likely significant and adverse impacts. A LGD can also call a local public forum (LPF) under Rule 508 to consider drilling applications that petition for an increase in well density and consideration of other requests that may affect the welfare, safety and health of nearby communities (COGCC 2008). Cities and counties may submit testimony during hearings. Municipal actions are not always state-sanctioned. According to State Official 1 (SO1), "the most significant way that municipal actors have shaped the state's fracking policies is through the local ballot measures that imposed bans or moratoria. Longmont, Fort Collins, Lafayette and Broomfield have created quite a stir and this has prompted, rightfully so, the current situation with such high stakes [Constitutional ballot initiatives in the Summer of 2014]. Loveland is poised to be next."

The debate enveloping fracking certainly involves the rules above, but they are not 'front and center' during state-municipal natural resource conversations. As Davis (2014) documented, due to their acute impacts to local communities, setbacks are often high on the agenda of local policymakers. New rules issued by the COGCC in 2013 expanded setbacks from 350-feet in urban areas and 150 feet in rural areas to a uniform 500-foot boundary. The larger buffers also

prohibit drilling within 1,000 feet of any building that houses/hosts a large number of individuals like a school or nursing home without approval from the COGCC. The 2013 setback rule, offers an exemption for operators seeking to drill in rural areas (Jaffe 2013a). In rural areas, operators may drill within 500 feet of an occupied structure, if the COGCC director approves the well and if it incorporates all best practice mitigation measures (Jaffe 2013a). While several municipalities have voiced concern over COGCC rulemaking (addressed later in this chapter), Dave Neslin, former Executive Director of the COGCC, summarized recent rules. He stated "taken together, we [COGCC] think these rules address many of the concerns that people have raised about hydraulic fracturing by requiring operators to provide additional information to our staff and to medical professionals, and also by establishing some common sense precautions against potential impacts" (Neslin quoted in Woock 2010).

Despite promulgating new and more stringent rules, the setback issue, according to policymakers, is hardly settled. "Undoubtedly, this decision will go under the dome" said Mike King, the Executive Director of State Department of Natural Resources and a COGCC member. Despite, lobbying against the setback expansion, oil and gas representatives are reluctant to pursue legislative alternatives or strategies, explaining that attention from state lawmakers would add considerable regulatory uncertainty for the industry and could depress its overall output (Jaffe 2013a paraphrasing Tisha Schuller, President and Chief Executive Officer of the Colorado Oil and Gas Association).

Despite, Colorado's pro-extractive industry past, Davis (2012) identified multiple challenges to the industry's influential position within State Government. Since the early 1990s, the state's politics have moved from a conservative orientation towards more moderate and liberal policy positions. Liberal-leaning governors and statehouses have advanced new

environmental policies. The environmental movement in Colorado has also grown and become more sophisticated, enabling it to act as a political counterweight to the oil and gas industry. Land-use conflicts have sparked the rise of new interest group alliances and coalitions (usually between sportsmen, ranchers and environmentalists), which have further eroded the influence exercised by industry (See also Duffy 2005). Finally, several schisms have weakened industry's hegemonic political position and have opened new windows for environmental groups to influence policy (Davis 2012).

Judicial Decisions

The Colorado Supreme Court has also weighed in on the relationship between state and municipal regulatory authority. In *City and County of Denver v. State of Colorado* (1990),788 P.2d 764, the Court held that when an issue impacts both state and local governments, a municipal ordinance may exist alongside state regulation. The ordinance, however, must not conflict with the state statute, and in cases when it does the state law prevails. The Colorado Supreme Court reaffirmed the principle of limited concurrent regulation when it ruled that a home rule municipality may regulate outdoor advertising with its jurisdictional limits "only to the extent that the local ordinance does not materially impede the significant state goals expressed in the Outdoor Advertising Act §§ 43-1-401 to 420" (*Voss v. Lundvall Brothers* 830 P.2d 1061 (1992)).

Second order conflict relative to natural gas development reached the judiciary in the mid 1980s. In 1985, Greeley voters banned the drilling of oil and natural gas wells within its limits. The Greeley City Council followed and implemented Ordinance No. 90, with language that enacted the citizen-led initiative. After the promulgation of Ordinance Number 90, Lundvall Brothers sued the City on the grounds that the Ordinance No. 90 violated the COGCC's

preemptive authority. In *Voss v. Lundvall Brothers* 830, P.2d 1061 (1992) the Supreme Court ruled against the City stating that "the state's interest in efficient oil and gas development and production throughout the state, as manifested in the Oil and Gas Conservation Act is sufficiently dominant to override a home-rule city's imposition of a total ban on the drilling of any oil, gas or hydrocarbon wells within the city limits."

The Court's logic centered on two factors: the nature of oil and gas deposits and the state's overriding development goals. Oil and gas deposits, according to the Court, do not follow the boundaries of local governments, making natural gas extraction as much a state issue as a local one. As such, it found natural gas regulation to be a mixed (state-local) issue, and that municipal regulation may not significantly impede or conflict with State law or the State's goal of responsible and efficient development. In its holding, the Court ruled that the ordinance did impede the State's goal and that the State's interest superseded the City of Greeley's home rule powers (Jones 2013). The court's decision, however, was not absolute and left enough 'grey area' for future local legislation and litigation.[49]

The Court reached a similar conclusion in the Bowen case (*Bowen v. Edwards 830 P.2d 1045 (1992)*. The case came to the courts after La Plata County Commissioners enacted additional land-use regulations to control oil and gas development-taking place within the County. One particular regulation required that prior to drilling, oil and gas entities acquire county-issued permits in addition to COGCC licenses. The Court, in its ruling, pointed to the nature of the county's regulations, "It is the county's intent … to facilitate the development of oil and gas resources within the unincorporated area of La Plata County while mitigating potential land-use conflicts between such development and existing, as well as planned, land uses." Despite, noting the county's dual goals, the Court ruled that the state's interests and goals

[49] The Court did not specify the types of land use authority permissible under its holding.

preempt county regulatory authority.[50] Like its earlier *Lundvall* decision, the Court determined that COGCC's regulations do not preempt all aspects of a county's land-use authority, although it did not offer any examples (Jones 2013).

The Court of Appeals applied the twin *Lundvall/Bowen* holdings in *Town of Frederick v. North American Res. Co.* (60 P.3d 758 (2002)). In the Frederick case, the court ruled that a series of the state regulations preempted the Town's ordinances/rules. Setbacks, the Court found, conflicted with COGCC Rule 603a and Colo. Regs. 404-1; noise abatement requirements (§16-120, conflicted with COGCC Rule 802, visual impacts were invalidated because they conflicted with COGCC Rules 318, 803, 804, 1002, and 1003. The Court also struck down the Town's penalties against operators, because they are preempted by state law (*Town of Frederick v. North American Res. Co.* (60 P.3d 758 (2002)).

Fracking in Colorado

Production

Extractive industries have employed fracking since the 1970s, although recent technological advancements in horizontal drilling technology have made it possible for firms to access formations and deposits that were previously economically unrecoverable. As a result, the state's natural gas industry has enjoyed steady and, in some locales, explosive growth in recent years, much of it driven by fracking. This growth, in both number of producing wells and overall production (and by technique) and is shown below in Graphs 4.1-4.2.

[50] The Court's holding included "there is no question that the efficient and equitable development and production of oil and gas resources, requires uniform regulation of the technical aspects of drilling, waste prevention, safety precautions, and environmental restoration, [and] also to the location and spacing of wells."

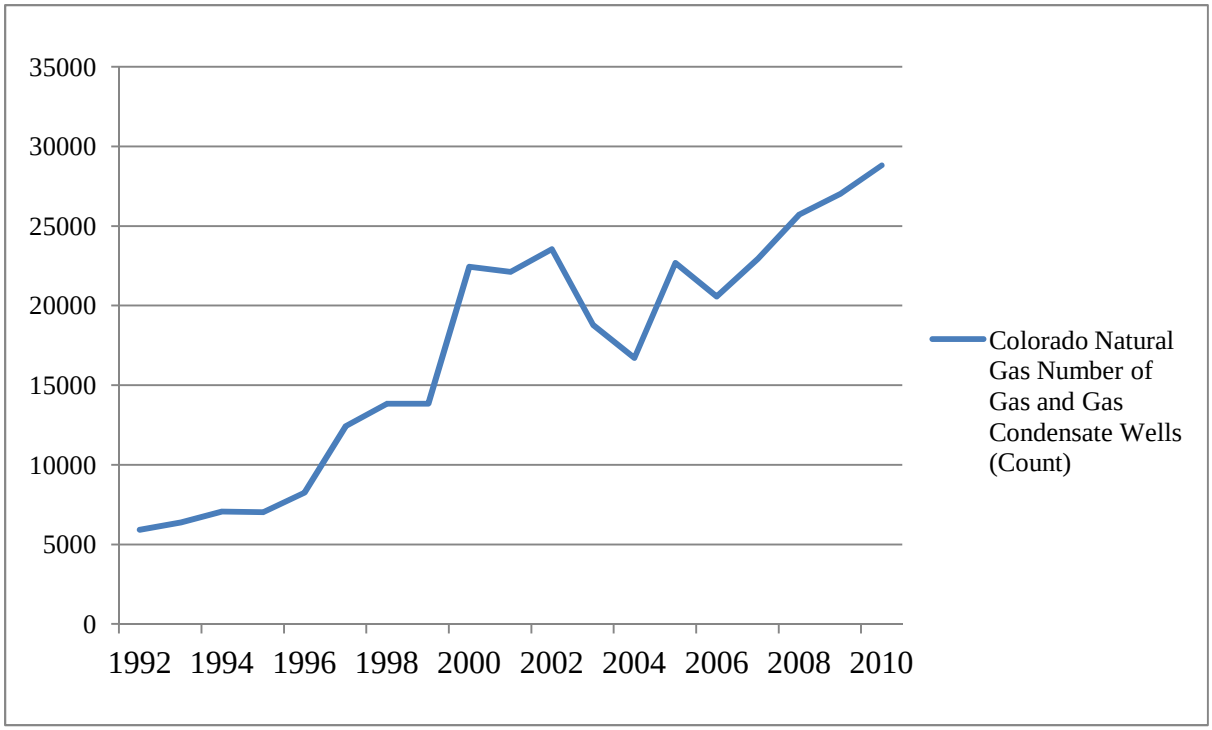

Figure 4.1 Count of Colorado Gas and Gas Condensate Wells

Source: EIA 2013d

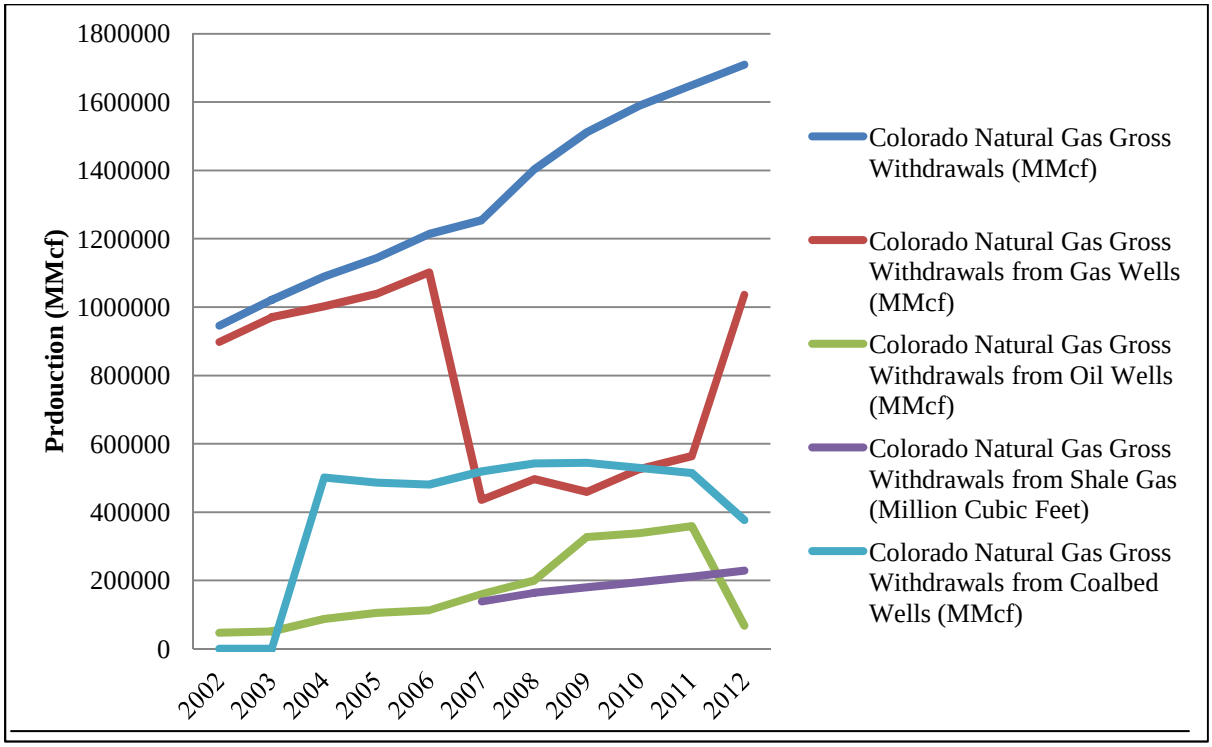

Figure 4.2 Colorado Natural Gas Production, By Technique

Source: EIA 2013d

The use of fracking and attendant industrial growth is concentrated in several counties (along the Front Range and Western Slope): Weld, La Plata, Las Animas, Garfield, Rio Blanco, Yuma and Mesa. These seven counties are home to 91 percent of well drills since 2011 and are home to a variety of second order dynamics and relationships.

Table 4.3 Localized Natural Gas Developments

County	Producing Wells since 2011	Percent of State Total
Weld	2262	49%
Garfield	1323	28%
Yuma	148	3%
Rio Blanco	109	2%
Mesa	127	3%
La Plata	99	2%
Las Animas	85	2%
All others (includes Front Range counties of Larimer, Boulder, Broomfield, etc.)	506	9%

Source: Randall 2012

Economic Benefits

Fracking generates a variety of state and local economic benefits. In 2012, for example, industry generated over $9.3 billion in production value, directly supported over 29,000 jobs and 50,000 indirect jobs. Industry jobs averaged over $100,000 in annual compensation, significantly higher than the average wage in the State. The cumulative impact for Fiscal year (FY) 2012 was approximately $3.8 billion in employee income.

Table 4.4 Oil and Gas Employment in 2012

	Direct	Indirect	Induced	Total
Drilling	2,402	780	1,753	4,935
Support Activities	26,853	15,363	25,356	67,572
Refining	501	2,193	2,052	4,746
Transportation	801	1,080	1,009	2,889
Gas Stations	14,062	1,998	2,586	18,646
Other	6,611	2,278	3,799	12,688
Totals	**51,230**	**23,691**	**36,554**	**111,476**

Source: Lewandowski and Wobbekind 2012

Oil and gas operations made additional contributions to the state's economy in 2012. Operators contributed $1.6 billion to the State's general fund in 2012, much of which came from severance taxes, public leases, royalties and property tax payments (Lewandowski and Wobbekind 2012). Despite gas industry's large role in the state's overall economy, critics highlight industry's 'avoided' costs. If Colorado wells were located Wyoming, for example, developers would owe over a billion dollars more in state taxes (adding costs avoided from 2002 through 2006). Gas developers have also benefited from the ad valorem loophole, which costs the state over 200 million dollars annually (Anderson 2014). Industry also paid over 600 million dollars to private landowners in royalties and lease payments. The cumulative economic statewide impact, as shown in the table below, is nearly $30 billion.

Table 4.5 Oil and Gas Economics in Colorado in 2012

	Employment	Employee Compensation (Millions)	Value Added (Millions)	Output (Millions)
Drilling	4,935	$319.17	$1,054.36	$1,556.59
Extraction and Support Activities	67,572	$3,942.23	$9,580.08	$18,701.75
Petroleum Refineries	4,746	$245.89	$1,133.73	$4,789.86
Transportation	2,889	$178.85	$263.18	$791.88
Gasoline Stations	18,646	$466.24	$1,000.47	$1,649.90
All Other	12,688	$687.31	$1,194.55	$2,078.18
Totals	111,476	$5,839.69	$14,226.37	$29,568.16

Source: Lewandowski and Wobbekind 2012

Local governments have also benefitted, primarily from additional indirect and direct sales and property taxes. In 2010, La Plata County, for example, collected approximately $30 million in oil and gas taxes, although the amount of local revenues depends on the volume of oil or natural gas extracted (COGA 2012b).

Environmental Impacts

Opponents point to a number of environmental ills including the use of chemicals that may cause cancer, disrupt major bodily systems (cardiovascular, nervous and skin) and respiratory ailments (Jacquet 2014; Kuster 2012). They also argue that fracking leads to surface and groundwater contamination, air pollution through methane leaks and particulates, and it contributes to climate change. A recent Colorado study linked areas near frack sites to greater concentrations of acute and chronic health impacts (Kuster 2012). EPA studies have also found a relationship between fracking and poor air quality in the West. Areas in and adjacent to Pinedale, Wyoming, for example, reported ozone pollution at well over 120 parts per billion. Ozone at that amount is 67 percent higher than the maximum daily limit established by the EPA and surpassed ozone pollution in Los Angeles (Associated Press 2011).

Drilling activities also have harmful environmental effects typically through increasing truck traffic and emissions from construction equipment (Wiseman 2009). Finally, environmental scientists have shown that fracking causes increases in methane (a potent greenhouse gas and worse than carbon dioxide) emissions because pipe fittings can become loose and leak (Finley 2014).

Fracking affects Colorado's limited water supply. Constitutionally, the state prioritizes residential and domestic consumption over all other uses (Grantham 2011).[51] The State must also pre-approve and authorize the withdrawal of water for any non-domestic use. As applied to fracking, this means natural gas firms cannot take water without prior state approval. Conflicts and legalities aside, state regulators estimated that oil and natural gas operations consumed

[51] When waters of any natural stream are not sufficient for the service of all those desiring the use of the same, those using the water for domestic purposes shall have the preference over those claiming for any other purpose, and those using the water for agricultural purposes shall have preference over those using the same for manufacturing purposes.

approximately 6.5 billion gallons of water in Colorado in 2012, about 0.1 percent of overall water consumption (Healy 2012). Operators may lease surplus water supplies from cities, which can also lease excess water to farmers.

While operators cannot arbitrarily withdraw water, their anticipated usage complicates an already complex set of water-related issues in the arid West. The recent and ongoing drought has exacerbated tensions between water users (Healy 2012). Colorado's farmers and ranchers have historically leased water from sellers (often cities) for approximately $30 for an acre foot of water, the equivalent of about 326,000 gallons.[52] Oil and gas companies, however are offering between $1,000 and $2,000 for an equal amount of treated water from cities, setting the stage for a potential conflict between farmers and frackers, which may be especially problematic during times of drought (Healy 2012).

The environmental impacts of fracking are disputed, especially its relationships to climate change. The table below presents the statewide environmental impacts with the time-frame noted in the column on the left.

Table 4.6 Environmental Impacts of Fracking

Environmental Harm	2012 Impact
Acres damaged since 2005	57,000
Based on Well Completion from 2005 to 2012 (metric tons of carbon dioxide-equivalent)	23,000,000 tons
Particulate Matter	1100 tons
NOx	14,000 tons
Carbon Monoxide	21,000 tons
Volatile Organic Compounds	2000 tons
Sulfur Dioxide	50 tons

Source: Ridlington and Rumpler 2013

[52] This can rise to over $100 for an acre foot of water in dry years.

Second Order Issues - Setting the Stage

Municipal authority to regulate oil and gas activities in Colorado is severely restricted. The State Supreme Court has announced that state law supersedes municipal home rule authority when:

1. There exists a need for statewide uniformity
2. Municipal regulations affect persons living outside the city's corporate limits
3. The issue has been historically governed by the state (*City & County of Denver v. State, 788 P.2d 764 (Colo. 1990); Lundvall Bros. Inc. v. Voss, 812 P.2d 693*.
4. The issue, as it is for a natural resource, is a mixed state-local issue.

Results and Implications

How does a centralized state structure shape the municipal implementation and the intergovernmental management of natural resources? The policy positions of 48 Colorado cities were collected. In some cases, there is outright opposition to the state's goals and conflict with State policy leading to the COGCC and the Governor participating in two lawsuits against city governments (Cities of Longmont and Fort Collins). In others, there is evidence of collaboration and cooperation leading to voluntary agreements with industry, typically done to avoid challenging the state's preemptive authority (Cities of Loveland and Erie). Finally, in other communities, there are examples of acquiescence, support/excitement and indifference to expanded urban gas drilling (Cities of Greeley, Grand Junction and Aurora). SO1 summarized Colorado's second order politics as:

> "The overall state of state-municipal relations concerning fracking depends, at least in part, on the particular municipal jurisdiction. However, there is definitely a tension between the state and local jurisdictions, and in Fort Collins many residents have definite land-use, public

health and welfare concerns. Such concerns were manifested with the passage of a local ballot measure to implement a 5-year moratorium on fracking within city limits."

One of the dissertation's major research questions is an inquiry about the scope and variety of municipal responses to urban natural gas development. A variety of cities support fracking and include both high green/high turnout communities to low green and low turnout jurisdictions. Cities that oppose fracking, conversely, appear to cluster in the 'box' that includes green and mobilized communities. Table 4.7 below shows the results.

Table 4.7 Aggregated Municipal Responses to Oil and Gas Development

Policy Responses (Policy Responses Code)	Frequency	Percent	Valid Percent	Cumulative Percent
Bans or Moratoria (0)*	4	8.3	8.3	8.3
Zoning Regulations (1)*	2	4.2	4.2	12.5
Bans on municipal property (2)*	2	4.2	4.2	16.7
Voluntary Agreements (3)^	4	8.3	8.3	25.0
Resolutions for local control/anti-fracking (4)^	4	8.3	8.3	33.3
No Action/resolutions in favor/special use permits that do not conflict with state law (5)	24	50.0	50.0	83.3
Actions increasing development (6)	8	16.7	16.7	100.0
Total	48	100.0	100.0	

Data collected from municipal websites, codes and news articles
^Symbolic Policies
*Substantive Legal Challenges

Table 4.7 reveals a number of interesting dynamics. The first is that while the recent bans/moratoria in several cities have attracted a great amount of media coverage and attention from state lawmakers, two-thirds of Colorado cities either have taken no position relative to fracking and land use or have opted to take actions to increase development including the larger cities of Aurora (340,000) and Greeley (95,000), although there are anti-fracking groups of citizens in both communities. Half of the sampled cities have passed polices and land use plans

that do not exceed the applicable state standards and one in six communities (nearly 17 percent) have taken extra steps to facilitate development. Action taken in support of industry, however, does not mean more drilling within city limits and quite frequently leads to extraction in areas outside of the supporting community.

Despite the state's goal of promoting uniform development policies, approximately one third of sampled cities registered some opposition to fracking and to the highly centralized nature of natural gas policymaking in Colorado. Two trends are noteworthy. The first is that in four communities, cities and industry have signed voluntary agreements that likely come close to reconciling municipal preferences for more restrictive development with the objectives of state policymakers and industry (voluntary agreements are allowed under state law). When the most coercive policies are singled out (bans and moratoria and zoning) six out of 48 sampled cities, have policies that likely conflict with the state's goal of orderly natural gas development and challenge its preemptive authority.

Aggregate trends are good indicators of the overall patterns of state-municipal relations. They do not, however, answer questions as to the factors that may be associated with specific municipal responses to urban drilling. To begin the process of identifying factors that contribute to municipal policies that conflict with the state, each city is sorted into the green-mobilization typology, as discussed in Chapter 3. Next to each city is its policy represented by a number that corresponds to the municipal policy positions in Table 4.7. At the bottom of table 4.8 are the average policy positions for the different types of communities.

Table 4.8 Individual Municipal Policy Responses to Oil and Gas Development*

LOWER GREEN				HIGHER GREEN			
LOWER TURNOUT (0)	**Policy**	**HIGHER TURNOUT (1)**	**Policy**	**LOWER TURNOUT (2)**	**Policy**	**HIGHER TURNOUT (3)**	**Policy**
Dacono	5	Holyoke	5	Commerce City	3	Fort Collins	0

Evans	5	Centennial	5	Aurora	6	Loveland	3
Fort Lupton	6	Englewood	5	Arvada	5	Timnath	5
Greeley	6	Glendale	5	Westminster	4	Boulder	0
Fruita	5	Greenwood Village	3	Brighton	2	Lafayette	0
Grand Junction	5	Sheridan	2	Thornton	5	Louisville	1
Craig	5	Wray	6	Carbondale	4	Longmont	0
Trinidad	5	Yuma	6	Glenwood Springs	4	Erie	3
Johnstown	5	Akron	5	Cortez	4	Meeker	5
Windsor	5	Littleton	5	Parachute	6	Rangely	5
Sterling	5	Brush	6	Rifle	1	Durango	5
Ault	6	Fort Morgan	5	Silt	5	Superior	5
Policy Average	**5.25**	**Policy Average**	**4.83**	**Policy Average**	**4.08**	**Policy Average**	**2.67**
*Data collected from municipal websites, codes and news articles							

ANOVA Results

In order to test whether the differences between the groups (High Sustainable Economic Development-High Turnout, High Sustainable Economic Development – Low Turnout, Low Sustainable Economic Development – High Turnout, Low Sustainable Economic Development – Low Turnout) occurred by more than just chance, I conducted a two-way ANOVA with a factorial structure based on high and low levels of sustainability and mobilization. In short, there is a difference between groups (p= .001), suggesting that the average scores in Table 4.8 did not occur by chance. Differences between the groups are not uniform as reflected in Table 4.9.

Table 4.9 Relationships between Municipal Sustainability, Ease of Mobilization and Fracking Policies

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	**46.417**	**3**	**15.472**	**6.707**	**.001**
Within Groups	101.500	44	2.307		
Total	147.917	47			

Several patterns are worth highlighting. First, while data limitations preclude stating any definitive causal relationships, there are statistically significant differences between the groups and these differences are in the anticipated direction. Communities inclined to support sustainability and environmental protection efforts are associated with more restrictive fracking policies (policy average of 2.67) as compared to cities that are less committed to growing sustainably and where overcoming the collective action problem is likely more difficult (policy average of 5.25).

It also appears that ease of mobilization impacts the willingness of cities to enact more coercive and controlling land use policies. Cities that ranked as more sustainable in terms of their economic development goals but less easily mobilized also demonstrated a greater propensity to advocate publically for greater local control but may be unwilling to go further and pass policies that might be seen as challenging the state's preemptive authority i.e. promulgating zoning policies or enacting (through citizen initiative or by municipal ordinance).

Table 4.10 Relationships among Specific Municipal Groups based on Greenness, Ease of Mobilization

		Mean Difference	Std. Error	Sig.
Low Sustainable Economic Development (SD) and Low Mobilization	Low SD and High Turnout	.41667	.62006	.505
	High SD and Low Turnout	1.16667	.62006	.067
	High SD and High Turnout	**2.58333***	**.62006**	**.000**
Low SD and High Turnout	Low SD and Low Mobilization	-.41667	.62006	.505
	High SD and Low Turnout	.75000	.62006	.233
	High SD and High Turnout	**2.16667***	**.62006**	**.001**
High SD and Low Turnout	**Low SD and Low Mobilization**	**-1.16667**	**.62006**	**.067**
	Low SD and High Turnout	-.75000	.62006	.233

	High SD and High Turnout	**1.41667***	**.62006**	**.027**
High SD and High Turnout	**Low SD and Low Mobilization**	**-2.58333***	**.62006**	**.000**
	Low SD and High Turnout	**-2.16667***	**.62006**	**.001**
	High SD and Low Turnout	**-1.41667***	**.62006**	**.027**

As shown in the table above, there are statistically significant group-level differences. The High SD – High Turnout group (HGHT) is significantly different when compared to the other three groups, with the relationship between sustainable economic development/mobilization (the typology) maintaining its strength with the other three categories, as shown in Table 4.10, p = .027; p= .001; p = .000).

What is the relationship between 'sustainable economic development,' mobilization and municipal fracking regulation? The two-way ANOVA is used here because of multiple independent variables and observations for each independent variable may interact with one another and whether the independent variables are significantly associated with loud or conflictual second order relationships. The two-way ANOVA shows the main effect of each independent variable in the table below.

Table 4.11 Being Sustainable or Being Mobilized

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	46.417[a]	3	15.472	6.707	.001
Intercept	850.083	1	850.083	368.509	.000
Sustainability (SD)	**33.333**	**1**	**33.333**	**14.450**	**.000**
Turnout	**10.083**	**1**	**10.083**	**4.371**	**.042**
SD * Turnout	3.000	1	3.000	1.300	.260
Error	101.500	44	2.307		
Total	998.000	48			
Corrected Total	147.917	47			
R Squared = .314 (Adjusted R Squared = .267)					

The measures of both variables (green and mobilization) indicate statistically significant relationships with urban drilling municipal responses. Overall, as a pair, they account for nearly 28 percent of the variation in the dependent variable. The variable approximating support for sustainable development is significant at p = 000. The turnout variable also showed statistical significance, p = .042. Interestingly, despite the HGHT group reporting statistically significant differences between it and the other groups, there appears to be no interactive effect between green and turnout and municipal natural gas policy.

A second ANOVA model incorporated socio-demographic factors including median home value and education.[53] Once included, they negate the effects of the turnout variable, although Rosenstone and Hansen (1993) noted that these variables shape mobilization patterns. Sustainable economic development maintains its statistically significant and robust association (p=.011) with group level differences associated with second order relationships. Despite the inclusion of additional variables, the model's ability to account for variation increased only slightly to 27.2 percent.

Table 4.12 Sustainable Economic Development versus Being Mobilized with Socio-Demographic Characteristics

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	51.748[a]	5	10.350	4.520	.002
Intercept	2.781	1	2.781	1.214	.277
LNHomeValue	.999	1	.999	.436	.512
Education	.232	1	.232	.102	.752
Green	**16.082**	**1**	**16.082**	**7.023**	**.011**
Turnout	4.262	1	4.262	1.861	.180
Green * Turnout	1.772	1	1.772	.774	.384
Error	96.169	42	2.290		

[53] These variables showed a statistically significant association with the dependent variable in the bivariate correlation table (Table 4.13).

Total	998.000	48			
Corrected Total	147.917	47			
a. R Squared = .350 (Adjusted R Squared = .272)					

Explaining the Differences

Despite the high bar for municipal natural gas legislation, state-level actions have not impeded municipal governments from entering the arena of fracking politics. The Cities Fort Collins, Longmont, Lafayette and Broomfield have enacted bans or moratoria, first two already. The Colorado Oil and Gas Association and the COGCC have already filed lawsuits against the Cities of Longmont and Fort Collins contending that state law preempts the cities' actions to restrict drilling. Cities, in response, typically argue that their inherent home rule zoning powers provide legal grounds for local land use restrictions (Rochat 2013).[54] Other cities are taking a less 'visible' approach to regulating development and working with developers to sign voluntary memorandums that include more stringent land use and setback provisions when compared to state law. Finally, in other cases, municipalities become willing partners to industry and have taken actions to spur on additional development.

A number of factors may be associated with more restrictive municipal fracking policies. In the bivariate table below, a variety of socio-demographic, environmental and housing characteristics are included to assess what, if any, impact they may have on municipal fracking policies.

[54] Industry and its supporters in State Government have initiated multiple lawsuits that address second order federalism. Currently, the City of Longmont faces two lawsuits based on its oil and gas regulations and its ban on hydraulic fracking. In December 2012, COGA sued the city based on its hydrofracking ban. In July 2012, COGCC filed a lawsuit against Longmont arguing that the city's oil and gas rules materially conflicted with COGCC rules.

Table 4.13 Bivariate Correlations and Second Order Federalism

		Typology	Municipal Policy	Owner Occupied	Home Value	Income	Minority Population	Education	Council Districts
	Pearson Correlation	1	-.541**	-.019	.388**	.293*	.071	.457**	-.143
	Sig. (2-tailed)		.000	.896	.006	.043	.632	.001	.333
Typology	N	48	48	48	48	48	48	48	48
	Pearson Correlation	**-.541****	**1**	**.032**	**-.386****	**-.297***	**-.103**	**-.419****	**-.094**
Municipal	**Sig. (2-tailed)**	**.000**		**.829**	**.007**	**.040**	**.484**	**.003**	**.525**
Policy	**N**	**48**	**48**	**48**	**48**	**48**	**48**	**48**	**48**
	Pearson Correlation	-.019	.032	1	.109	.255	-.288*	.066	.013
	Sig. (2-tailed)	.896	.829		.463	.081	.047	.655	.929
Owner Occupied	N	48	48	48	48	48	48	48	48
	Pearson Correlation	.388**	-.386**	.109	1	.840**	-.113	.781**	.032
	Sig. (2-tailed)	.006	.007	.463		.000	.443	.000	.828
Home Value	N	48	48	48	48	48	48	48	48
	Pearson Correlation	.293*	-.297*	.255	.840**	1	-.116	.863**	.092
	Sig. (2-tailed)	.043	.040	.081	.000		.434	.000	.534
Income	N	48	48	48	48	48	48	48	48
	Pearson Correlation	.071	-.103	-.288*	-.113	-.116	1	-.013	.274
	Sig. (2-tailed)	.632	.484	.047	.443	.434		.931	.059
Minority Population	N	48	48	48	48	48	48	48	48
	Pearson Correlation	.457**	-.419**	.066	.781**	.863**	-.013	1	.075
	Sig. (2-tailed)	.001	.003	.655	.000	.000	.931		.615
Education	N	48	48	48	48	48	48	48	48
	Pearson Correlation	-.143	-.094	.013	.032	.092	.274	.075	1
	Sig. (2-tailed)	.333	.525	.929	.828	.534	.059	.615	
Council Districts	N	48	48	48	48	48	48	48	48
**. Correlation is significant at the 0.01 level (2-tailed).									
*. Correlation is significant at the 0.05 level (2-tailed).									

Data collected from municipal websites, codes and news article

A number of statistically significant relationships are evident with the caveat that they do not address causality.[55] The second order typology reported an R= -.541, the strongest relationship between the dependent variable and any independent variable. In other words as the typology moves from LGLT to HGHT, municipal regulation/policy values decrease (becomes more anti-fracking). Other variables also supported a finding of statistical significance. Both median home value (R= -.386) and per capita income (R= -.297) reported negative relationships with the dependent variable -.386 and -.297, although these two indicators are also highly correlated with one another. For both, the relationship suggests that as home value and income levels increase, municipal policy towards urban natural gas extraction becomes more restrictive. Finally, education is highly correlated with income and home value, and is negatively associated with municipal policies favoring natural gas producers.

Municipal leaders seeking to restrict fracking within their corporate limits have offered a variety of idiosyncratic reasons that sharpen second order federalism. Representatives of the City of Fort Collins explained that the city's first (and year-long moratorium) was needed so that it had enough time to develop local regulations, to consider and leave time for any legislative changes in the 2013 session and to give the City enough time to contribute to the COGCC rulemaking process (setbacks and groundwater monitoring).[56]

Additional justifications for municipal action include the advantages of local control over the issue, concerns over uncertain public health and environmental impacts and the need to work with the city's operators (Weinheimer 2013). SO1 reflected that "for municipalities such as Fort Collins, one of [the] most important "brands" is the quality of life that exists here and that [the]

[55] I also ran non-parametric correlations, which also flagged statistically significant relationships related to the typology, income, home value and education. They are available in the appendices.
[56] The moratorium was enacted after an extensive public comment period, substantial research by city staff and work with industry, the COGCC, Air Pollution Control Division of the Colorado Department of Public Health and Environment, and extensive discussions with both regulators and members of the industry.

community is a healthy and safe place to live, work and play with open spaces, natural resources and opportunities to be outside."

Similar justifications precipitated Longmont's opposition. Longmont Mayor Dennis Coombs described the COGCC lawsuit as unfortunate, but he added that his city "wasn't ready to retreat on the issue." He noted that that city governments "already have the right to restrict heavy industrial uses from residential zones, and that oil and gas drilling shouldn't be any different…It's not something I feel we should back down on" (Jaffe 2012). Finally, he explained that the city's policy does not substantially interfere with the state's goal of orderly oil and gas development. Rather, it balances public health and environmental protection with oil and natural gas development (Jaffe 2012).[57]

In other cases, municipal responses have adopted more measured responses and include private agreements with industry that exceed the stringency of state regulations. The City of Loveland presented operators with two options should they seek to drill within the city. They may opt to meet the standards established by the COGCC but also must accept a local review process that may take months and include multiple appeals. The alternative is to sign a voluntary agreement with the city that is more stringent than the standards established by the COGCC. The city's lone operator indicated a willingness to work with the City (Maher 2013).

Loveland's middle ground approach, however, is not without its detractors. Mayor Cecil Gutierrez criticized the ordinance's language as being highly influenced by the COGCC and industry stating, "those two entities [the State and industry] had significant impact into those regulations…we bent over backward to abdicate, acquiesce to the state" (Gutierrez quoted in

[57] A separate lawsuit, filed in December 2012 by COGA and recently joined by the COGCC, contends that the city's fracking (the drilling technique) ban also violates state law. According to Matt Lepore, executive director of the COGCC, "The COGCC did not initiate this lawsuit or this process…that said, the COGCC does believe Longmont's ban on hydraulic fracturing is contrary to state law, and we believe clarity from the courts on this matter is important" (Jaffe 2013).

Maher 2013). He also highlighted a number of provisions ultimately stripped after consulting with the state and industry. Councilman Ralph Trenary, in even stronger language, noted that "I can't agree to the City of Loveland deciding our policy and programs in that kind of convoluted, manipulated process." (Trenary quoted in Maher 2013). Councilman Phil Farley equated the participation of the COGCC and industry to the "fox guarding the henhouse" (Farley quoted in Maher 2013).

Industry has endorsed Loveland's more restrictive standards. Anadarko's attorney Susan Aldridge stated that the city's standards "were crafted with consultation of the oil and gas industry and are now agreeable" (Aldridge quoted in Maher 2013). For the city, the agreement provided stability and a template for other communities, "other cities will look to us for a template...we have nothing but to gain for enacting these for our community" said Councilmember Klassen (Klassen quoted in Maher 2013). In agreeing with developers on voluntary agreements, Loveland City Councilman Hugh McKean, reflected "you cannot have 500 sets of rules for every jurisdiction, every county and every municipality when it comes to an industry that has to operate across Colorado using the same technology" (McKean quoted in Observer Staff 2013).

Other cities have remained silent or have had elected officials issue laudatory comments about the drilling and extractive development. Located in the resource rich Niobrara Shale play, Greeley has shown to be much more of a cooperative actor. Inside the city's growth area, there are already 427 wells with another 1200 projected in its long-term future. The City's Mayor, Tom Norton, commented that new rules expanding setbacks to 500 feet "would hurt development and city planning and would undermine local governments" (Healy 2013). The city also collects millions in tax and lease revenues from oil and gas operators. In 2012, for example,

the city estimated that oil and gas operations generated 3.3 million dollars for the city and over the next twenty-five years, municipal oil and gas related revenues could surpass $420 million (City of Greeley 2013).

Elected leaders of Centennial (located in the lower green but higher mobilization quadrant) also refused to enact any sort of local restrictions on gas development. In defending his decision, Councilman Ken Lucas described the city's experience with fracking politics as "we were lobbied by the usual anti-fracking crowd, they presented the usual misrepresentations and we saw right through them…and after some extensive analysis, we believed that the State regs – which are the best in the country – were good enough for us" (Lucas quoted in Staff 2013). Lucas indicated that developers cannot freely drill within the city and that they must receive a special use permit prior to drilling.

Through their permitting processes, cities including Centennial and Greeley (and many others) impose a variety of ancillary requirements on natural gas operators, i.e. employing conditions of use rather than broad land use authority (specifying the location of wells). Greeley, for example, mandates screening and 'camouflage' be placed in and around many of its more urban wells and compels operators to keep the well site free of large weeds. Municipal permits may also require that wildlife passages be built or other that the firm takes other actions designed to mitigate the effects of development on wildlife and/or residents' quality of life. If the city suspects that a new well will damage public streets, part of the permit can also mandate that the operator's truck follow a specific route or that the driller reimburse the city for the cost of the repair work (City of Greeley 2011).

Why Critique or Exceed the State?

The final question of this dissertation is identifying and then considering potential relationships between the dependent (municipal fracking policy) and the independent variables. Table 4.12 presented the bivariate correlations and revealed a number of variables that may help to explain why municipal governments enact policies that encroach upon the 'turf' of state leaders. Yet, bivariates are limited to identifying relationships between the variables and they cannot address the third question, which is to isolate the factors associated with municipal policies that challenge and go beyond those of the state.

Because of a small sample size (n=48; sample on page 116), there is not enough variation in each category to support a probit regression model. There is, however, sufficient variation to run logit regression models. To do so, municipal policy responses are recoded into two different dichotomous dependent variables, each designed to further evaluate and explain the relationships between cities and their state government. The first logit model is a broader measure of second order relations and groups together municipal responses that challenge, restrict or voice displeasure relative to the State's natural gas goals (municipal policy responses 0, 1, 2, 3, 4). The second model includes those municipal policies that exist in direct opposition to state law, i.e. city regulations that challenge or conflict with the state's preemptive authority (originally coded as municipal policies 0, 1, 2). For both, I ran forward and backward LR logistic regression, which identified the most parsimonious set of independent variables – the results of forward and backward LR matched one another and are presented below.

The first overall model reported statistical significance (P=.042). Two variables showed noteworthy and significant relationships with municipal challenges to the state's preemptive authority including the logged home value (p = .05) and cities committed to more sustainable

forms of economic development (p=.01). Interestingly, turnout fails to reach statistical significance, although it may be indirectly accounted for through the logged home value variable (Rosenstone and Hansen 1993).

Table 4.14 Municipal Fracking Policies that Exceed State Policy Requirements

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Green	-2.734	.847	10.430	1	.001	.065
	Constant	2.398	.739	10.541	1	.001	11.000
Step 2[b]	**LogHomeValue***	**-1.943**	**.990**	**3.850**	**1**	**.050**	**.143**
	Sustainable Economic Development*	**-2.295**	**.905**	**6.433**	**1**	**.011**	**.101**
	Constant	**26.130**	**12.270**	**4.536**	**1**	**.033**	**2.229E11**
a. Variable(s) entered on step 1: Green.							
b. Variable(s) entered on step 2: LNHomeValue.							
Cox & Snell R Square = .325 *Significant at the .05 level							

In this first model, each one unit increase in a municipalities sustainable development score is associated with a 90 percent decrease in the odds of a municipal policy that supports or does not interfere with the State's goals, while holding the logged home value constant. This is a dramatic decrease in the odds. Part of this, however, is due to the sample of 'green cities,' which is limited to those cities that have actively sought out a high number and concentration of environmental and clean tech jobs. For some cities these jobs amount to three to four percent of the city's overall employment base, which is much larger than the average community in Colorado. The log of median home value also reached statistical significance, albeit its P value was considerably higher than the 'green' variable. For each one unit increase in the logged home value, the likelihood of deferring to the state of Colorado on oil and gas regulatory issues decreases by approximately 86 percent, holding environmentalism and turnout levels constant.

While this number may seem like a dramatic shift in the odds, a one-unit increase in the logged home value is the equivalent of a median home value increasing from 100,000 to 274,000, a sizable and improbable jump.

In the second model, only those communities whose policies contradict and challenge the state (originally coded as municipal policies 0, 1, 2) are considered. Although, no variables reached the .05 level of statistical significance, if a more generous .1 threshold is applied, both the sustainable economic development variable and turnout variable become statistically significant and associated with challenges (loud) to the state's preemptive authority. Interestingly, the combined effect shows no relationship with the presence of policies that challenge the state's preemptive authority.

Table 4.15 Municipal Fracking Policies that Challenge the State's Preemptive Authority

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 5[a]	District – Council	-1.586	1.154	1.891	1	.169	.205
	Sustainable Economic Development**	**-2.341**	**1.267**	**3.416**	**1**	**.065**	**.096**
	Turnout**	**-2.176**	**1.236**	**3.097**	**1**	**.078**	**.114**
	Constant	5.689	1.864	9.312	1	.002	295.523
Step 6[a]	**Sustainable Economic Development****	-1.914	1.167	2.687	1	.101	.148
	Turnout	-1.914	1.167	2.687	1	.101	.148
	Constant	4.470	1.438	9.662	1	.002	87.333
a. Variable(s) entered on step 1: BachorHigher, DistrictCouncil, LNHomeValue, Green, Turnout, LNIncome, Interaction1 (GreenXTurnout)							
**Significant at the .1 level							

In the 'challenging the state's preemptive authority' model, with each one unit increase in the greenness of the municipality (with the same caveats identified on page 30, the first overall

model), there is a 91 percent decrease associated in the likelihood that a city passes a policy that complies with state law, holding turnout constant. In a similar manner, with a one unit increase in voter turnout, the odds of passing municipal drilling policies that do not interfere with state oil and gas goals/policies decrease by 89 percent, while holding the green measure constant. Unlike the first model, the log of median home value failed to reach statistical significance. The remaining variables were not significant in either model.

Discussion of Results

The sample of Colorado communities revealed interesting, but limited results. First, the small sample size presents challenges when generalizing about other Colorado cities let alone the population of cities in those states that currently allow fracking. Second, data are not random and cannot address questions of causality and are limited to measures of association. Finally, because of data and logistical limitations, the city-level reasons behind decisions to support or oppose stricter municipal fracking policies are unknown.

Despite these limitations, the sample did reveal several patterns associated with challenges to the state's preemptive authority and second order federalism. In Colorado, more sustainable communities are associated with a greater likelihood of promulgating policies that challenge and test the state's centralized natural gas policies. Data in both logit models and the ANOVA models reflect the key role that environmental support and ideologies play in municipal fracking opposition. Data also points to a role for political activism and mobilization, evident in Tables 4.15 and 4.11. Turnout, for the sample cities, is also associated with municipal policies that exerted more local control over natural gas development. Both help to explain second order dynamics in Colorado, albeit through a number of potential mechanisms and dynamics, explicated below.

Table 4.16 Summary of Findings

Variable	Model 1 – Critical of the State (Symbolic and Substantive Challenges)	Model 2 – Challenging the State (Substantive Challenges)
Sustainable Economic Development	**Support**	**Support**
Turnout	No Support Observed (highly correlated with home value)	**Support**
Income	No Support Observed (highly correlated with home value)	No Support Observed
Owner Occupied	No Support Observed (highly correlated with home value)	No Support Observed
Median Household Value	**Support**	No Support Observed
Municipal Institutional Structures	No Support Observed	No Support Observed
Race	No Support Observed	No Support Observed

Second Order Politics and Information

While casual mechanisms are beyond the scope of this analysis, its findings underscore the strategic nature of information in impacting environmental and turnout dynamics. Both explanations highlight the role of information in engendering the political will necessary to exceed and challenge the state. Disclosure scholars, Desvousges, Smith, and Rink's (1992) study of radon testing offers insights into how municipal opposition to state policies may be a function of the quality, saliency and proximity of information that is available to municipal stakeholders and less so at the state level. First, information must be disseminated, accessible, clear and salient in the minds of the public. Second, the public must internalize the information in such a way that it leads to changes in their knowledge and behavior. Because of its proximity and novelty, natural gas development and its impacts to residents' quality of life may become highly salient among residents and drive them to push their city halls for more restrictive land use drilling policies. City councilmembers, mindful of their reelection prospects, may be more

sensitive to these localized pushes when compared to state lawmakers, who can have much broader ideological and geographical (and less proximate to oil and natural gas development) constituencies.

The City of Longmont's efforts to limit fracking within its limits, exemplifies the interplay between rational choice, anti-fracking activism and information. In July 2012, following a citywide drilling moratorium, the City enacted a new set of oil and gas regulations that included an outright ban on drilling in residential areas (passed on a 4-3 vote). Part of this vote also authorized for the City to cap and close the Rider Well. Located near a middle school and reportedly leaking benzene, this particular site became a catalyst in prompting the city's interest in promulgating tougher oil and gas rules. Longmont citizens also mobilized against fracking once they learned of the leaking well. In November 2012, Longmont voters backed a complete fracking ban by a 60-40 margin (Rochat 2012; 2012a).

Second Order Politics, Mobilization and Sustainability

The results here also support a long line of research that links oil and gas development, proximity to development and ideological factors. Klyza and Sousa (2007) found that Republicans generally advocate for the positions of the business community and other anti-environmental interests. Democrats, conversely, are generally more sympathetic and supportive of the environment (See also Kamienicki 2006). Michauda, Carlisle and Smith (2008) documented 'perception' patterns that appear to be present in Colorado's second order fracking proxy battles. They note that Republicans and those possessing individualist cultural attitudes were more likely to favor oil drilling as compared to Democrats, liberals, or egalitarians. The former also tended to believe that spills were rare and that drilling can be done safely. Finally, in terms of scientists, this 'group' was less likely to believe environmental scientists and more

likely to believe oil industry scientists. Democrats, on the other hand, were more likely to believe environmental scientists as compared to industry scientists, that drilling was less safe and were more likely to oppose drilling.

Greener cities were associated with restrictions on fracking and challenges to the state. These results reaffirm the notion that fracking is as much an environmental issue as it an energy one (Davis and Fisk 2014). When Colorado communities are prone to have concerns about environmental protection, they are associated with more oppositional fracking policies and a greater willingness to challenge the state's preemptive authority. This finding is not necessarily surprising, although, the willingness to challenge state fracking policy may be suggestive of a new form of bottom up environmental activism and potentially, an attractive new venue and issue boundary for opponents.

What is new, however, is that mobilization and turnout matter when it comes to second order federalism. Turnout and mobilization help cities overcome collective action dilemmas, i.e. they are willing to legislate in policy arenas traditionally reserved to the state – but why? Jennings and Andersen's 2003 study of AIDS activism suggests some clues pointing to a potential relationship between conflicting second order relations and motivation/engagement, emotion and context. Jennings and Andersen (2003) created two models, only one of which included AIDS-specific variables. In the first model, they found statistically significant relationships between gender and sexual orientation and activism levels, suggesting that gay men were most likely to be active in the AIDS movement. However, when Jennings and Andersen introduced AIDS-specific attributes into the model (their second model), gender and sexual orientation lost much of their explanatory power in favor of the context specific factors i.e. personal health status and whether AIDS had affected a loved one.

Contextual factors attributed to AIDS status and the intensity of pain and loss, i.e. conditions that would create anxiety were responsible for heightened levels of activism. This latter model indicated that those who face the greatest risk or have suffered a significant loss, regardless of gender and sexual orientation, were the most likely to seek information and engage in political activism. In a similar manner, when citizens are motivated, as they were in Longmont and Boulder after the Rider Well leaking focusing event or spills near Fort Collins, they may become more likely to work to overcome environmental collective action dilemmas and pass policies that challenge the state's authority (Rochat 2012; 2012a).

Economic Development Goals, Second Order Federalism and Fracking

Local governments often use their resources to influence location decisions made by business leaders. The competitive environment influences how a city allocates its resources and the decision to support or impede oil and gas development. Kantor and David (1988) argued that because they operate in a political environment that expects them to compete for economic investment and business attraction they are likely to promote economic development and competitiveness, such motives are seemingly evident in cities that are going beyond the state's development goals.

Regime theory may also help understand decisions to restrict fracking. Such decisions may be less because of democratic responsiveness, but because expanded development may threaten green jobs in the community. Additionally, if a community does not expect or depend on impact fees for its general fund the influence of industry may be blunted. Concomitantly, industry's very early presence in some communities may also limits its 'place' in a governing regime, especially when a community is already home to a variety of green businesses, which do not want the additional competition (Imbroscio 1999).

Colorado's Second Order Dynamics Revisited

Elmore's (1980) description of backward mapping identifies limitations inherent to the top-down implementation model as well as more centralized institutional systems. Elmore argues that executives or higher level agencies can focus attention on a problem, help set the agenda and offer opportunities for street-level officials or lower level governments to exercise discretion and judgment, they cannot solve the problem, as they are too far removed from the actual problem-solving process. Others go further and note that top-down executives cannot unilaterally control the agenda and do not hold a monopoly on political power (Frederickson et. al 2012; Hupe 2011; Long 1947; Pressman and Wildavsky 1984).

Elmore's descriptions of the problems associated with top-down implementation may help explain the 'tense' second order relationship in centralized Colorado. Heated second order conflicts in Colorado have led to a number of results in addition to multiple lawsuits, especially in more mobilized cities that are predisposed to support environmental protection. First, through municipal activism, the state's natural gas agenda is more crowded. State lawmakers, for example, have heralded the passage of numerous bills that advance issues of local concern including: stricter air regulations and emission limits, tougher disclosure laws and larger buffer zones between occupied structures and new development. Local activism has helped to spur a new ballot initiative that "empowers cities and counties to set their own standards providing Coloradans with regional flexibility in regard to fracking and other highly industrial forms of Oil and Gas Development." The proposed initiative, according to proponents, would also offer new legal protections to communities, which pass more restrictive policies, i.e. the flexibility to solve local problems (Local Control Colorado 2014).

Chapter 5
Second Order Politics in Ohio

Ohio's intergovernmental experiences are important for several reasons. First, it is typical of a middle ground state in which the state's oil and natural gas development goals can be somewhat balanced by municipal land use preferences. Second, its eastern geography is home to the expansive Marcellus and Utica Shale Plays, which are driving industry interest in extraction and economic optimism in the region. New economic opportunities are particularly attractive for the region's policymakers, who are seeking to help Ohio emerge from persistent unemployment and the slow economic recovery following the 2009 recession. Advocates also promise secondary economic benefits for local communities including rising property and sales tax collections and the payment of impact fees (OOGA 2012; Wiseman 2009). Third, fracking has brought drilling to Ohio's population centers of Youngstown and communities near Cleveland, Canton and Akron. As of 2013, over three million Ohioans live within a mile of a natural gas well (Gold 2013). Finally, Ohio's second order politics mirror Colorado's more mercurial politics with tense and oppositional dynamics (an ongoing state lawsuit), indifference and cooperative relationships between Ohio's cities, its elected State leaders and the Department of Natural Resources (ODNR).

This chapter's organization follows the same format as the preceding chapter. It begins with a summary of relevant state statutes, regulations and judicial opinions that establish the formal boundaries governing natural gas development, hydraulic fracturing and municipal-state relations. Fracking's costs and benefits in an Ohio specific context follow. The chapter then transitions to a municipal-centric perspective and addresses the dissertation's second (municipal policy responses) and third (challenging the state's preemptive authority) major questions.

Through a sampling of cities, the chapter summarizes and offers an explanation of the landscape of municipal responses to increasing urban drilling. It concludes by addressing the dissertation's third major question: why are some cities exceeding and / or challenging the state's preemptive authority and others are not?

Ohio's Natural Gas Experiences and Context

Commercial oil and natural gas production began in 1888 and grew quickly. The boom, however, was short-lived and production peaked in 1896. Operators began to vertically frack many of Ohio's oil and gas wells in 1951 and revived production in many of the state's depleted fields. A second production 'boom' began in the late 2000s with the deployment of directional drilling. Today, Ohio produces a modest but growing volume of natural gas (78 billion cubic feet) and oil (4.7 million barrels) (OOGA 2014).

Natural gas formations are located primarily under the Eastern half of the State. The larger Marcellus Shale lies underneath the eastern edge of the State. Ohio officials, however, consider it the less economically viable shale deposit.[58] Comparatively, industry leaders and state policymakers see the Utica Shale as a richer source of natural gas. State estimates put the total volume of reserves at 3.75 trillion cubic feet (TCF) of natural gas and 1.31 billion barrels of oil assuming a 1.2 percent recovery rate. Production forecasts skyrocket to 15.7 TCF of natural gas and 5.5 billion barrels of oil if the recovery rate rises to five percent (OOGA 2012).

Table 5.1 Recoverable Natural Gas in Ohio

Shale Play	Recoverable Natural Gas (in Trillions of Cubic Feet TCF)	Region
Marcellus	369 TCF	Extreme Eastern Ohio
Utica	111 TCF	Eastern half of the State

Source: EIA 2014

[58] At its deepest point in Ohio, the Marcellus Shale is 62 feet thick (which is generally not thick enough for recoverable quantities of oil or natural gas).

Both Ohio Democrats and Republicans generally support expanded natural gas development via fracking. Former Democratic Governor, Ted Strickland, touting HB278/SB 165's environmental and economic benefits, signed it into law in 2010. The law added new pre-drilling notification requirements in urban areas, increased insurance rates and fees, standardized spacing and well intensity regulations, and it included additional resources (for the ODNR) for environmental enforcement (ODNR 2014). Republican Governor, John Kasich and his allies in the Statehouse are also favorably inclined towards fracking and have taken steps to encourage drilling. Natural Resources Director, Jim Zehringer, noted that the Kasich Administration worked with industry to produce comprehensive new rules governing well-pad construction, permitting, processing and waste recycling, and hired new staff to meet the regulatory demand associated with its expectation of expanded production. He described industry as a wonderful partner through the process and stated that Ohio is open for business (Zehringer quoted by McParland 2014).

Debate about whether to allow fracking in Ohio appears settled, although new concerns over seismic activities have contributed to calls for a statewide fracking moratorium and new efforts to limit the underground injection of fracked water.[59] Lawmakers have also sparred over oil and natural gas revenues and reimbursements to local governments for fracking related impact costs. Statehouse Republicans (backed by industry) favor a lower severance tax rate while the Republican Governor favors of a higher one, "I want to make sure as they deplete our resources that they pay for it, mostly out-of-state people, and that we use those resources to benefit every Ohioan by reducing the tax burden [for] every Ohioan" (Governor Kasich quoted in Kovac 2013). Kasich's plan is also more generous to local governments, which allocates a fourth of the additional severance tax collections to the 33 counties most affected by oil and gas

[59] There are also examples of municipal/township bans and other land use restrictions on urban drilling.

exploration. If the plan were to become law, affected counties would receive approximately $15 million in 2014 and nearly $110 million by 2016 (Vardon 2013). Statehouse Republicans, however, oppose the Kasich plan and efforts to raise the severance tax rate (Pelzer 2014).

Constitutional and Statutory Provisions

A number of formal documents (statutory and constitutional) shape Ohio's second order politics. Pertinent provisions include constitutional language that lays out the scope of home rule authority, environmental protections and the relationship between state authority and municipal autonomy. Other relevant constitutional clauses establish rights pertaining to water withdrawals/ usage and private property (surface and subsurface property) rights.

The State Constitution, Article XVIII, Section 3, imbues Ohio's municipalities with the "authority to exercise all powers of local self-government and to adopt and enforce within their limits such local police, sanitary and other similar regulations, as are not in conflict with general laws" *Morris v. Roseman*,162 Ohio St. 447 (1954). Home rule powers are inherent to all local governments regardless of enabling legislation, their size, class or charter. The section contains three clauses that add further depth but also uncertainty to the second order relationship between Ohio's cities and state leaders:

1. The power to exercise all powers of local self-government.
2. The power to exercise police powers concurrently with the state.
3. The conflict clause (usually modifies the police powers clause).

The State Constitution delegates to city and other sub-state governments two additional powers. First, local governments may conserve and preserve natural and open space areas, which the Constitution defines as legitimate public purposes. Second, municipalities and counties may

"control, prevent or minimize, clean up or remediate water contamination or pollution" (Nolon and Gavin 2013).

Ohio law considers water a property right, protected by Article 1, Section 19b of the State Constitution. Landowners, under the current regulatory scheme, are allowed to make reasonable uses of groundwater (beneath their land) and of surface water (waters located on or flowing through their land) without state oversight. Unreasonable withdrawals that interfere with other landowners' rights to use water are subject to state regulation and possible litigation. Section 1521.16 of the Ohio Revised Code clarified what is meant by 'interfere' and required that firms (like natural gas operators and extractors) possessing the capacity to consume or withdraw more than 100,000 gallons per day (about 70 gallons per minute) register with the Ohio Department of Natural Resources Division of Soil and Water Resources (Division of Soil and Water Resources [DWSR] 2012).

Ohio statutes distinguish cities from villages (having fewer than 5,000 residents) and townships. There, are, however, few substantive differences in regards to sub-state type and the authority to regulate land use and author zoning regulations. Cities, villages and townships may provide residents with public safety and health services, offer waste management, build senior and community centers, roads, parks, maintain lighting and engage in zoning/land use and transportation planning (Cox 2012).[60]

The Ohio Oil and Gas Act of 1965 established the first set of formal boundaries for state and city governments relative to natural gas. Two recent amendments to Chapter 1509 of the Act are noteworthy. First, Democratic Governor, Ted Strickland, signed into law Substitute SB 165,

[60] Within Ohio, 59 percent live in cities and 35 percent reside in townships.

centralizing the state's permitting authority in urban areas and adding new enforcement provisions including (ODNR 2014):

- New directionally drilled wells may not be closer than 150 feet to any property line unless the operator has secured the landowner's written consent
- New surface wells cannot be located closer than 100 feet to an occupied dwelling or public building
- New permit fees for urban areas (ODNR 2014)

Republican Governor John Kasich signed Senate Bill 315 ("S.B. 315"), into law on June 11, 2012. The new language placed additional standards for well and site construction, added new disclosure requirements and increased fines for health and safety violations. The bill also required new pre-drilling water testing, tracking water usage and increased insurance requirements (ODNR 2012; Simmer 2012). Table 5.2 identifies other statutes with tangential impacts on urban drilling.

Table 5.2 Other Environmental and Energy Laws

Name and Year	Policy Area	Agencies
Ohio Solid and Hazardous Waste and Disposal Act (1967)	Reducing and preventing pollution	Division of Materials and Waste Management
Clean Air Act (1970)	Stationary and Mobile Air Sources and state implementation plans	Ohio Environmental Protection Agency (OEPA)
Clean Water Act (1970)	Regulate wastewater treatment plants, factories and storm water to reduce the impact of pollutants.	OEPA

Source: Ohio Rules 2014

Ohio is a split estate state. In *Chartiers Oil Co. v. Curtiss*, 34 Ohio C.C. 106 (Ohio Cir. Ct. 1911) the Circuit Court held that the mineral estate owner was entitled to an implied right to use the surface estate. The Court's decision permitted the subsurface owner (Chartiers) to explore and drill for oil and gas on the surface estate to a reasonable extent. *In J.R. Operating*

Co. v. Lindsay, (Mahoning App. No. 96 C.A. 35) the Mahoning appellate court clarified what "reasonable" meant. The court determined that the mineral estate owner may not unreasonably intrude upon the surface estate while he or she is extracting underground resources (Energy and Mineral law Institute 2011).

Regulations

Two state agencies oversee Ohio's natural gas industry. The Ohio Environmental Protection Agency (OEPA) regulates fracking's environmental impacts to water and air quality. The Ohio Department of Natural Resources Division of Mineral Resources Management (ODNR-DMRM) holds considerably more authority to shape fracking's land use impacts. The agency oversees the life cycle of a frack site from the issuance of initial drilling permits to its operational stages and then to well plugging and abandonment. The ODNR's regulatory authority also extends to natural gas transportation, land use and wastes/waste byproducts produced during production (Shale 2014).

Founded in 1972, the Ohio Environmental Protection Agency protects the environment and public health. A gubernatorial appointee heads several divisions (air, water, hazardous wastes and site remediation) and sets day-to-day policy. Each division, in turn, carries out several functions: reviewing and issuing permits to facilities/firms, investigating complaints from citizens/landowners, providing technical assistance to firms and monitoring and enforcing environmental regulations (OEPA 2014). The OEPA's jurisdiction over fracking extends to monitoring air and water impacts typically through the permitting and inspections process. Finally, the OEPA regulates soil contamination. If drilling is suspected of polluting adjacent soils, it is classified as a contaminated solid waste, which only permitted waste facilities can receive (OEPA 2014a).

Since 1959, the Ohio Department of Natural Resources (ODNR) has promoted, protected and regulated the state's natural resources. Also led by a gubernatorial appointee, its mission includes four disparate goals. The first two promote the state's natural resources and the facilitation of statewide economic development through policies that lead to job creation, expansion and retention. To advance these goals, the agency cultivates ties with industry. Third, the ODNR is to provide leisure and recreational opportunities for Ohio residents and tourists. To achieve its fourth goal, the ODNR regulates industrial development in such a way that it does not endanger public health or cause serious environmental harm (ODNR 2014).

Under its current regulatory authority, the ODNR enacts rules that govern a number of industry activities of interest to local governments such as disclosure, injection wells and well setbacks (ODNR 2014). Like its counterparts in Texas and Colorado, ODNR requires that operators first apply and obtain a drilling permit from the Oil and Gas Division. Once received, firms must meet requisite casing, cementing, well integrity and completion and disposal standards. State law requires firms to leave a 150-foot minimum setback requirement between new wells and residential units (in urban areas) and a 50-foot buffer between development and water sources. Municipalities (as of April 2014) can still enact zoning ordinances and land use regulations to oversee natural gas development but must do so in a way that protects public health or its environment, i.e. simple opposition to development is not sufficient.

Table 5.3 Ohio's Other Fracking Regulations

Area	Regulation
Disclosure	CAS numbers be disclosed; maximum amount of all additives and pressures; base fluid; pre-drilling water quality sampling; process to challenge trade secret exemptions
Pre-Drilling Water Well Testing	Within 0.28 miles of well
Water Withdrawal Restrictions	Permit req. if>2m gal/day, reg./report if>100k gal/day
Casing and Cementing Depth Requirements	50 feet. below water table

Intermediate and Production Casing Cement Circulation Regulations Surface Casing Cement Circulation	500 feet above SHOE 1000 feet above SHOE
Venting and Flaring	Banned, Restricted
Fluid Storage	Permit required for all pits and tanks
Underground fluid injection	Permit/approval and recordkeeping required

Source: Richardson et al. 2013

Both the OEPA and ODNR hold significant authority over natural gas operations within the State. As co-regulators, each has the opportunity to influence oil and natural gas operations and to affect Ohio's second order politics. The table below summarizes applicable powers by operator activity.

Table 5.4 State Co-Regulators

	REGULATORY AGENCY	
	Ohio Department of Natural Resources	**Ohio Environmental Protection Agency**
Drilling	▪ Drilling permits ▪ Establishes requirements for spacing/location, design and construction of wells ▪ Performs inspections and oversight ▪ Sets requirements for spills, releases and well plugging/abandonment ▪ Permits to withdraw water	▪ Mandates that operators receive authorization for construction when a proposed activity impacts wetlands, streams, rivers ▪ Drillers must obtain an air permit-to-install and operate
Waste-water	▪ Creates and enacts design requirements and closure requirements when operators plan to store drill cuttings and brine/flowback water in on-site pits or lagoons ▪ Establishes standards for cuttings and sediments left on-site	▪ Once soil is considered a solid waste, operators are required to follow solid waste protocols for shipping it off-site
Water disposal	▪ Regulates the disposal of brine and sets design standards and oversees operation of underground injection ▪ Responds to citizens	

Source: Shaleinfo 2013

Judicial Decisions

Ohio Courts conduct a three-step home rule analysis for determining the scope of state-municipal relations (*Ohioans for Concealed Carry, Inc. v. City of Clyde,* 96 NE 2d 967 (2008). The analysis is applied in a variety of circumstances ranging from gun control and toxic waste facilities to urban drilling.

The analysis begins by determining whether or not an ordinance falls within the inherent set of powers of municipal self-government or if it is an extension of local police powers. Municipal actions are permissible if the "result affects only the municipality itself, with no extraterritorial effects, the subject is clearly within the power of local self-government and is a matter for the determination of the municipality. However, if the result is not so confined it becomes a matter for the General Assembly" (*Cleveland Elec. Illuminating Co. v. Painesville*, 15 Ohio St.2d 125, 129, 239 N.E.2d 75 (1968), quoting *Beachwood* at 371).

If the Court determines that the ordinance is an exercise of local police power rather than a pure local issue, the analysis proceeds to a second step (*Ohioans for Concealed Carry, Inc. v. City of Clyde*, 96 NE 2d 967 (2008)). Police-power ordinances, according to the Court, are pieces of legislation that protect public health, safety, morals or residents' general welfare. If the Court finds the ordinance is a police power, it then attempts to determine if a state general law should supersede the municipal ordinance.

The Court defines general laws as (*Canton v. State*, 95 Ohio St.3d 149 (2002)):

1. The statute is part of a statewide enactment and is comprehensive
2. The statute is applied uniformly throughout the state
3. Establishes police, sanitary or other standards that are not just restrictions on state power
4. Articulates rules of conduct upon citizens

During this final step, the court ascertains whether or not there are inconsistencies, contradictions or conflicts between state law and the municipal action (*Rispo Realty & Dev. Co. v. Parma*, 55 Ohio St. 3d 101 (1990). If the municipal ordinance conflicts with the relevant state law (a general law), then the Court rules it as unconstitutional and strikes it down. However, local communities may promulgate regulations that do not necessarily conflict with the State's general laws, suggesting that concurrent regulation is permissible.

In its 1986 *Fondessy* decision, the State Supreme Court applied its three-part analysis to two ordinances passed by the City of Oregon to regulate toxic waste facilities within the city (*Fondessy Enterprises v. City of Oregon*, 492 N.E.2d 797, 23 Ohio St. 3d 213). Under its ordinance, the City charged a permit fee on hazardous waste sites within city limits and mandated that waste site operators keep detailed and complete records. The State Supreme Court held in favor of the City, explaining that the permit does not conflict with or impede the implementation of state law (Nolon and Gavin 2013).

The judiciary has also inserted itself into second order natural gas debates. In its *Newbury* decision, the Supreme Court evaluated Newbury's Township drilling ban in residentially zoned areas, which coincidently included large swaths of farmland, typically where natural gas extraction takes place (*Newbury Township Board of Trustees v. Lomak Petroleum*, Inc 583 N.E.2d 302 (Ohio 1992). The Court struck down the Township's ban. In its holding, the Justices surmised that more than just concerns over public health and welfare (part of the Constitutional obligations of city and township governments) drove the township's policies (Nolon and Gavin 2013). The practical effect of *Newbury* is that should municipal or township governments promulgate fracking restrictions or regulations (as they failed to do in Newbury), they must

demonstrate a compelling concern for health and safety; mere opposition to oil and gas development is not a sufficient cause.

The most recent case to test the legal relationship between cities and the State originated in the northeastern city of Munroe Falls. In this case, the City charged Beck Energy with violating its zoning, right of way and permitting ordinances after the company began to drill on private property. The trial court ruled in favor of Munroe Falls. The Appellate Court, however, reversed the lower court and held in favor of Beck Energy. At issue, is whether HB 278 preempts municipal home rule authority. In its holding, the Appellate Court centered its logic on the comprehensive language used in HB 278/SB 165 (included well location, spacing and operation, permitting, drilling, well stimulation and completion), and found the legislation sufficient to preempt municipal regulation (Cocklin 2013). The State Supreme Court has accepted the case for review with a decision likely in late 2014 or early 2015.

Fracking in Ohio

Production

Much of the recent and renewed natural gas development is concentrated in the State's eastern half. Driving these production increases is fracking via directional drilling and vertical fracking in traditional gas wells.

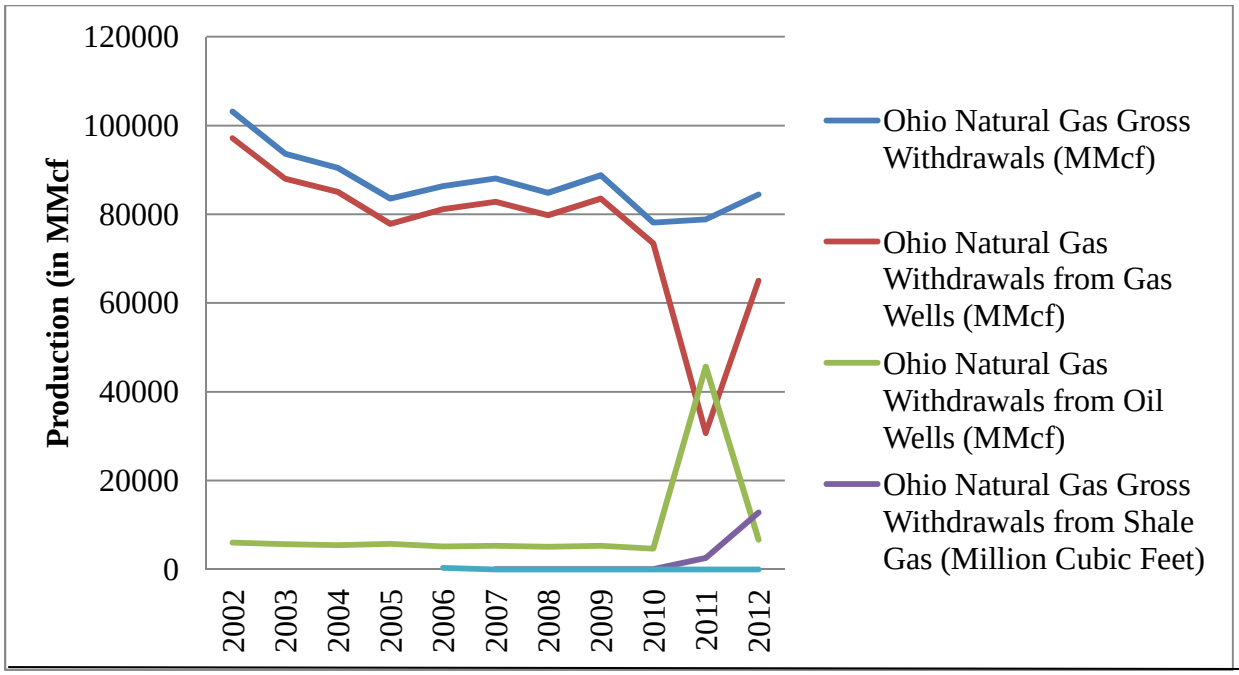

Figure 5.1 Ohio's Natural Gas Production, by Extraction Technique

Source: EIA 2013e

Despite the recent rise in overall gas production, the number of producing natural gas wells has remained steady at 35,000.

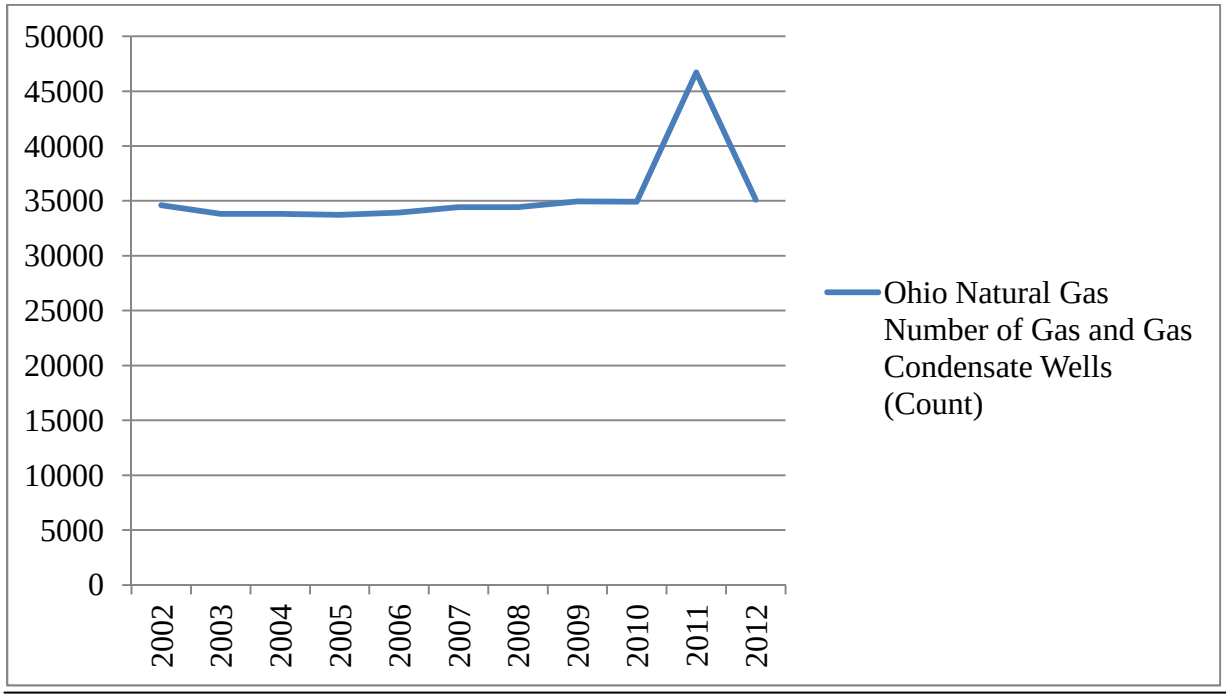

Figure 5.2 Ohio Natural Gas Wells (Count)

Source: EIA 2013e

Ohio's gas industry expects continued growth. Production, like Colorado and Texas, is location specific contributes to the unequal distribution of natural gas environmental/economic costs and rewards.

Table 5.5 Ohio's Fracked Counties

2012 Rank	County	Wells Drilled	Average Depth	Footage Drilled
1	Carroll	87	13,541	1,178,078
2	Noble	49	5,824	285,376
3	Licking*	42	2,709	113,757
4	Knox	40	3,042	121,675
5	Stark	36	6,342	228,312
6	Monroe	31	4,677	144,987
7	Columbiana	30	13,005	390,147
8	Harrison	22	13,906	305,933
9	Coshocton	18	4,299	77,382
10	Guernsey	18	4,733	85,194
*Located just east of Columbus				
**Development is also occurring in and around Cleveland, Youngtown and Akron				

Source: Simmers 2012

Economic Benefits

Industry advocates promise increasing severance tax revenues, private sector economic growth and strong employment forecasts. Government budget experts also project additional property and sales tax receipts and the creation of thousands of industry jobs, filled by unemployed and underemployed Ohioans (OOGA 2011). Tables 5.6-5.8 show the projected impact.

Table 5.6 Statewide Economic Impacts

	Year				
(in millions)	**2011**	**2012**	**2013**	**2014**	**2015**
Employment	3,794	21,469	102,052	177,006	203,138
Gross Regional Product	$180	$1,090	$5,382	$9,972	$12,265
Wages	$153	$955	$4,907	$9,412	$11,990
Output	$336	$2,028	$9,987	$18,429	$22,583
Local Wage Tax (@ 2%)	$3	$19	$98	$188	$239

Source: Kleinhenz and Associates 2011

Table 5.7 Employment Impacts

	Direct Employment Impacts				
	2011	**2012**	**2013**	**2014**	**2015**
Mining and Extractive	**494**	**2,922**	**14,222**	**71,297**	**30,900**
	Indirect Employment Impacts				
Support activities for mining	2,473	13,521	63,118	105,709	117,204
Retail trade	166	1,007	4,948	8,990	10,743
Professional and technical services	149	885	4,299	7,675	8,988
Administrative and support services	107	625	3,023	5,365	6,236
Ambulatory health care services	106	634	3,215	5,911	7,060
Construction	98	660	3,235	6,673	9,077
Food services and drinking places	71	434	2,156	3,994	4,940
Wholesale trade	54	321	1,539	2,722	3,162
Real estate	43	259	1,287	2,307	2,670
Personal and laundry services	33	201	1,010	1,834	2,158
Total	**3,300**	**18,547**	**87,830**	**105,709**	**172,238**

Source: Kleinhenz and Associates 2011

Table 5.8 Revenue Impacts

Year	Severance Taxes	Commercial Activity Tax	Ad Valorem Tax	Federal Income Tax	State & Local Income Tax	Total
2012	$434,862	$239,430	$1,072,262	$1,878,604	$469,651	$4,094,809
2013	$2,967,123	$1,633,663	$7,316,193	$12,817,970	$3,204,492	$27,939,440
2014	$15,080,854	$8,303,341	$37,185,668	$65,149,290	$16,287,322	$142,006,475
2015	$32,368,301	$17,821,606	$79,812,249	$139,831,060	$34,957,765	$304,790,980
Total	$50,851,140	$27,998,040	$125,386,372	$219,676,924	$54,919,230	$478,831,704

Source: Kleinhenz and Associates 2011

The tables point to a number of optimistic projections. Severance taxes, for example, may grow by hundreds of millions of dollars along with new indirect sales and property taxes (Kleinhenz and Associates 2011). Additional revenues via better paying jobs and support industries, according to forecasts, will help reinvigorate stagnant municipal and regional economies. Rising gas and oil collections have created a number of attractive policy options available to elected officials (especially the Governor), such as income tax cuts, increasing local aid and new spending on enforcement and environmental remediation programs (McParland 2014; Vardon 2013).

On the ground, numbers are mixed. In FY 2012, Ohio's top fifteen shale gas producing counties' sales tax receipts increased by 20 percent, significantly larger than non-producing counties. Job growth from shale exploration, even in strong and moderate shale producing counties, however is weak, averaging less than one percent. Industry and its supporters are quick to explain that they expect that as more Ohioans complete natural gas job training programs and as more gas fields begin producing, these employment numbers will improve (Institute of Government Studies 2013).

Gas economics are not always favorable to municipal governments. According to Amanda Woodrum, a researcher for Policy Matters Ohio, oil and natural gas extraction contributes to cycles of boom and bust, which should give caution to state and municipal leaders eager to cultivate new industrial development. Woodrum observed that during boom cycles "communities across all [Marcellus Shale] five states show increased retail and food consumption, higher educational enrollment rates and larger tax revenues via severance and property taxes in the first couple years of drilling." During bust episodes, however, she warns that municipal governments will confront more pernicious effects, "communities experience higher incidences of drug use and criminal activity, increased drop-out rates" and a growing number of abandoned properties, increasing demands on social services and rising crime levels (Woodrum 2013; See also Remington 2013).[61] Cycles are sharper in states like Ohio, which have not historically experienced high levels of natural gas development (Remington 2013).

Environmental Impacts

Environmentalists and other anti-fracking activists point to a number of environmental harms. Many of these are described in Chapter 1 and include air and water degradation and quality of life concerns. Ohio's unique geography also means that fracking debates center on more parochial concerns including water consumption, potable water safety and earthquakes (Henry 2013a).

Citing numerous examples of potential agency capture, environmentalists charge both the Governor and Statehouse leaders with being too cozy with industry. They cite the resignation of the State's Environmental Protection Agency director, who left the agency because of purported conflicts (air and fracking pollution enforcement plans) he had with the Governor (Johnson 2014) Anti-fracking groups also argue that state authorities do not respond to citizen complaints.

[61] Pennsylvania, New York, Virginia, West Virginia and Ohio

Brian Kunkemoeller, of the Ohio Sierra Club stated “we want the EPA to investigate all these complaints because we don’t trust the substantiation by state agencies that these contaminations are not legit” (Kunkemoeller quoted in Knox 2014). He continued by casting doubt on the Ohio Department of Natural Resources’ (ODNR) new regulations, believing them to be ineffective at protecting water and the public’s health (Knox 2014).

Environmentalists are especially concerned about water quality and have charged the ODNR with ignoring water quality violations. Responding to environmentalists’ claims, the Division of Oil and Gas Resources Management highlighted that between 2010 and October of 2013, it investigated over 180 natural gas well/site complaints. It found that all of the problems were from older vertical wells and that even these spills rarely affected surface water quality. ODNR maintains that fracking is environmentally benign as shown in Table 5.9 (Downing 2013a).

Table 5.9 Surface Water Quality Impacts

Year	Total Surface Complaints	Affected Water Systems
2010	37	0
2011	54	2
2012	59	2
2013	33 (as of October 2013)	2

Source: Downing 2013; Knox 2014

Air emissions are particularly problematic in rust belt states such as Ohio, Pennsylvania and West Virginia. In July 2011, the Natural Resources Defense Council ranked Ohio as one of the top states for poor air quality, partly due to the state’s industrial heritage. Fracking, according to environmentalists, contributes to and could exacerbate this poor legacy through emissions and particulates. They contend that each stage in a natural gas well’s life cycle emits harmful air pollution. In just five days of production, for example, operators consume 29,000 gallons of diesel fuel and once burned, they release toxic compounds including benzene, smog and

formaldehyde. This phase, according to Mike Settles, spokesman at the Ohio EPA, can last several years, but is mostly unregulated by local, state or federal environmental laws (Ohio Environmental Council 2013; Staff 2012).

Table 5.10 Environmental Impacts of Fracking

Environmental Harm	2012 Impact
Acres damaged since 2005	1,600
Based on Well Completion from 2005 to 2012 (metric tons of carbon dioxide-equivalent)	420,000 tons
Particular Matter	100 tons
NOx	1,700 tons
Carbon Monoxide	2,600 tons
Volatile Organic Compounds	200 tons
Sulfur Dioxide	6 tons

Source: Ridlington and Rumpler 2013

Fracking's causal relationship to earthquakes is also generating high levels of elite and public attention, and is especially acute in Ohio, which has a high number fracking wastewater injection wells. In 2011, the wells contributed to a series of small earthquakes in Eastern Ohio (near Youngstown).[62] Following the eleventh earthquake of 2011, state officials froze underground waste injections until scientists could gain a better understanding of the causes behind the tremors (Henry, Tom. 2013, 2013a).

Second Order Issues

The state of municipal natural gas regulation is 'in waiting' while the State Supreme Court deliberates the Munroe Falls case. While state government in Ohio is home to a great deal of decision-making authority, municipalities do have land use authority and constitutional powers to protect the environment and limit the effects of urban drilling. Second order disputes center around differing interpretations of the three-part home rule analysis. State regulations preempt home rule authority with these constraints:

[62] The quake measured below 4.0 on the Richter scale.

1. The power to exercise all powers of local self-government
2. The power to exercise police powers concurrently with the state
3. The conflict clause (usually modifies the police powers clause)

Results and Implications

In order to determine how Ohio's 'middle of the road' second order political structures impact municipal decision-making, I compiled the policy positions of 60 cities and townships (full list available on page 148). A variety of state-local relationships may be observed ranging from cities that actively embrace fracking to those who prefer to exercise greater levels of local control. Research findings show instances of direct challenges to the state's preemptive authority through zoning and bans. Much like Colorado communities, these cities also argue that their home rule and land use authority permit them to regulate where drilling may take place. For others, fracking and urban drilling are the means to fund new public projects, to contribute to local economic growth and to improve municipal budget forecast levels.

The second major goal of this dissertation is to provide an overview of the actions and frequency of municipal activity relative to urban natural gas development. The types of activities are well dispersed once placed in the municipal policy action scale. Most cities prefer to defer to the state, the position of slightly over a third of the cities in the sample. Findings show that three other policy options are fairly popular among local governments: zoning regulations (considered a challenge to the state's preemptive authority), resolutions for local control (considered as oppositional but not challenging the state's authority) and actions supporting additional development (supporting the state's extraction goals). When this latter category is combined with deferential cities, over half of sampled cities are supportive of the state's natural gas land use policies.

Concomitantly, almost a third of cities have acted assertively, through either bans or zoning regulations that exceed and challenge the state's policies towards natural gas. When expanded to include communities that support decentralized authority like the City of Munroe Falls in Munroe Falls vs. Beck Energy Corp, this number increases to almost half of the sampled municipal governments. Table 5.10 displays the aggregate results and descriptive statistics.

Table 5.11 Aggregated Municipal Responses to Oil and Gas Development

Policy Responses (Policy Responses Code)	Frequency	Percent	Valid Percent	Cumulative Percent
Bans or Moratoria (0)*	3	4.8	5.0	5.0
Zoning Regulations (1)*	14	22.6	23.3	28.3
Bans on municipal property (2)^	1	1.6	1.7	30.0
Voluntary Agreements (3)^	0	0	0	30.0
Resolutions for local control/anti-fracking (4)^	10	16.1	16.7	46.7
No Action/resolutions in favor/special use permits that do not conflict with state law (5)	22	35.5	36.7	83.3
Actions increasing development (6)	10	16.1	16.7	100.0
Total	60		100.0	
Data collected from municipal websites, codes and news articles				
^ Symbolic Challenges * Substantive Legal Challenges				

Once disaggregated, it becomes possible to identify relationships between the variables. Each of the typology's four quadrants (see below) is home to a variety of municipal legislative and regulatory actions. Lower green and lower turnout communities are not monolithic supporters of state gas policy and some communities have enacted zoning and other land use restrictions. Conversely, there are communities located in the high green – high turnout quadrant that take actions to encourage gas development within their corporate limits.

Table 5.12 Individual Municipal Policy Responses to Oil and Gas Development*

LOWER GREEN				HIGHER GREEN			
LOWER TURNOUT (0)	**Policy**	**HIGHER TURNOUT (1)**	**Policy**	**LOWER TURNOUT (2)**	**Policy**	**HIGHER TURNOUT (3)**	**Policy**
Olive	6	Minerva	5	Cambridge	5	Broadview Heights	0
Martins Ferry	6	Steubenville	5	Loudonville	1	Cleveland Heights	4
St. Clairsville	5	Toronto	5	Belpre	0	Massillon	6
Barnesville	6	Cortland	5	Marietta	6	Euclid	4
Bellaire	6	Girard	5	Columbiana	4	North Olmsted	5
Shadyside	5	Hubbard	1	East Palestine	5	Parma	1
Cadiz	6	Niles	0	Salem	6	South Euclid	4
Colerain	1	Warren (Trumball County)	1	East Liverpool	5	Westlake	5
Goshen	1	Youngstown	4	Perry	1	Alliance	1
Mead	5	Bazetta	5	Aurora	4	Canton	4
Pease	5	Champion	5	Streetsboro	5	Brooklyn	1
Pultney	4	Canfield	1	Dover	1	Bay Village	1
Richland	5	Howland	5	New Philadelphia	5	Akron	4
Warren (Belmont County)	5	Struthers	6	Uhrichsville	6	Munroe Falls	1
York	2	Weathersfield	4	Ravenna	5	North Royalton	1
Policy Average	4.53	**Policy Average**	3.8	**Policy Average**	3.93	**Policy Average**	2.8
*Data collected from municipal websites, codes and news articles							

ANOVA Results

There appears to be differences among the groups when classified according to the second order typology. However, are such differences the result of stochastic processes or are there meaningful differences to be observed? To begin answering this question, I apply one and

two way ANOVA tests (Tables 5.13 and 5.14). The latter includes a factorial structure based on the second order typology. The results suggest that there are significant differences between the groups that may be associated with the typology (p= .000).

Table 5.13 Relationships between Municipal Sustainability, Mobilization and Fracking Policies

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups*	**76.516**	**3**	**25.505**	**6.948**	**.000**
Within Groups	602.002	164	3.671		
Total	678.518	167			
*Bold relationships are significant					

Table 5.14 Relationships among Specific Municipal Groups based on Commitment to Sustainable Economic Development, Ease of Mobilization

		Mean Difference	Std. Error	Sig.
Low Sustainable Economic Development (SD) and Low Mobilization	Low SD and High Turnout	-.07143	.41809	.865
	High SD and Low Turnout*	**.91696***	**.42063**	**.031**
	High SD and High Turnout*	**1.54430***	**.41565**	**.000**
Low SD and High Turnout	Low SD and Low Mobilization	.07143	.41809	.865
	High SD and Low Turnout*	**.98839***	**.42063**	**.020**
	High SD and High Turnout*	**1.61573***	**.41565**	**.000**
High SD and Low Turnout	**Low SD and Low Mobilization***	**-.91696***	**.42063**	**.031**
	Low SD and High Turnout*	**-.98839***	**.42063**	**.020**
	High SD and High Turnout	.62734	.41821	.136
High SD and High Turnout	**Low SD and Low Mobilization***	**-1.54430***	**.41565**	**.000**
	Low SD and High Turnout*	**-1.61573***	**.41565**	**.000**
	High SD and Low Turnout	-.62734	.41821	.136
*Relationships are significant				

Several group relationships are worth highlighting. The High SD – High Turnout group (HGHT) is unique and differs significantly from both lower green groups p = .000; p= .000) but not the other high green (but lower turnout; p = .136) category. The high SD - low turnout group also shows meaningful differences between itself and the two lower green groups (p = .031; p= .020).

What is driving the differences between the groups? Are cities more committed to sustainable economic development more likely to exercise control over land use policy versus more highly mobilized cities? Do they interact in a way that suggests HGHT cities are different? To further evaluate the relationship between the independent and the dependent variables, I ran a two-way ANOVA. Table 5.15 presents the results.

Table 5.15 Being Green or Being Mobilized

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	23.267[a]	3	7.756	2.035	.119
Intercept	851.267	1	851.267	223.318	.000
Sustainable Economic Development	9.600	1	9.600	2.518	.118
turnout1*	**13.067**	**1**	**13.067**	**3.428**	**.069**
Sustainable Economic Development * turnout1	.600	1	.600	.157	.693
Error	213.467	56	3.812		
Total	1088.000	60			
a. R Squared = .098 (Adjusted R Squared = .050)					
*Statistically significant at the .1 level					

Overall, the model lacks significance. Neither the green nor turnout variables reach the .05 threshold of statistical significance, but if a more generous .1 measure is applied, turnout reaches statistical significance.

Do any of the common socio-economic variables help account for differences observed between the groups? With the inclusion of the new variables, the significance of turnout becomes slightly stronger (P=.05). A second predictor variable, percentage of occupied homes, also reaches statistical significance (P =.03). Overall, the enhanced socio-economic model inches closer to overall statistical significance (P = .052) and explains 11 percent of the variation present in the dependent variable.

Table 5.16 Being Sustainable versus Being Mobilized with Socio-Demographic Characteristics

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model**	**48.084[a]**	**6**	**8.014**	**2.251**	**.052**
Intercept	.522	1	.522	.147	.703
Logged Median Home Value	4.071	1	4.071	1.144	.290
Logged Per Capita Income	6.088	1	6.088	1.710	.197
Owner Occupied*	**17.685**	**1**	**17.685**	**4.969**	**.030**
Sustainable Economic Development	8.875	1	8.875	2.493	.120
turnout1*	**14.352**	**1**	**14.352**	**4.032**	**.050**
Sustainable Economic Development * turnout1	.039	1	.039	.011	.917
Error	188.649	53	3.559		
Total	1088.000	60			
Corrected Total	236.733	59			
a. R Squared = .203 (Adjusted R Squared = .113)					
*Significant at the .05 level **Significant at the .1 level					

Explaining Differences

Despite the threat of legal challenges, sampled municipal governments are active intergovernmental participants. Multiple cities, such as Munroe Falls and Oberlin, have enacted citywide zoning restrictions, bans and moratoria. Other cities act as willing partners to industry and supporters of the State's goal of expanding natural gas development by leasing public lands and excess water. Below are the bivariate correlations between municipal fracking policy and the predictor variables, with statistically significant relationships bolded.

Table 5.17 Indicators of Loud Second Order Relationships in Ohio

		Muni Policy	Owner Occupied	Median Home Value	Per Capita Income	Minorities	Education	Manager	Council Districts	HGHT	Sustainable Dev	Turnout
Municipal Policy	Pearson	1	**-.279***	**-.279***	**-.257***	.023	-.222	.209	-.059	**-.281***	-.201	**-.235****
	Sig.		**.031**	**.031**	**.048**	.864	.088	.108	.654	**.030**	.123	**.071**
Owner Occupied	Pearson	-.279*	1	.551**	.645**	-.362**	.624**	-.277*	-.274*	.060	-.106	.076
	Sig.	.031		.000	.000	.004	.000	.032	.034	.649	.419	.565
Median Home Value	Pearson	-.279*	.551**	1	.945**	-.097	.876**	-.080	.103	.394**	.374**	.223
	Sig.	.031	.000		.000	.463	.000	.542	.435	.002	.003	.087
Per Capita Income	Pearson	-.257*	.645**	.945**	1	-.100	.939**	-.070	.091	.381**	.265*	.295*
	Sig.	.048	.000	.000		.447	.000	.594	.487	.003	.041	.022
Race	Pearson	.023	-.362**	-.097	-.100	1	.052	-.051	.361**	.438**	.172	.382**
	Sig.	.864	.004	.463	.447		.691	.696	.005	.000	.190	.003
Educ	Pearson	-.222	.624**	.876**	.939**	.052	1	-.062	.064	.437**	.232	.337**
	Sig.	.088	.000	.000	.000	.691		.637	.626	.000	.075	.008
Manager	Pearson	.209	-.277*	-.080	-.070	-.051	-.062	1	.059	-.182	.105	-.035
	Sig.	.108	.032	.542	.594	.696	.637		.653	.165	.425	.791
Council Districts	Pearson	-.059	-.274*	.103	.091	.361**	.064	.059	1	.415**	.422**	.328*
	Sig.	.654	.034	.435	.487	.005	.626	.653		.001	.001	.011
HGHT	Pearson	-.281*	.060	.394**	.381**	.438**	.437**	-.182	.415**	1	.577**	.577**
	Sig.	.030	.649	.002	.003	.000	.000	.165	.001		.000	.000
Sustainable Eco--Devo	Pearson	-.201	-.106	.374**	.265*	.172	.232	.105	.422**	.577**	1	.000
	Sig.	.123	.419	.003	.041	.190	.075	.425	.001	.000		1.000
turnout1	Pearson	-.235	.076	.223	.295*	.382**	.337**	-.035	.328*	.577**	.000	1
	Sig.	.071	.565	.087	.022	.003	.008	.791	.011	.000	1.000	

*Significant at the .05 level
**Significant at the .1 level
Data collected from municipal websites, codes and news articles

A number of statistically significant relationships are evident. While, the 'sustainable development did not reach significance, its interaction term (HGHT) showed the strongest relationship with municipal policy. Its negative relationship (R= -.281) suggests that as municipal policy scores decrease, the interactive term (Greenness X Turnout) increases i.e. from zero to one. While, it is the weakest in terms of significance, turnout also appears to be inversely (as turnout increases, municipal fracking policies decrease) associated with municipal fracking policies (R =.235). There also appears to be a relationship between owner-occupied homes and municipal fracking policy. Both the median home value and the percentage of owner occupied homes variables are inversely related to the dependent variable (R= -.279). Finally, as per capita income (R= -.257) rises, municipal policies towards natural gas decreases as cities assert more control over fracking, potentially putting them at odds with state leaders in Columbus.

Local Politics

Examples of municipal legislation and less coercive approaches are taking place in an array of communities ranging from urban centers like Cincinnati to smaller college towns like Oberlin. Outright bans in the Cities of Oberlin, Hartville, Bowling Green and Mansfield have led to lawsuits and/or threats of litigation by both industry and State leaders. In other cities, municipal opposition has contributed to the enactment of conservation zones and zoning restrictions. The cities of Athens and Munroe Falls, for example, have 'zoned out' gas wells in residential areas (Brumfield 2013). Like municipal bans, zoning regulations also stand on questionable legal grounds. Finally, in other communities, municipal policymakers are staying quiet or looking for ways to benefit from the state's policy of encouraging expanded development.[63]

[63] Amesville, Athens, Athens County,, Bowling Green, Broadview Heights, Brunswick, Burton, Canal Fulton, Canton, Chester Township, Cincinnati, Columbiana, Garrettsville, Girard, Hartville, Heath, Hinckley Township,

Many of the same motivations underlying local opposition in Colorado are present in municipal activism opposing fracking in Ohio. Oberlin resident, Sam Rubin, who spearheaded the initiative to prohibit fracking within the city, described the impetus to ban fracking as a duty to protect the environment and as a "chance for Oberlin to re-assert its democracy" (Rubin quoted in Miller 2013). An Oberlin resident struck a similar environmental chord, stating that "we can't do anything to prevent that from happening here…I'm concerned about the environmental impacts of fracking itself and what it's doing to the water and the air" (Rev. Steve Hammond of Peace Community Church quoted in Miller 2013).[64] Brunswick Councilman Anthony Capretta, explaining his vote in favor of an anti-fracking resolution made a similar justification (Capretta quoted in Lisik 2013). Brunswick Councilman-at-large Brian Ousley (also supporting the resolution) reported that he believed that the state should not tell us [the city] what do and that he is not "business unfriendly, but I am resident friendly…threats by businesses cannot bully our citizens" (Ousley quoted in Lisik 2013).

Other criticisms of state policy revolve around the heterogeneous nature of cities and close proximity city leaders share with citizens. North Royalton Ward 4 Councilman Paul Marnecheck, noted that "I feel when it comes to municipal drilling, the residents of North Royalton can do a better job with how to have this in our city than a bureaucrat in Columbus….the best way to make sure communities have laws that reflect their unique character is to strengthen home rule" (Marnecheck quoted in Anton 2013). Ward 6 Councilman Dan Kasaris, while generally supportive of extraction, was baffled that "we [City of North Royalton] can regulate the placement of fences, driveways, sheds and houses but not an oil well? To me

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Lake Erie, Madison Township, Meyers Lake, Montville Township, Munroe Falls, Niles, North Canton, Oberlin, Plain Township, Randolph Township, Sharon Township, South Russell, Stow, Summit County, Weathersfield Township, Yellow Springs, Youngstown and York Township

[64] Bruce Whitteberry, assistant superintendent of Cincinnati Water Works (CWW) stated that "Our goal is to know what is in a spill – and know about it ahead of time…that gives us the best shot to make sure all of our customers stay protected." CWW is also opposed to any water-based shipping of fracking wastes (Smith 2014).

that fact is inconsistent with the rule of those who reside within the boundary of any city…" He concluded that "cities need to be able to control when and where oil wells are placed" (Kasaris quoted in Anton 2013).

The willingness to challenge the state is also grounded in the belief that the state has failed in its duty to protect the health and wellbeing of citizens. John Spon, City of Mansfield's law director, explained his community's decision to ban underground injections was necessary to protect Mansfield's water supply. He added that he believed that ODNR's current regulatory framework was illogical, inadequate and failed to protect the public's health (Marshall 2012). Also citing the need to protect public health, cities have used their police powers to restrict fracking. Bowling Green City Attorney Michael Marsh advised city council members that the city's fracking ban is part of its larger police powers rather than of its zoning code. He equated the legal logic behind the city's fracking policies to its decision to ban public smoking prior to state action:

> "the same tack was taken by us several years ago when we were the first city in Ohio to regulate cigarette and cigar smoking in certain facilities. Smoking at that time was also a 'legal' activity and was heavily regulated by the state of Ohio. Our ordinance was challenged, and it was upheld, as a reasonable exercise of our police power, and since it did not conflict with the state criminal code, there was no pre-emption argument to overcome" (Marsh quoted in Henry 2013).

Like Texas and Colorado, Ohio's municipalities range in their policy positions towards urban drilling. Voters in the City of Youngstown rejected multiple fracking bans, even after a 2011 series of earthquakes. In other jurisdictions, cities have leased their park space to operators or have sold extra water to natural gas firms. Economic reasons often drive municipal support. Mahoning County commissioners, for example, authorized the County to sell up to 500,000 gallons of water a day to a natural gas firm. In turn, the county will be paid $6 per 1,000 gallons for up to $90,000 per month (Downing 2013; See also Gorman 2013). The City of Campbell also

raised revenue via fracking. Beginning in 2012, the City leased the mineral rights to 167 acres for $5,000 per acre plus 20 percent in royalties. The sale included mineral rights located under two parks and sparked little public protest.[65] In Barnsville, City leaders struck a similar deal and permit drilling in public places.

The promises of private sector job growth and urban redevelopment can also cement municipal support. Youngstown city leaders have promised to use new leasing revenues to fund municipal programs that combat urban blight and persistently high unemployment. Mayor Charles P. Sammarone said that "We're not inventing anything here and we need money for demo, and if we don't get it, then there's no demo. He touts a new $650 million fracking pipe manufacturing plant that will employ 350 workers (Niquette (2012). Job growth is particularly attractive for many Ohio municipalities, especially around Youngstown, which have unemployment rates hovering around 10 percent (BLS 2014; Niquette 2012).

Why Critique or Exceed the State?

The third major question of this dissertation includes the assessment and exploration of second order relationships. What variables may be associated with pushing cities to challenge the state's preemptive authority? Are these the same set of factors that are linked with cities that voice their opposition to state policy through more symbolic measures such as amicus briefs or resolutions criticizing the state's approach?

Due to the small sample size and distribution (n=60) logistic regression is the most appropriate statistical test. Municipal policy responses may be classified according to two different dependent variables with yes/no dyads. The first is designed to be a broader measure of second order relations by grouping together municipal responses that challenge, restrict or voice

[65] Campbell's population in 2012 was 8179.

municipal opposition to the State's natural gas policies (municipal policy responses 0, 1, 2, 3, 4 or 27/60 cities). The second dependent variable measures municipal policies that directly challenge the state's preemptive authority (originally coded as municipal policies 0, 1, 2 or 18/60 cities). With both models, forward and backward LR logistic regression identified the most parsimonious set of explanatory variables – the results of forward and backward LR matched one another.

The first model, by the fourth iteration, is significant (P = .011). Two of the tested independent variables also came back as significant: the green city (P = .035) and the turnout variables (P = .035).

Table 5.18 Municipal Fracking Policies that Exceed State Policy Requirements

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Owner Occupied	-4.951	4.152	1.422	1	.233	.007
	Logged Home Value	-2.704	2.442	1.226	1	.268	.067
	Logged Per Capita Income	4.792	3.597	1.775	1	.183	120.526
	Sustainable Economic Development	-1.278	.694	3.392	1	.066	.278
	Turnout1	-1.465	.644	5.183	1	.023	.231
	Constant	-11.932	15.252	.612	1	.434	.000
Step 2[a]	Owner Occupied	-4.409	4.155	1.126	1	.289	.012
	Logged Per Capita Income	1.300	1.706	.581	1	.446	3.669
	Sustainable Economic Development	-1.489	.666	4.999	1	.025	.226
	Turnout1	-1.350	.624	4.681	1	.030	.259
	Constant	-8.461	14.876	.324	1	.570	.000
Step 3[a]	Owner Occupied	-2.090	2.796	.559	1	.455	.124

	Sustainable Economic Development	-1.251	.577	4.704	1	.030	.286
	turnout1	-1.173	.570	4.233	1	.040	.310
	Constant	2.787	2.005	1.933	1	.164	16.228
Step 4[a]	**Sustainable Economic Development***	**-1.196**	**.567**	**4.445**	**1**	**.035**	**.302**
	turnout1*	**-1.196**	**.567**	**4.445**	**1**	**.035**	**.302**
	Constant	1.352	.528	6.549	1	.010	3.865
a. Variable(s) entered on step 1: OwnerOcc, LogHomeValue, LogIncome, Sustainable Economic Development, turnout1.							
Cox and Snell R = .14							
*Significant at the .05 level							

Both independent variables are associated with municipal fracking policies that challenge the state or criticize state control. A one-unit increase in either is associated with a 70 percent decrease in the likelihood of a municipal policy that supports or does not interfere with the State's goals, while holding the other variable constant. A one-unit increase in turnout (growth in the number of active voters) is associated with a 70 percent decline in the municipality enacting a policy that furthers state goals, while holding the green level constant. When turnout is held constant, a one-unit increase in commitment to sustainable economic development (here, this means increasing the number of green jobs and membership in climate change networks) reduces the likelihood of a city policy that advances state goals by 70 percent.

The second model narrows the pool of municipal legislation/actions to only those communities whose policies directly challenge the state's preemptive authority (originally coded as municipal policies 0, 1, 2). Unlike the broader measure of municipal opposition, both the green and turnout variables fail to reach statistical significance.[66] However, when socio-

[66] An alternative model, which included the interaction term (High Green X High Turnout) also did not reach statistical significance.

economic predictors are included, the percentage of owner occupied homes becomes significant (P = .02). In the model, with each one unit increase in the percent of owner occupied homes, there is a 99 percent decrease associated in the likelihood that a city passes a policy that follows the state's oil and gas development land use goals. This may seem like a dramatic effect but its 'real world' implications are somewhat more muted. Consider Youngstown, which has over 26,800 homes, of which nearly 16,000 were owner-occupied. A one-unit change from .597 to 1.597 is neither feasible nor possible. Even a .4 unit increase to 100 percent owner occupied homes is highly unlikely. Despite these limitations, the association between owner occupied homes and more restrictive land use policies is fairly robust (P = .02) (ACS 2012).

Table 5.19 Municipal Fracking Policies that Challenge the State's Preemptive Authority

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Owner Occupied	-12.062	4.738	6.481	1	.011	.000
	LogHome Value	-2.627	2.865	.841	1	.359	.072
	Logged Income	5.737	4.030	2.026	1	.155	309.999
	Sustainable Economic Development	-1.043	.775	1.813	1	.178	.352
	turnout1	-.978	.695	1.980	1	.159	.376
	Constant	-16.948	16.452	1.061	1	.303	.000
Step 2[a]	Owner Occupied	-11.887	4.795	6.145	1	.013	.000
	Logged Income	2.501	1.885	1.760	1	.185	12.199
	Sustainable Economic Development	-1.309	.730	3.214	1	.073	.270
	turnout1	-.880	.681	1.668	1	.197	.415
	Constant	-14.891	16.257	.839	1	.360	.000
Step 3[a]	Owner Occupied	-10.678	4.653	5.266	1	.022	.000

	Logged Income	1.600	1.703	.882	1	.348	4.952
	Sustainable Economic Development	-1.159	.710	2.662	1	.103	.314
	Constant	-7.203	14.740	.239	1	.625	.001
Step 4[a]	Owner Occupied	-7.544	3.119	5.849	1	.016	.001
	Sustainable Economic Development	-.848	.617	1.888	1	.169	.428
	Constant	6.530	2.296	8.089	1	.004	685.434
Step 5[a]	**Owner Occupied***	**-7.055**	**3.044**	**5.373**	**1**	**.020**	**.001**
	Constant	5.754	2.174	7.005	1	.008	315.374
a. Variable(s) entered on step 1: OwnerOcc, LogHomeValue, LogIncome, Sustainable Economic Development, turnout1.							
Cox and Snell R = .095							
*Significant at the .05 level							

Discussion of Results

While, answering the precise causal mechanisms undergirding second order federalism is outside of the scope of this project, Ohio communities' activities reflect both macro and micro factors. These likely contribute to a community's 'uncomfortableness' with nearby oil and gas development and its ability to overcome collective action dilemmas. At a more macro level, greener and more mobilized communities appear more likely to push for policies that challenge, voice disagreement or exceed state natural gas regulations. Data also point to more contextual and micro-level reasons associated with municipalities treating fracking as dangerous and exercising greater levels of land use control (and challenging the state) over fracking.

Table 5.20 Summary of Findings in Ohio

Variable	Model 1 – Critical of the State (Symbolic and Substantive Challenges)	Model 2 – Challenging the State (Substantive Challenges)
Environmentalism	**Support**	No Support Observed

Turnout	**Support**	No Support Observed
Income	No Support Observed	No Support Observed
Owner Occupied	No Support Observed	**Support**
Median Household Value	No Support Observed	No Support Observed
Municipal Institutional Structures	No Support Observed	No Support Observed
Race	No Support Observed	No Support Observed

Second Order Politics, Mobilization and Sustainability

The relationship between pro-environmental attitudes/policies and concern over fracking is generally supported by the applicable literature (Davis 2012; Davis and Fisk 2014). Much like the evidence and explanations offered in the Colorado chapter, Ohio data confirms the relationship between oil and gas development, proximity, partisanship and environmental opposition. Attitudinal scholars Michauda, Carlisle and Smith (2008) found a relationship between pro-environmental attitudes and less support for drilling. They also documented that Republicans and those possessing individualist cultural attitudes are more likely to favor drilling when compared to Democrats, liberals, or egalitarians. Republicans also believed that spills were infrequent and rare events. Democrats, conversely, are more likely to be receptive to environmental groups and scientists and to believe that drilling poses a public health and environmental risk (See Davis and Fisk 2014).

For several cities, commitment to sustainable development appears to have contributed to the willingness to challenge the state's preemptive authority or voice opposition to state policy. When citizens see something as threatening quality of life, the threat of loss is intensified. Fracking, in an urban context can directly threaten a park, clean air or water. Earthquakes, as a result of underground injections, may also raise environmentally based concerns. When citizens are motivated, as they are in Munroe Falls and other communities impacted by nearby

earthquakes or responding to other perceived environmental threats, they appear to be more likely to support and work towards passing policies that challenge the state's authority or supporting their city's leadership as they engage in second-order political contests with state-level actors.

Second Order Politics, NIMBYISM, Social Capital and Proximity

Urban drilling is collective action dilemma. By their nature, collective action dilemmas are difficult to overcome. Under this sort of dilemma, players would be better off if they cooperated in the pursuit of a common goal, but for one reason or another, each seemingly chooses a less optimal course of action (Vig and Kraft 2009). However, proximity and higher participatory efforts offer "a forum through which residents can achieve some degree of consensus on the idea that reducing externalities represents a desirable community good and consensus on how to reduce these externalities" (Portney and Berry 2010, 122). Despite the challenge, some Ohio cities have passed bans and zoning schemes. Why and how do some cities overcome this challenge and pass or maintain these types of policies? Part of this answer may relate to how individuals, especially Ohio's homeowners perceive the costs and benefits posed by fracking i.e. more localized concerns (NIMBYISM or quality of life), may be driving municipal opposition to fracking, especially among residents who are more predisposed to be attentive and mobilized.

For some cities and residents, earthquakes may be significant drivers for elevated levels of skepticism relative to fracking and NIMBYISM and an impetus to work together. State Representative Robert Hagan, following the series of earthquakes near the Youngstown area, called for a statewide moratorium on injection drilling and a right of residents to know what the State is doing and what is causing the quakes (Niquette 2012a). Youngstown city leaders also

support the moratorium on injecting wells. Youngstown's Mayor Charles P. Sammarone, in supporting the ban questioned whether fracking is making his city shake and informed his constituents that he recently bought earthquake insurance. He also noted the stakes for homeowners, pointing out that "you lose your whole house, that's your life savings, and if you have no money or no insurance to replace it, then what do you do…Information is needed to make the homeowner and the residents feel safe" (Sammarone quoted in Niquette 2012a). Governor John Kasich, in response, announced that he would not let anyone put Eastern Ohio's economic revival in jeopardy and that the earthquakes are isolated events.

Researchers have found that home ownership alters attitudes among the general public and how it may perceive risks. DiPasquale and Glaeser (1999) identified several key differences between renters and homeowners. 77% of homeowners reported that they voted in a recent local election, 25 percentage points higher than renters. They also found that a willingness to engage in local problem solving also differed. Approximately 40 percent of homeowners stated they had participated in mitigating and addressing a local problem as compared to only a quarter of renters. Finally, homeowners tend to invest more time and energy in acquiring local amenities relative to renters. New amenities improve owners' property values and quality of life; only the latter available to renters. This suggests that if urban natural gas development harms resident' quality of life or home values, homeowners may believe that they have more to lose than do renters.

The willingness to invest in one's community and address its problems has important implications for second order federalism. Putnam (2000) theorized that as social capital increases, measured by the density of social networks, community members are more likely to eschew apathy, exchange information (like risk evaluations) and work together for mutual

benefit and solving problems. These facts may indeed push the city towards challenging state policy and its preemptive authority. Increasing social capital and levels of political efficacy also enhances a policy's legitimacy, its perceived fairness and the level of citizen support, each of which may become important if municipal action challenges the state's preferred policies (Hempel 2009; McKinney and Harmon 2002).

Regime Politics and Second Order Relationships

Early work by Dahl (1961) reflected concern about government's coercive power and assumed that its legal authority alone was sufficient to govern. In this environment, private interests are among many other interests competing for favorable policies. Peterson (1987) challenged notions that municipal power politics was an egalitarian enterprise with groups competing over meaningful choices. He argued that the mobility of private firms and the competition between governments constrains and precluded meaningful choice. As a result, cities pursue economic development opportunities and avoid policies that may limit real or perceived economic growth.

In proposing his middle of-the-road approach, Stone (1980, 1993, 2006) described the ways in which local government policymakers work with each other and the private sector to facilitate economic growth. His articulation of regime theory builds on Lindblom's (1977) observations regarding the fundamental tensions present in a market-based economy. The system, Stone (1980) suggests, requires near continuous economic growth but provides governments with only a limited role to affect decisions made by private sector i.e. where and how drilling may take place.

The combined effect is that state and local governments often deploy resources and incentives to influence the 'locational' decisions made by business leaders. Cited as the need to

create a “favorable business climate,” states and municipalities offer tax and other financial inducements in order to attract business investment (Schragger 2009; Savitch and Kantor 2004). These efforts manifest themselves in developmental policies that are narrowly applied and increasingly generous (Kantor and David 1988). In Ohio, it likely has contributed to some communities opting to lease land and water to natural gas operators. They are also likely to support programs that foster economic development and competitiveness even at the expense of programs that promote more egalitarian ideals and social equity such wealth redistribution, living wages or environmental protection ordinances (Kantor and David 1988).

Even communities that limit fracking may be doing less because of social capital and democratic responsiveness, but because expanded development may not threaten or be seen as contributing to economic growth. Ohio’s uncertainty relative to impact fees, for example, may depress the need to new fracking related revenues. Concomitantly, industry’s nascent presence may also ‘shrink’ its influence and ability to influence local government, especially when compared to other industries like coal or other opponents to gas. Finally, smaller municipal restrictions like bans on drilling in residential zones or larger setbacks may be seen as an acceptable outcome because it does not end growth (Imbroscio 1999).

Ohio’s Second Order Dynamics Revisited

Ohio’s second order politics are uncertain, especially while the State Supreme Court deliberates the City of Munroe Falls case. Returning to the themes of implementation and intergovernmental management, a number of observations are possible even with a limited sample size. First, in Ohio, there exists legal ambiguity as to the relationship among municipalities, constitutional home rule authority and state regulatory power, likely contributing

to a wide variety of municipal responses to urban drilling. The Court's current jurisprudence, nonetheless, supports concurrent state-municipal regulation.

State and sub-state units and levels of government share power to oversee natural gas development and urban drilling. Anton (1989) noted that because power and authority are often incomplete, as they are in Ohio, tensions and uncertainty between stakeholders are inevitable. Second order oppositional relationships have led to the aforementioned lawsuit against the City of Munroe Falls by industry and the State. Uncertainty is also evident in Ohio's intergovernmental natural resource management networks. It has enabled Ohio's municipalities to adopt an array of policies ranging from outright support to remaining on the 'second order' sidelines to oppositional relationships between state and municipal policymakers (Bowman and Kearney 2012). For those communities that are challenging the state's preemptive authority, a combination of macro and micro-level factors are influential determinants. The percentage of owner-occupied homes, environmentalism and mobilization through higher social capital 'scores' and denser networks, are each associated with second order tensions.

In more uncertain policy arenas, actors seeking to change the status quo may utilize conflict expansion strategies (Pralle 2006). Munroe Falls Mayor Frank Larson equated the issue to a larger trend of state's preempting municipal authority, arguing "if this goes the way that I hope and pray it would go, it would restore some home rule to municipalities that has been taken away by the state…it would uphold our right to be able to zone certain areas and exclude certain uses and to allow those uses in other areas" (Larson quoted in Smythe 2013). In response, Beck Energy equated the zoning plan to imposing costly and onerous regulations with the goal of preventing all drilling (Smythe 2013).

Chapter 6
Second Order Politics in Texas

Texas' second order (state-municipal) experiences, as a decentralized state, are important for many reasons. First, the state has a long history of nurturing oil and natural gas production, but its regulatory goals and interests exist alongside a robust set of land use powers delegated to sub-state home-rule governments. Home rule has empowered Texas' cities to influence the scale, pace and location of urban/suburban natural gas production. Second, to many Texans, natural gas wells and drills have long been a common sight on Texas horizons, although their close proximity to population centers of Dallas/Fort Worth and San Antonio is somewhat new. In fact, the number of Texans living within one mile of a natural gas well is closing in on seven million people (Gold 2013). Third, like Colorado and Ohio, examples of state-municipal tension, indifference and cooperation are observable in Texas, likely the result of a variety of causes. Fourth, three major players regulate natural gas production: the Railroad Commission of Texas (RCT), the Texas Commission on Environmental Quality (TCEQ) and home rule municipal governments.

This chapter adopts an organizational scheme similar to the two preceding chapters. The first section summarizes the applicable state statutes, regulatory enactments and judicial opinions all of which establish the formal parameters governing natural gas extraction, hydraulic fracturing and municipal activities. The benefits and costs of fracking in a Texas context follow. The second section includes a series of statistical tests designed to better understand the factors associated with municipal governments challenging and/or exceeding the preemptive authority held in Austin.

Texas' Natural Gas Experiences and Context

The relationship between Texas' policymakers and the natural gas industry stretches back to the late nineteenth century and has contributed to the growth of industry-friendly sub-governments, especially within the RCT (Davis 2012). [67] Today, the State is the leading producer of natural gas in the U.S., extracting over 6 trillion cubic feet (TCF) in 2009 and 7.1 TCF in 2012. Within the state, several major natural gas deposits exist: the Barnett Shale located near Fort Worth and the Eagle Ford Shale close to San Antonio (Pless 2010). The state expects the surge in gas production to continue, primarily through fracking in the Eagle Ford play (Davis 2012; Rahm 2011).

Table 6.1 Recoverable Natural Gas in Texas

Shale Play	Recoverable Natural Gas	Region
Eagle Ford	72 TCF	Southern Texas (near San Antonio)
Barnett	119 TCF	North Texas (Dallas-Fort Worth Region
Permian Basin	34 TCF	West Texas

Source: EIA 2013c

Texas' support for industry appears to be solid. A strongly conservative and Republican-dominated state legislature along with allies in the Governor's office has succeeded in blocking most legislation aimed at restricting fracking/extraction. Working in concert, they have also passed laws/regulations intended to facilitate additional development, including industry backed disclosure rules, air and water quality standards, well design and intensity and spacing, i.e. setback requirements (Davis 2012). The legislature vested oversight authority in two state agencies: the Railroad Commission of Texas (RCT) (all regulatory areas other than air quality) and the Texas Commission on Environmental Quality (TCEQ) (air quality). Davis (2012) noted

[67] Major gas reserves were found near Laredo in 1911, White Point in 1914 and Kingsville in the early 1920s.

that in general, both are responsive to the concerns of industry even when natural gas production poses a threat to public safety and to environmental protection.

Constitutional and Statutory Provisions

Voters amended the State Constitution in 1891 to allow for the creation of the Railroad Commission of Texas, although, at the time, its jurisdiction was limited to regulating the state's railroads. In 1917, the Pipeline Petroleum Law (SB 68) provided the RCT with the jurisdictional authority necessary to oversee natural gas production and distribution within the state. With this act, the legislature deemed that pipelines, like railroads were common carriers, and it authorized the agency to exercise regulatory oversight upon them. The 1919 Oil and Gas Conservation Law (SB 350) expanded the commission's authority to regulate the production and extraction of oil and natural gas, which led to the State's first rules on well intensity, safety and gas conservation (Riley 2007; University of Texas Libraries 2014). Other laws that touch Texas' oil and natural gas industry and municipal governments are outlined in Table 6.2 below.

Table 6.2 Other Environmental and Energy Laws

Name and Year	Policy Area	Agencies
Texas Pollution Control Act (1961)	Reducing and preventing pollution	Texas Commission on Environmental Quality
Texas Water Quality Act (1967)	Water Pollution	Texas Commission on Environmental Quality and Railroad Commission
Texas Injection Well Act (1961)	Injection Wells (other than from the oil and gas industry)	Texas Commission on Environmental Quality and Railroad Commission
Texas Solid Waste Act (1969)	Hazardous Waste	Texas Commission on Environmental Quality
Texas Clean Air Act (1965)	Stationary and Mobile Air Sources	Texas Commission on Environmental Quality

Source: Texas Commission on Environmental Quality 2014

Property laws also shape Texas' second order politics. Texas is a split-estate state, meaning that it recognizes property rights for surface and mineral estates, the latter of which,

according to Maxwell (2009, 356-357) is dominant. In effect, because it is the dominant estate, "the mineral owner is entitled to use as much of the surface as may be reasonably necessary to extract the mineral."

Texas local governments also enjoy statutory and constitutional powers. The law identifies two broad classes of cities: general law and home rule. Cities with more than 5,000 residents may opt to adopt local charters and become home rule cities.[68] Once adopted, home rule cities enjoy constitutionally protected "full power of local self-government (McFarland 2013). Home rule authority includes the power to adopt municipal ordinances and regulations, necessary to protect the "interest, welfare, or good order of the municipality as a body politic" (Welch 2007, 144-146).

Constitutional home rule powers also imbue municipalities with inherent powers and the ability to act without prior authorization from the legislature. These powers include a number of municipal functions with a tangential impact to fracking: police and fire protection, health and sanitation services, transportation and street construction and land use restrictions. Municipal powers are presumed valid and legal unless the act in question is considered to be inconsistent or preempted by state statute with unmistakable clarity (Welch 2007). The legal position of general law cities is the opposite of home rule communities meaning that the state legislature must authorize them to act before they can legally enact policies or enforce them.[69]

[68] The other type of city in Texas is general law. Typically, these are smaller communities with limited powers and operate according to state statutes that define the extent of their powers. Unlike home rule cities, they do not have inherent powers and when there is no legislative authorization, the city cannot act. It should be noted that some General Law (Type C) cities in Texas also have authority to regulate natural gas and oil.

Regulatory Provisions

Two state agencies are responsible for overseeing the industry and enforcing Texas' environmental and gas laws. The Texas Commission on Environmental Quality's (TCEQ) mission is to protect the environment in a manner consistent with sustainable economic development practices and policies. Three gubernatorial appointees establish overall agency direction and policy and set priorities relative to enforcement activity. An executive director oversees the agency's day-to-day administration (TCEQ 2014a). The TCEQ's jurisdiction to oversee development is much narrower as compared to the RCT and is limited to air quality and emissions due to: benzene (a (volatile organic compound), carbon disulfides, toluene, ethyl and trimethyl benzenes, xylenes and C1–C13 hydrocarbons (e.g., methanes, ethanes, pentanes, propanes) (Maxwell 2009).

Beginning in 1917, the Railroad Commission of Texas has served as the state's main regulatory oversight arm for oil and natural gas. Originally, three gubernatorial appointees directed the RCT. In 1894, voters amended the Texas Constitution so that Commissioners run in popular elections and would serve six-year overlapping terms (RCT History 2014; University of Texas Libraries 2014). While there are no formal rules requiring that commissioners have a background in oil and gas production, Davis (2012) described the agency's culture as generally supportive of extraction and that agency officials believe that the RCT's current regulatory approaches/frameworks are sufficient to effectively manage fracking and urban drilling (See also Briggle 2012).

The agency's mission includes ensuring the efficient production and distribution of the state's natural resources, the protection of private property rights and public safety and the guarantee of a fair market price for developers (University of Texas Libraries 2014). In order to

do so, the legislature has authorized the agency to regulate all aspects of oil and natural gas production (permitting, monitoring and inspection of operations), distribution and portions of consumption. RCT's mandates include the ability to set gas utility rates, oversee natural gas pipelines and to enforce applicable tax and rate regulations on producers and distributers (Turner 2007, 363).

Within the RCT, the Oil and Gas Division oversees hydraulic fracturing along with other gas extraction activities. Besides carrying out the RCT's mission of efficient production and waste prevention, it measures market demand and sets production limits for all operators. The division also carries out a number of functions affecting local governments and Texans' quality of life through: the issuance of drilling permits, the promulgation and enforcement of health and safety regulations, the administration of a data clearinghouse for oil and gas operations, the approval of well completions and the promotion of public safety by investigating complaints. Site remediation, protection of underground drinking water, well plugging and hazardous waste mitigation also fall under the purview of the Division (Rahm 2011; RCT 2014; Texas State Library Archives 2009).

Under its current regulatory framework, firms interested in fracking (or deepening a well) must first apply and obtain a drilling permit from the Oil and Gas Division. Once received, firms must comply with casing, cementing, well integrity, and completion and disposal standards as set forth in the permit and in RCT regulation (Davis 2012). Texas does not require additional environmental or wildlife assessments. The RCT does have the authority to shutter a well if it is found to be polluting waste and for technical/construction violations, although this process takes between two and three months to complete. It cannot, however, shut down a well for causing seismic activity (Allen 2014).

Table 6.3 Other Texas Fracking Regulations

Regulatory Area	Texas
Pre-Drilling Water Well Testing	No evidence of regulation in effect
Water Withdrawal Restrictions	Addressed in permit
Casing and Cementing Depth Requirements	Performance Standard
Intermediate and Production Casing Cement Circulation Regulations Surface Casing Cement Circulation	600 feet above SHOE 600 feet above SHOE
Venting and Flaring	Notification and approval required
Fluid Storage	Pits allowed and regulated for all fluids including freeboard and liner requirements and five year tracking requirements
Underground fluid injection	Allowed in areas that are not producing oil, gas, or geothermal resources. Fluid injection areas must be separated by water formations by impervious zones that offer adequate protection against contamination

Source: Richardson et al. 2013

Municipal Interests

Even though the State vested the RCT and TECQ with substantial regulatory authority, it did not replace or repeal the fundamental powers (through their inherent land use/zoning and police powers) of municipalities to regulate the surface aspects of urban drilling. Protected by the State Constitution and by way of their land use and police power authority, home rule municipalities and Type C general law cities may regulate drilling in order to protect public health, quality of life and private property (Welch 2007). In short, cities govern many aspects of the surface estate and operations while the RCT has jurisdiction over the mineral one and underground processes (Rahm 2011; Riley 2007).

Municipal interest in oil and natural gas regulation began in the 1970s in an effort to further protect surface owners from the negative impacts of oil and gas extraction. Today, municipal authority to restrict and limit drilling's surface impacts is fairly extensive (McFarland

2013). Many Texas communities, for example, require operators to apply, qualify and pay for a permit before drilling can legally begin, costing the operator thousands of dollars and significant time (Dish 2014). Additionally, city officials or their authorized designees conduct inspections, enforce municipal regulations and issue sanctions for non-compliance. They also have the authority to determine the frequency of inspections (typically at least one annual inspection of all permitted wells inside the city's limits), when gas flaring and venting is permitted, issue well/site security regulations and set the timing of well plugging and abandonment. Finally, city authority extends to regulating water use during fracking operations. In some cases, cities have enacted seismic policies. In the table below, the City of Dish' drilling requirements exemplify the regulatory latitude Texas communities hold regarding fracking operations:

Table 6.4 Dish, Texas Urban Drilling Surface Regulations

Policy Area – Surface Regulation	Example of Municipal (Dish') Requirements
Notification	The operator must post a sign at the well's entrance at least 48 hours prior to a fracking operation beginning.
Fluid Recovery	The operator may only recover fluids during daylight hours unless the local inspector authorizes non-daylight recovery hours.
Security	The operator must post a watchman during operations.
Venting	Venting directly into the atmosphere is not allowed and operators must first direct flaring and any flow through separation equipment or into a portable tank
Noise	Fracking operations cannot exceed the ambient noise level of ten (10) decibels. This level is lowered to five (5) decibels for backflow operations during nighttime hours.
Odors	Fracking operations must not emit odors that are "extremely repulsive to the physical senses of ordinary persons which annoy, discomfort, injure or inconvenience the health of any appreciable number of persons."

Sources: Dish 2014, 2014a, 2014b

These particular restrictions and requirements apply to zoned areas within the City in which drilling is permitted. In other areas, the City has banned development in areas near and in

floodways and in zoned areas not specifically designated for natural gas exploration, production or development (Dish 2014).

Judicial Decisions

For the past seventy years, Texas courts have recognized that both the State and municipalities have an interest in regulating oil and natural gas development. One of the earliest cases to recognize concurrent authority was the 1944 *Klepak* decision (*Klepak v. Humble Oil & Refining Co.*, 177 S.W. 2d 215). Litigation began after the City of Tomball enacted legislation that restricted drilling to one well per drilling block. The City denied Henry Klepak a drilling permit even after he obtained a drilling permit from the RCT, because the proposed well violated the community's 'one well per drilling block' ordinance. The First Court of Appeals (Galveston) held that the RCT did hold the requisite and final authority to issue oil and natural gas drilling permits. State authority, however, was not exclusive and did not preclude municipalities from promulgating their own ordinances that they believed were necessary to ensure public safety and order. Municipal legislation, the Court continued, should be presumed valid unless city actions are "facially unreasonable, arbitrary or discriminatory."

The *Klepak* decision dominated case law through 1982. In 1982, the City of Burkburnett fined a private property owner, Unger, for drilling an oil well within city limits prior to obtaining municipal permits. Unger claimed that the ordinance went beyond the City's authority to regulate drilling activities by proscribing them, which, he argued is reserved solely to the RCT. Consistent with previous jurisprudence, the Fort Worth Court of Appeals in *Unger v. State* held in favor of the City of Burkburnett and reaffirmed that home rule municipalities and the state may act as co-regulators when it comes to urban/suburban natural gas permitting and drilling (Turner 2007). Equally important, the Court set a high bar to overturn municipal regulation.

Municipal legislation, according to the Court, enjoys the presumption of validity (as an exercise of local policing authority) and unless municipal ordinances are facially unreasonable or constitute a regulatory taking, they are constitutional.

Although reaching a similar decision as *Klepak*, the Fort Worth Court's logic in its *Unger* decision differed substantially. *Klepak* treated city natural gas legislation as a legal application of municipal police powers. In *Unger*, the Court determined that the ordinance was valid under the municipality's power to regulate land use and zoning. Riley (2007, 371) described the significance of the *Unger* decision as one in which "the court opened a new line of reasoning supporting municipal authority regulating oil and gas development in a manner similar to other forms of land use restrictions" (See also McFarland 2013).

The most recent challenge touching upon the relationship between cities and state regulatory power came in 1997 with *Shelby Operating Co. v. City of Waskom*, 964 SW 2d 75 - Tex: Court of Appeals, 6th Dist. 1997. In the case, the Texarkana Court of Appeals reaffirmed the validity of municipal regulation. At the core of the dispute was the City of Waskom's decision to deny a drilling permit to the Shelby Operating Company. Fifty-two years before the case, in 1945, Shelby Operating Company obtained a 303-acre mineral lease (outside the Waskom's 1945 corporate limits) contingent upon the firm leaving at least 200 feet between any wells and then-existing structures. The City, in 1981 annexed a portion of the land above the mineral estate. Five years later, the Aztec Manufacturing-Waskom Partnership purchased the surface interest. In 1987, the City extended its setback ordinance to 500 feet for any structure unless the operator secures the surface owner's consent. In 1996, Shelby sought a permit for a well that was to be located between 200 and 500 feet from Aztec's building. Aztec refused to consent to the well, leading to the City's rejection of Shelby's permit request and the lawsuit.

The Court, acting with the presumption that the City's actions were valid, held in favor of the city. In its ruling, the Justices stated that Shelby failed to convince them that the setback ordinance was unrelated to City's inherent powers of protecting its citizens' health and safety (Riley 2007).

Fracking in Texas

Production

At both state and municipal levels of government, the oil and gas industry typically finds a receptive audience. Coupled with technological innovations that made shale gas recovery economically feasible, Texas production has undergone significant growth in the number of producing wells and overall production as demonstrated in Figures 6.1 and 6.2.

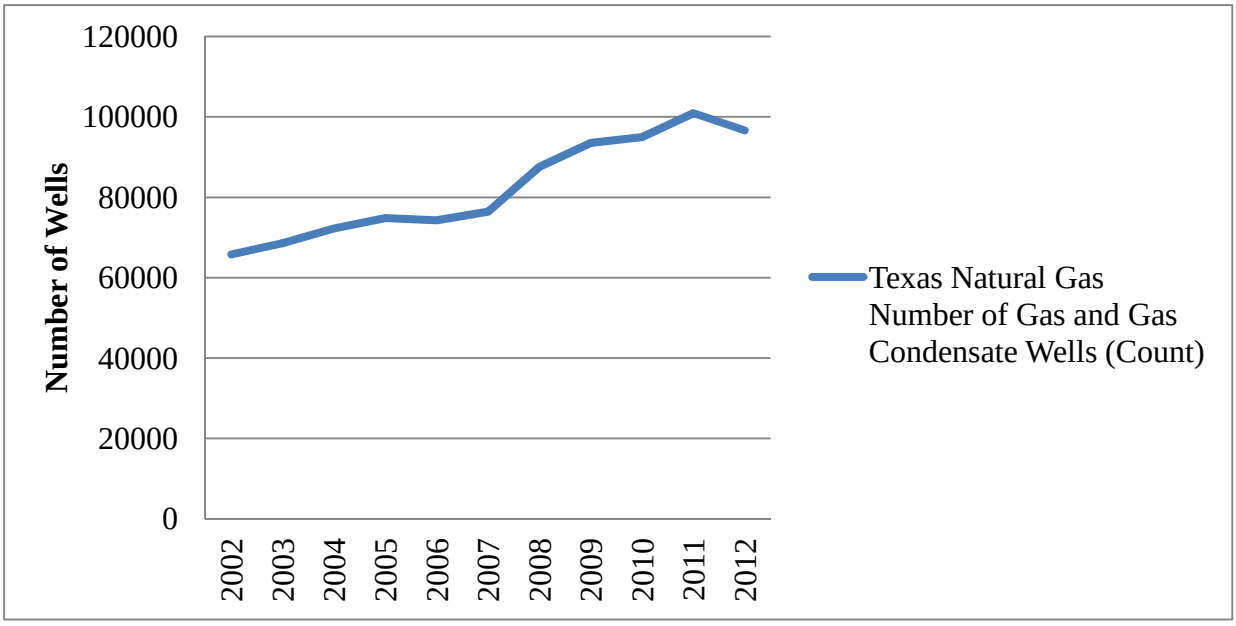

Figure 6.1 Texas Gas and Gas Condensate Wells (Count)

Source: EIA 2014

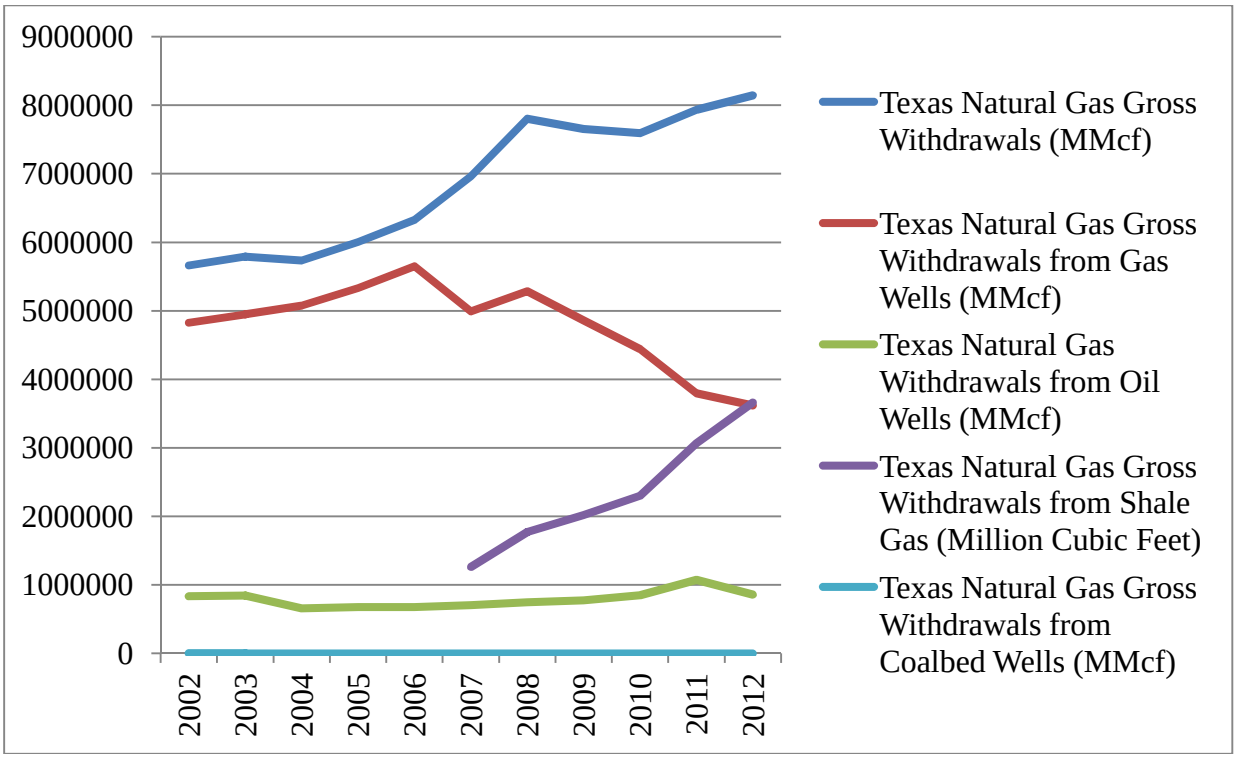

Figure 6.2 Texas Natural Gas Production by Production Technique

Source: EIA 2014

Development and production is not uniform across the counties of the State and ranges from no production to billions of cubic feet per year.

Economic Benefits

Industry supporters cite a multitude of statewide economic benefits, specifically state and municipal revenues and employment forecasts that accompany drilling. These benefits would add to the already strong economic contributions made by the industry. Oil and gas related property and sales taxes, for example, generated over four billion dollars for state and municipal policymakers in 2010. Oil and natural gas firms also employ thousands of Texans in jobs that typically pay better than the state average wage (Texas Oil and Gas Association ([TXOGA 2014; TXOGA 2014a]). The total economic impact to the state is approximately $160 billion or nearly 15 percent of Texas' gross domestic product, shown in Tables 6.5 and 6.6.

Table 6.5 Economics of Texas' Drilling in 2010

		Per Job	
Revenues	Amount in Millions	Oil and Gas	All other Industries
Property	$3,219.00	$10,823.00	$2,779.00
Sales, State & Local	$1,114.00	$3,745.00	$1,256.00
State franchise tax	$332.00	$1,115.00	$409.00
Other taxes	$214.00	$720.00	$443.00
Total taxes	**$4,879.00**	**$16,403.00**	**$4,887.00**
Royalties to State Funds	$760.00	$2,555.00	$5.00
Total Paid	**$5,639.00**	**$18,958.00**	**$4,892.00**

Source: TXOGA 2010

Table 6.6 Employment Benefits - Total

Sector	Jobs	Total Compensation	Average Compensation
Crude petroleum and natural gas production	79,618	$13,310,042,923.00	$167,175.00
Natural gas liquid production	3,299	$515,612,718.00	$156,317.00
Drilling oil and natural gas wells	30,817	$2,916,742,791.00	$94,647.00
Support activities, oil and gas operations	72,943	$5,743,584,527.00	$78,740.00
Natural gas distribution	7,322	$739,240,484.00	$100,958.00
Petroleum refineries	21,880	$2,439,640,978.00	$111,504.00
Petroleum manufacturing	15,319	$1,591,307,752.00	$103,881.00
Oil and Natural Gas machinery and equipment	38,972	$3,307,019,123.00	$84,857.00
Petroleum products wholesalers	12,826	$1,209,350,689.00	$94,293.00
Pipelines	14,446	$1,903,262,799.00	$131,750.00
Totals	**297,442**	**$33,675,804,784.00**	**$112,412.20**

Source: TXOGA 2013

The economics of urban drilling attract local policymakers as well. The Dallas-Fort Worth metroplex, located above the Barnett Shale Play illustrates the allure of oil and gas development. Throughout the region, various city leaders expect that the exploration and fracking of the shale formation will contribute approximately $5 billion annually and generate between 83,000-108,000 permanent jobs to the region's economy by 2030. The City of Fort Worth anticipates a significant share of the region wide economic benefits. Again, through 2030,

local policymakers anticipate that revenue from natural gas lease bonuses will exceed $740 million and that additional property tax monies will surpass $250 million (Lovell, Barrow and Wiegand 2008).

The state's rainy day fund also benefits from oil and natural gas drilling revenues. For the FY 2010, oil and natural gas generated $1.7 billion in severance tax revenues, enabling lawmakers to transfer an additional $451 million into the fund. The transfer pushed the balance to over $8 billion and made it an attractive target for lawmakers, especially during lean budget years. In 2003, for example, Texas confronted a $9.9 billion dollar deficit. In order to help balance the budget, lawmakers appropriated $1.2 billion from the account. State leaders have also utilized rainy day dollars to avoid raising taxes and to reduce property taxes (Lovell, Barrow and Wiegand 2008).

Environmental Impacts

Support for expanding natural gas development is generally widespread across the state. When opposition does exist, anti-fracking advocates cite concerns about its impacts to air and water quality. Fracking's most acute impacts in Texas stem from its voracious 'appetite' for water and resulting access/equity issues. Although,, cities have the authority to accommodate quality of life concerns, opponents still point to fracking's potentially harmful effects on quality of life as a reason for advocating additional regulation ranging from outright bans (Denton) to comprehensive zoning regulations (Dallas) (Ridlington and Rumpler 2013).

Water Supply

Similar to Ohio and Colorado, natural gas operators are not immune from applicable state water laws. The State requires the issuance of water permits to operators when they seek to divert water from surface water (rivers and lakes) to drill pads/sites. The TCEQ grants water

rights under a “first come—first serve” rule and until the surface body of water reaches a withdrawal limit established by the TCEQ. Groundwater regulation, however, is considerably more laissez faire. Under Texas law, individuals or groundwater conservation districts own most groundwater resources. Both, by way of the “rule of capture,” may divert, use or lease as much water as they choose. Significant groundwater usage may continue without legal liabilities relative to environmental externalities experienced by adjacent or nearby property owners (TCEQ 2014b; RCT 2014).

Texas’ frack sites consume millions of gallons of water. Since 2010, Texas natural gas firms have consumed an estimated 25 billion gallons of water annually. Industry observers expect consumption to grow especially as drilling in the Eagle Ford Formation continues. The water needed per well, however, is highly variable and depends on a number of factors including: geological formation, location and the type of well, i.e. vertical or horizontal. In the Barnett Shale formation, fracturing a vertical well necessitates approximately 1.2 million gallons (28,000 barrels) of water while a horizontal well requires nearly three times more or approximately 3.5 million gallons (over 83,000 barrels). Water extractions are nevertheless small (represent less than one percent of total state water withdrawals) when compared to the water usage/volumes consumed by manufacturing, agriculture and local government entities (RCT 2014). But, once withdrawn, operators inject the fracked water deep underground, where future users cannot economically recover it (Wittmeyer 2013).

The severity of water issues varies across the state (Wittmeyer 2013). In the East, water is less of a concern. In some western and southern portions of the State, fracking accounts for between 10 and 25 percent of all water consumption. When combined with the effects of a prolonged drought and growing water demands, millions of Texans face water restrictions.

Between 2011 and 2013, wells in nearly thirty West and South Texas communities ran almost dry. In Barnhart, Texas, the town's well did go dry. In 2013, 15 million Texans lived under some sort of water restriction. Access to water has also transformed itself into an equity issue. Spicewood Beach, best described as a resort town near Austin, began trucking water into the community in early 2012. San Angelo, a city of 100,000, is financing a 60-mile pipeline to access new sources of underground water and is digging multiple new wells (Goldenberg 2013). Poorer and smaller communities, conversely, have found it more difficult to access new sources of ground and surface water.

Air and Gas Emissions

Air pollution is another environmental concern raised by fracking's opponents. In 2006, the Texas Commission on Environmental Quality estimated that leaks from storage tanks contributed to around 8% of all volatile organic compounds emissions. Increasing truck traffic and dust contamination also contribute to declining air quality in the Dallas and San Antonio regions (Song, Morris and Hasemyer 2014*)*. Texas environmentalists and anti-fracking advocates also criticize the TCEQ's environmental protection efforts based, in part, on the following:

- As of early 2014, only five permanent air monitor stations measured air quality in the Eagle Ford Shale Play. Each monitor is located at the formation's periphery, which covers over 20,000 square miles.
- Many of the state's oil and gas facilities self-audit their emissions and do so without state oversight.
- Penalties for violations are rarely severe. Between 2010 and 2013, Eagle Ford residents made 284 complaints but only two resulted in fines ($14,000 was the largest fine). The TCEQ documented 164 violations.

- State lawmakers have reduced the TCEQ's budget from $555 million in 2008 to $372 million in 2014 (Song, Morris and Hasemyer 2014*)*.

Air quality is of particular concern for the Cities of Dallas and San Antonio. In San Antonio, development is pushing the City closer to violating Federal Clean Air laws. The City is located on the northern border of Karnes County, part of the Eagle Ford Shale Play. Peter Bella, natural resources director for the Alamo Council of Governments, noted that for many cities in the region the "more immediate concern is all the exhaust from the diesel engines in the thousands of trucks, generators and compressors used to service the well sites." Bella adds that as of "right now, the San Antonio region is the largest city in the United States that is in full compliance with all air quality laws. I have to say in the same breath, we are right on the cusp of violating the ozone standard" (Burnam quoted by Fehling 2012). Air quality is also a concern of North Texas and Dallas-Fort Worth Metroplex lawmakers. Lon Burnam, a Democratic state representative from Fort Worth observed, "Those of us in North Texas (have been) in non-attainment for so many years. We absolutely recognize the huge impact this is having, the negative impact on our air quality" (Burnam quoted by Fehling 2012).

Safety

Safety concerns are also on the agenda of those seeking to ban or restrict urban fracking. Aggregated RCT data shows that between January 2006 and December 2011, operators reported slightly more than 4,500 spills. Of this total, one in twelve (six percent) or 266 resulted in harmful impacts to nearby bodies of water (RCT 2014a). In Forest Hill, Texas an accident resulting from contractors who ignored safety precautions killed a fellow contractor and led to the evacuation of 500 people.[70]

[70] Safety concerns also include pipelines but since pipelines cut through multiple jurisdictions, they are typically under the exclusive domain of the RCT.

Natural gas projects also necessitate numerous trucks to carry water to frack sites. The group, Texas Citizens for a Safe Future and Clean Water, came out in support of more oversight by expressing concern over the frequency of trips over roads popular with children and pedestrians (Turner 2007).

Table 6.7 Environmental Impacts of Fracking

Environmental Harm	2012 Impact
GHG or equivalent emitted tons Since 2005	40,000,000
Acres Damaged 2005 to 2012	130,000
Particular Matter	7800 tons
NOx	100,000 tons
Carbon Monoxide	153,000 tons
Volatile Organic Compounds	14,000 tons
Sulfur Dioxide	300 tons

Source: Ridlington and Rumpler 2013

The City of Three Rivers' experience encapsulates the promise and peril of expanded urban gas drilling via fracking. New oil and gas tax revenues built a new high school and athletic facilities and precipitated the development of four new hotels. Despite its new wealth, Three Rivers Mayor Sam Garcia laments the side effects, drawing attention to the fact that "traffic accidents are a daily occurrence…the city's small (ten person) police department is encountering a surge of traffic calls, break-ins and are even dealing with increasing prostitution (from San Antonio). He finally commented "Water's a big issue right now…It's as valuable as the oil" (Garcia quoted by Jervis 2014).

Second Order Issues

State authority through the Texas Railroad Commission is fairly extensive. Unlike Colorado and in some ways, unlike Ohio, the state shares its regulatory authority with Texas' home rule cities. Municipal authority to regulate oil and gas activities within their corporate limits is protected by the Courts and applicable state regulations as long as it satisfies a three part

test included below (*Klepak v. Humble Oil & Ref. Co*., 177 S.W.2d 215; *Unger v. State*, 629 S.W.2d 811 (Tex.App.-Ft. Worth 1982).

1. Does not govern matters that are preempted by state with unmistakable clarity prohibition
2. Is validly enacted and is not arbitrary and unreasonable
3. Advances a legitimate governmental interest and is reasonably related to protecting the safety and general welfare of the public (McFarland 2013; Turner 2007)

With these restrictions in place, Texas' cities are active policymaking venues for natural gas regulation. They have promulgated ordinances that limit access and hours of operation, restrict noise, prohibit certain uses and techniques, require security and other vegetation on the site and have established larger setbacks than the state.

Despite a fairly quiet second order relationship, city governments may still find themselves inside a courtroom. The City of Dallas' 1500-foot buffer may lead to legal challenges between it and the state and /or industry (Mosqueda 2013; 2013a). Following the council's passage of the setback requirement, Councilmember Lee Kleinman called the ordinance an "unreasonable and extremist" attempt to ban gas wells in Dallas. Councilmember Vonciel Jones Hill agreed with Councilman Kleinman stating, "I believe that the setback requirement is arbitrary and capricious and unreasonable…I believe that [banning drilling] is what this motion does" (Kleinman quoted by Loftis 2013).

In Denton, anti-fracking fervor has led to a proposed and subsequently passed (through a citizen ballot initiative) citywide ban on new drilling and frack sites. By early 2014, advocates announced that they have gained enough signatures to place a proposed ban on the November (2014) ballot. Cathy McMullen, the President of the Denton Drilling Awareness Group commented "We need to gather as many signatures as possible, to show they'll pay a political

price if they try to thwart their constituents' wishes." She added, (referring to city officials) "we want to send a strong message to the city that the citizens want this" (Malewitz 2014 citing McMullen).

Results and Implications

To assess how a more decentralized state structure shapes intergovernmental relations and to address the dissertation's second and third research questions, the policy positions of 60 Texas cities (on Page 188) are inventoried and categorized. A variety of state-municipal relationships are observable, albeit the data's distribution appears to be somewhat bimodal. The most frequent policy response is little to no municipal action with the second most popular response being zoning and land use regulatory schemes. Part of this is likely due to an institutional design that enables local governments to pass regulation in policy areas that are of most concern to local governments (land use and setbacks) should they determine that municipal regulation is necessary.

Despite the absence of second order lawsuits, conflict between cities and the State may be simmering below the surface on two fronts. The first is how to address environmental requirements of the Clean Air Act, especially in the San Antonio and Dallas metropolitan regions. The second being the citizen-led ballot initiative to ban fracking in Denton and the 1500 foot setbacks, which industry and city councilmembers have labeled as de-facto bans and have described such policies as arbitrary and capricious (Loftis 2013).

Table 6.8 Aggregate Municipal Responses to Oil and Gas Development*

Policy Responses (Policy Responses Code)	Freq-Uency	Percent	Valid Percent	Cumulative Percent
Bans or Moratoria (0)*	7	11.7	11.7	11.7
Zoning Regulations (1)^	15	25.0	25.0	36.7
Bans on municipal property (2)^	0	0	0	0
Voluntary Agreements (3)^	0	0	0	0

Resolutions for local control/anti-fracking (4)^	1	1.7	1.7	38.3
No Action/resolutions in favor/special use permits that do not conflict with state law (5)	31	51.7	51.7	90.0
Actions increasing development (6)	6	10.0	10.0	100.0
Total	60	100.0	100.0	100.0
*Data collected from municipal websites, codes and news articles				
^Symbolic Challenges *Substantive Challenges				

In Table 6.8, several trends are noteworthy. First, data appears to be bimodal with twin peaks in the zoning policies (that exceed the state) and the no actions/special use permits categories. Second, Texas cities are generally supportive of expanded urban natural gas development. Sixty three percent of the sample cities (N=60) have policies that minimize local oversight, by relying upon a more ad-hoc process of special use permits to regulate gas development within their community. Like municipalities in Colorado and Ohio, however, there does appear to be some pushback against relying solely on the state to establish oil and natural gas policies, with a third of cities enacting comprehensive land use policies that go beyond state regulations.

The state of Texas permits municipal governments a greater role in regulating the natural gas industry, which likely explains the higher number of city zoning schemes. But like Colorado and Ohio, a small group of Texas communities have established setback distances so great that they have effectively banned the practice. In the case of Denton, residents deemed greater 1200 foot setback distances as ineffective and succeeded in placing an outright ban on the ballot for the city's November 2014 election. In these more restrictive cases, while the legal implications are unclear, they clearly stand in contrast to the pro-development positions of many of Texas state lawmakers and regulators.

Aggregate trends provide a general overview of municipal responses in Texas. They cannot, however, explicate the factors associated with cities challenging the state's preemptive authority or going beyond its requirements. To begin identifying the antecedents to municipal activism, communities are organized by the typology as shown in Table 6.9 (N=60):

Table 6.9 Individual Municipal Policy Responses to Oil and Gas Development*

LOWER GREEN				HIGHER GREEN			
LOWER TURNOUT (0)	**Policy**	**HIGHER TURNOUT (1)**	**Policy**	**LOWER TURNOUT (2)**	**Policy**	**HIGHER TURNOUT (3)**	**Policy**
Ennis	5	Azle	4	Carrollton	1	Bowie	5
Glenn Heights	1	Mineral Wells	6	Denton	0	Burleson	5
Midlothian	1	Weatherford	5	Corinth	0	Keene	5
Red Oak	5	Hillsboro	5	Fort Worth	1	Addison	1
Waxahachie	1	Yoakum	5	Plano	5	Dallas	1
Lancaster	5	Cuero	6	Southlake	0	Garland	0
Stephenville	5	Granbury	5	The Colony	5	Grand Prairie	5
Beeville	6	Columbus	5	Arlington	1	Irving	0
Cotulla	6	Eagle Lake	5	Euless	1	Rowlett	5
Carrizo Springs	6	Bellville	5	Flower Mound	0	DeSoto	5
El Cenizo	5	Sealy	5	Frisco	5	Cedar Hill	5
Laredo	1	Karnes City	6	Lewisville	5	Mesquite	1
Rio Bravo	5	Kenedy	5	Mansfield	5	Duncanville	1
Decatur	1	Madison-ville	1	Jacksboro	5	Richardson	0
Bridgeport	1	Hearne	5	Colleyville	1	Grapevine	5
Policy Average	**3.6**	**Policy Average**	**4.87**	**Policy Average**	**2.3**	**Policy Average**	**2.93**

*Data collected from municipal websites, codes and news articles

ANOVA Results

Do these group level differences occur by chance or are there explanatory factors at work? A one and two way ANOVA (a factorial structure based on high and low levels of environmentalism and mobilization) were utilized to answer this question. Like Ohio and Colorado there are differences between the groups and the overall model reaches statistical significance (p= .013).

Table 6.10 Relationships between Municipal Sustainable Economic Development, Ease of Mobilization and Fracking Policies

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	**49.933**	**3**	**16.644**	**3.932**	**.013**
Within Groups	237.067	56	4.233		
Total	287.000	59			

Are group level differences observable between all groups, i.e are high green/high turnout communities statistically significantly different than high green/low turnout cities? Do they differ from less green communities and do those cities take sustainability seriously? In Texas, the results suggest differences between the groups. First, the low-green and high turnout is significantly different from its counterpart – the high green, low turnout group. Second, for the high green-high turnout group, the only significant difference is between it and low green and high turnout.

Table 6.11 Relationships among Specific Municipal Groups based on Commitment to Sustainable Economic Development and Ease of Mobilization

		Mean Difference	Std. Error	Sig.
Low Sustainable Economic Development (SD) and Low Mobilization	Low SD and High Turnout	1.26667	.75130	.097
	High SD and Low Turnout	1.26667	.75130	.097
	High SD and High Turnout	.40000	.75130	.597

	Low SD and Low Mobilization	1.26667	.75130	.097
	High SD and Low Turnout	**2.53333***	**.75130**	**.001**
Low SD and High Turnout	**High SD and High Turnout**	**1.66667***	**.75130**	**.031**
	Low SD and Low Mobilization	-1.26667	.75130	.097
	Low SD and High Turnout	**-2.53333***	**.75130**	**.001**
High SD and Low Turnout	High SD and High Turnout	-.86667	.75130	.254
	Low SD and Low Mobilization	-.40000	.75130	.597
	Low SD and High Turnout	**-1.66667***	**.75130**	**.031**
High SD and High Turnout	High SD and Low Turnout	.86667	.75130	.254
Bolded relationships are significant				

The table above suggests that there is some sort of relationship between municipal fracking policy, 'greenness' and potential for mobilization. The ANOVA's results, however, cannot begin to elucidate what that relationship is between green and mobilization or between municipal fracking policies. To explore these relationships, I again apply a two-way ANOVA test. The model and both of the typological variables show statistical significance. Overall, the model accounts for a modest 13 percent of the variation, which is about 50 percent less than Colorado and slightly less than Ohio. Both variables are significant, p = 008 (green cities) as well as voter turnout, p = .049. There is no interactive effect between green and turnout, which reinforces the ANOVA results shown in tables 6.10 and 6.11.

Table 6.12 Being Green or Being Mobilized

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	49.933[a]	3	16.644	3.932	.013
Intercept	735.000	1	735.000	173.622	.000
Sustainable Economic Development (SD)*	**32.267**	**1**	**32.267**	**7.622**	**.008**
Turnout*	**17.067**	**1**	**17.067**	**4.031**	**.049**
SD* Turnout	.600	1	.600	.142	.708
Error	237.067	56	4.233		
Total	1022.000	60			
a. R Squared = .174 (Adjusted R Squared = .130)					
*Significant at the .05 level					

I ran a second two factorial ANOVA model that included socio-demographic variables (education, logged per capita income, logged home value – flagged as significant in the bivariate correlation table). Once included, the socio-economic variables wash out the effects of the green and the turnout variables. After multiple models, the logged median home value reports the most robust level of statistical significance (P = .022) and produces the highest adjusted R squared value at .195, meaning it can account for nearly 20 percent of the variation in the dependent variable, i.e. group differences.

Table 6.13 Being Green versus Being Mobilized with Socio-Demographic Characteristics

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	**71.743[a]**	**4**	**17.936**	**4.583**	**.003**
Intercept	31.375	1	31.375	8.017	.006
LoggedHomeValue*	**21.810**	**1**	**21.810**	**5.573**	**.022**
Sustainable Economic Development (SD)	2.651	1	2.651	.677	.414

Turnout	9.658	1	9.658	2.468	.122
SD * Turnout	1.994	1	1.994	.509	.478
Error	215.257	55	3.914		
Total	1022.000	60			
Corrected Total	287.000	59			
a. R Squared = .250 (Adjusted R Squared = .195)					
*Significant at the .05 level					

Explaining the Differences

Texas' law permits municipalities a wide degree of latitude when it comes to regulating natural gas development. They may establish setback standards, restrict the times that drilling may occur and require security and other safety features. This flexibility has contributed to a number of municipalities enacting comprehensive zoning schemes and even land use plans that effectively preclude gas development. With greater municipal autonomy, Texas' communities have promulgated a wide variety of setback distances including several that according to industry, amount to de facto bans. Dallas, Duncanville and Grand Prairie, for example, all have bans or setbacks more than 1200 feet. Despite, the potential for lawsuits, the state-municipal relationship in Texas is fairly one sided in favor of development. Most cities are working with developers and have yet to pass comprehensive land use policies.

Table 6.13 presents the bivariate correlations. A number of statistically significant relationships are observable and in the hypothesized directions. In general, socio-economic variables appear to be strongly associated with stricter municipal fracking policies. The strongest predictor variable, logged home value, reported an R= -.4, meaning that as median home values increase, Texas cities seek to exercise more control over natural gas development and promulgate more comprehensive land use policies. Other economic/social variables also reach statistical significance. Both income (R= -.348) and education (R= -.379) report negative relationships with the dependent variable, although these two indicators are also highly

correlated with one another. Green cities are also negatively associated with fracking policies (R= -.335; P= .009), suggesting that as cities increase in their environmental score, they also have more restrictive fracking policies. Finally, while the turnout variable fails to reach significance at the .05 level, it did report a P value of .06 (R= .244) and was positively associated with the municipal policy. Perhaps surprisingly, as turnout in Texas increases, municipal support for fracking does as well.

Table 6.14 Indicators of Loud Second Order Relationships in Texas

		Municipal Policy	Owner Occupied	**Logged Home Value**	**Logged Income**	Minorities	**Education**	Council	**Green**	Turnout
Municipal Policy	Pearson	1	-.084	**-.400***	**-.348***	-.052	**-.379***	-.018	**-.335***	.244
	Sig.		.522	**.002**	**.006**	.692	**.003**	.892	**.009**	.060
OwnerOcc	Pearson	-.084	1	.317*	.319*	-.173	.182	-.211	.030	-.270*
	Sig.	.522		.014	.013	.186	.165	.106	.820	.037
Logged Home Value	Pearson	-.400**	.317*	1	.962**	-.148	.907**	-.304*	.519**	-.213
	Sig.	.002	.014		.000	.259	.000	.018	.000	.103
Logged Income	Pearson	-.348**	.319*	.962**	1	-.103	.936**	-.352**	.564**	-.170
	Sig.	.006	.013	.000		.434	.000	.006	.000	.195
Minorities	Pearson	-.052	-.173	-.148	-.103	1	-.061	.172	.113	.276*
	Sig.	.692	.186	.259	.434		.642	.188	.388	.033
Education	Pearson	-.379**	.182	.907**	.936**	-.061	1	-.308*	.674**	-.175
	Sig.	.003	.165	.000	.000	.642		.017	.000	.182
Council Districts	Pearson	-.018	-.211	-.304*	-.352**	.172	-.308*	1	-.012	-.041
	Sig.	.892	.106	.018	.006	.188	.017		.927	.756
Green	Pearson	-.335**	.030	.519**	.564**	.113	.674**	-.012	1	.000
	Sig.	.009	.820	.000	.000	.388	.000	.927		1.000
Turnout	Pearson	.244	-.270*	-.213	-.170	.276*	-.175	-.041	.000	1
	Sig.	.060	.037	.103	.195	.033	.182	.756	1.000	

*Significant at the .05 level

**Significant at the .1 level

Data collected from municipal websites, codes and news sto

Texas municipal leaders have offered a number of reasons for either supporting or opposing expanded natural gas drilling in their communities. In explaining the desire to ban fracking in Denton, Adam Briggle, the vice president of the Denton Drilling Awareness Group (DAG) stated "we saw, once the [original] ordinance was passed, the sort of futility of this compatibility strategy...the realization was that you can either have fracking or you can have a healthy city, but you can't have both" (Briggle quoted in Dropkin 2014). Denton's Mayor, Mark Burroughs, supports greater restrictions but cautioned that a ban could place the city at risk for lawsuits. Burroughs explains "if it [the ordinance] does pass, the city has to follow it…but we could be bound to enforce an illegal act, which throws into a whole panoply of open issues….we as a city would be bound to defend it, whether we believed it was illegal or not" (Burroughs quoted in Dropkin 2014). Denton's ban is likely to lead to second order legal challenges (challenge the state's preemptive authority and its gas goals) and opponents have claimed that the ban amounts to a regulatory takings.

Besides leading to second order lawsuits, Cyrus Reed, the Conservation Director of the Lonestar Chapter of the Sierra Club opined that Denton's actions maybe a harbinger of a greater levels of activism within Texas communities in the near future. "I think cities throughout Texas are looking at the fact that while an individually fracked well might not be that big of a deal, when you talk about lots and lots of wells and lots and lots of oil and gas facilities being located where people live, play and work, that does become an issue…but it's unclear if a complete ban falls under the health, safety and welfare clause" (Reed quoted in Dropkin 2014).

Other cities have also passed restrictive zoning ordinances. In Southlake, Texas, for example, tougher and more restrictive rules and the city's 1500-foot setbacks contributed to Chesapeake Energy's decision to abandon production within city limits (Dlouhy 2011).

Following the City of Dallas' decision to enact 1500-foot buffer zones, Councilman Kingston put out a press release that stated, "I will oppose dangerous gas drilling**,** fracking, and refining within the city limits of Dallas. Even under the strictest of regulations, these activities still threaten our air quality and water supply. I am the only candidate who has been a vocal and active opponent of drilling, and I am proud to have earned the endorsement of the Sierra Club as well as many environmental leaders in our city" (Kingston 2014).

Other cities are more sanguine about natural gas development and believe it can be balanced with localized and neighborhood level concerns. Rick Trice, the City of Fort Worth's gas drilling inspector noted that "In the early stages of the surge, drilling companies sometimes were less than sensitive to neighborhood concerns…executives from outside [Fort Worth] would come to public meetings and get frustrated and go, 'we can just do what we want to.' I mean, it was kind of obnoxious. They quickly learned [that] if you're going to do work in Fort Worth in an urban environment, and with some of the politics, that just wasn't going to be the way things were going to operate" (Trice quoted in Fehling 2014). Since the early 2000s, the City has expanded its setback requirements to 600 feet and enacted other standards to mitigate the impacts of urban drilling. Despite pushing back development, Trice stated he still expects to encounter land use disputes, "you can expect a lot of conflict with what is essentially an industrial activity in an urban area. That's what our ordinance attempts to do, is to attack quality-of-life issues" (Trice quoted in Fehling 2014). Mansfield Mayor Pro Tem, arguing in favor of gas development/fracking but also the need for local control argued, "it [local control] does allow citizens to control what's going on in their own cities — and that's a good thing" (Stephen Lindsey quoted in Malewitz 2013).

Many supportive cities are using natural gas revenues to fund other programs. Indicative of this trend is Arlington, which does have a comprehensive zoning scheme regulating gas development exceeding that of the state. The City uses its gas revenues to fund its Arlington Tomorrow Foundation. The foundation has grown to $80 million, enabling it to award 252 grants equating to over $7 million dollars to city departments, nonprofits and other neighborhood groups (Schrock 2012). The Eagle Ford Shale City of Carrizo Springs has experienced an even more precipitous increase in gas revenues and its related economic growth. Carrizo Springs Mayor Adrian DeLeon estimated that daily traffic counts as exceeding 200,000 and a population of fifteen to twenty thousand, both being dramatic increases since the City's entire population was just 5,500 before the fracking boom (Petty 2014).

Why Critique or Exceed the State?

The third question relates to identifying and then exploring the variables that may be associated with more or less municipal regulation of urban hydraulic fracturing. Like Colorado and Ohio, I used logistic regression to identify potential relationships. Following the scheme described in Chapter 3, Texas municipal policies were recoded with two different 'yes/no' dependent variables. The first dependent variable lumps together municipal responses that go beyond the state and includes more restrictive zoning policies, bans or other restrictions on public property (municipal policy responses 0-4). The second is a more direct measure of state-municipal conflict and sets apart those policies that conflict with the state's goal of natural gas production (originally coded as municipal policy - 0). The output presented below represents the most parsimonious set of independent variables.

The first model reaches a marginal level of statistical significance (P=.073). Echoing the ANOVA results, only the logged home value (p = .008) is a significant predictor variable. The

marginal effects, however, are impactful. For each one-unit increase in the logged home value, the likelihood of deferring to the state of Texas relative to oil and gas land use issues decreases by approximately 84 percent. Like Colorado, a one unit increase in the logged median home value is the equivalent of moving from a $100,000 median valued home to one valued at $274,000 dollars.

Table 6.15 Municipal Fracking Policies that Exceeds State Policy

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Sustainable Development (SD)	-.022	.985	.000	1	.982	.978
	Turnout	1.222	1.003	1.486	1	.223	3.394
	Interactive SD * Turnout (HGHT)	-.696	1.309	.283	1	.595	.499
	Log Home Value	-2.822	1.905	2.194	1	.139	.059
	LogIncome	1.621	2.252	.518	1	.472	5.057
	Constant	16.807	9.982	2.835	1	.092	1.992E7
Step 2[a]	Turnout	1.232	.906	1.849	1	.174	3.427
	HGHT	-.715	.987	.524	1	.469	.489
	Log Home Value	-2.817	1.888	2.226	1	.136	.060
	Log Income	1.602	2.087	.589	1	.443	4.964
	Constant	16.920	8.584	3.885	1	.049	2.230E7
Step 3[a]	Turnout	.762	.597	1.630	1	.202	2.143
	Log Home Value	-3.098	1.863	2.766	1	.096	.045
	Log Income	1.756	2.085	.710	1	.400	5.792
	Constant	18.676	8.397	4.947	1	.026	1.291E8
Step 4[a]	Turnout	.833	.589	2.002	1	.157	2.301
	Log Home Value	-1.702	.691	6.057	1	.014	.182
	Constant	19.991	8.139	6.033	1	.014	4.809E8
Step 5[a]	**LoggedHome Value***	**-1.825**	**.690**	**6.994**	**1**	**.008**	**.161**
	Constant	21.846	8.109	7.258	1	.007	3.073E9

a. Variable(s) entered on step 1: Green, Turnout, HGHT, LogHomeValue, LogIncome.
Cox & Snell R Square = .145
*Significant at the .05 level

The second model specified a narrower range of municipal policies (bans and setbacks that have blocked development) but produced a similar result. The model is statistically significant (P=.000) and like the previous model, the median logged home value is the only significant predictor variable. Here, a one unit change in its value equates to an 87 percent decline in the odds of a municipality passing a land use policy that fits within the regulatory framework of the state, i.e. one that encourages development.

Table 6.16 Municipal Fracking Policies that Challenge the State's Preemptive Authority

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1[a]	Logged Home Value	-2.530	3.462	.534	1	.465	.080
	Logged Income	.374	4.209	.008	1	.929	1.453
	Education	.787	13.478	.003	1	.953	2.196
	Green x Turnout	-.884	.899	.968	1	.325	.413
	Constant	28.346	36.405	.606	1	.436	2.044E12
Step 2[a]	Logged Home Value	-2.448	3.148	.604	1	.437	.086
	Logged Income	.490	3.686	.018	1	.894	1.633
	Green x Turnout	-.875	.883	.981	1	.322	.417
	Constant	26.334	11.497	5.247	1	.022	2.733E11
Step 3[a]	Logged Home Value	-2.051	.934	4.820	1	.028	.129
	Green x Turnout	-.875	.883	.983	1	.322	.417
	Constant	26.632	11.268	5.585	1	.018	3.681E11
Step 4[a]	**Logged Home Value**	**-1.984**	**.898**	**4.887**	**1**	**.027**	**.137**
	Constant	25.521	10.761	5.625	1	.018	1.212E11

a. Variable(s) entered on step 1: LogHomeValue, LogIncome, BachorHigher, HGHT.
Cox & Snell R Square = .092
*Significant at the .05 level

Discussion of Results

A number of variables fail to reach statistical significance including the measure that approximated a city's proclivity to take sustainability seriously. This lack of significance perhaps is not surprising, given the pro-development attitudes and policies held by many state and municipal public officials in Texas (Davis 2012). Despite the absence of macro level factors i.e. environmentalism, bottom up municipal activism and local variation are observable in Texas. In Texas, however, greater levels of municipal oversight and the willingness to inch closer to challenging the state's preemptive authority are associated with median home values, a micro-level issue. Consideration of home values, while not necessarily a 'usual' suspect in explaining substate environmentalism, does make some sense in the context of high cost-benefit decision-making and the social–psychological/planned behavior explanations that undergird environmental support (Lubell 2002).

Table 6.17 Summary of Findings

Variable	Model 1 – Critical of the State (Symbolic and Substantive Challenges)	Model 2 – Challenging the State (Substantive Challenges)
Environmentalism	No Support	No Support
Turnout	No Support Observed (highly correlated with home value)	**Slight Support**
Income	No Support Observed (highly correlated with home value)	No Support Observed
Owner Occupied	No Support Observed (highly correlated with home value)	No Support Observed
Median Household Value	**Support**	**Support**
Municipal Structures	No Support Observed	No Support Observed
Race	No Support Observed	No Support Observed

Second Order Politics, Rational Choice and Environmental Protection

Ajzen's (1991) theory of planned behavior includes two major components: a positive evaluation of the likelihood of success and holding favorable attitudes. Blake's (1999) work identified that both components are part of the rational choice orientation used by scholars attempting to explain individual and institutional decision-making. For these scholars, "reasoned human agency" is a critical factor that underlies action and volition, and it may help explain a municipality's decision to challenge or 'get close' to challenging their state's preemptive authority.

Researchers adopting a rational choice approach are confident in the utility of their approach especially in high-cost situations. In these situations, strong pressures exist on individuals to make decisions based on self-interest and rationality because their choices involve real and tangible consequences (Blake 1999). Lubell (2002) identified several components that enter an individual's calculus in higher-cost environmental scenarios:

1. The collective good's perceived value that would be produced by successful environmental action
2. The chances of success and the individual's contribution to success if he or she opts to participate in the environmental action
3. The likelihood of group success
4. The selective costs and benefits of participation

By comparison, in lower-cost situations, the consequences are more abstract and decision-making strategies become more idiosyncratic and less rational.

Why would a threat to home values instigate municipal environmental actions and a NIMBY (Not in my backyard) like response? Miller and Krosnick's work (2004) examined

citizen rationality and decision making in the context of a political threat.[71] They surmised that under duress, rational citizens survey the political landscape to identify the optimal course of action, i.e. where the selective benefits outweigh the costs and where they stand a reasonable chance of accomplishing their goals, i.e. mitigating the threat. A reasonably effective strategy by Texas citizens, who believe that fracking threatens their home values, is to work with municipal leaders, where they stand a reasonable chance of achieving their goals, for instance to pass policies that keep their home values high through municipal bans and large setbacks. Their actions and motivation fits within the definition of Nimbyism as their opposition to state policy is based in part on elevated levels of apprehension about the project's risks and benefits and not generalized environmental concern (Michauda, Carlisle and Smith 2008).

An additional way that Nimbyism and the threat of diminishing home values can lead to challenges to the state's preemptive authority is through direct and indirect citizen mobilization efforts, information sharing and other disseminative strategies. Once activated, threatened individuals become more aware of select solidary, purposive and material benefits associated with their activism (Olson 1965). Because nearby urban drilling may negatively affect property values, once individuals become aware of this association, their calculus shifts and the material benefits of municipal action (higher home values) likely outweigh the costs of participation (time, energy and money) and leads the political calculus to favor municipal intervention into natural gas policies.

Home values in Flower Mound, Texas illustrates the higher-cost rational choice calculation of urban drilling. Flower Mound homes are generally valued at more than $250,000. However, when they are located within 1,000 feet of a well site, they lose between three and

[71] While, a complete causal answer is beyond the scope of the data and of this dissertation, potential answers need to address self-interest and rationality.

fourteen percent of their overall value. Visual buffers helped to mitigate this relationship but did not eliminate the financial impact. Perhaps not surprisingly, city leaders in Flower Mound responded and passed a 1,500-foot setback, effectively preventing gas development within the city (Integra Realty Resources 2010).

Lubell's second point (chances of success) further supports municipal regulatory activism. Portney (2002, 2009) noted that sustainability efforts were more successful in cities because of the processes in place that build social capital and facilitate increases in political efficacy among citizens, i.e. offer citizens more opportunities to become involved and shape local policies and accomplish one's policy goals. In cities throughout Texas, citizens may comment on draft plans for the city's future, comprehensive land use plans and potential ordinances. Citizens may also participate in surveys, boards and focus groups to share specific ideas (Portney 2009). These opportunities help to build social capital and encourage the development of relationships and social networks that help overcome collective action dilemmas (Hempel 2009).

Texas' Second Order Politics and Economic Goals

In proposing his middle of-the-road approach, Stone (1980, 1993, 2006) also describes urban by the ways in which local government policymakers work with each other and the private sector. His articulation of regime theory is builds on Lindblom's (1977) observations regarding the fundamental tensions present in a market-based economy. The system, Stone suggests, requires near continuous economic growth but provides governments with only a limited role in the decisions made by private sector. By forming regimes that often include state governments, local governments facilitate policy change while at the same time, acknowledging and accepting that business and government often share common interests. The resulting dynamics have

significant ramifications for democratic accountability and transparency. Imbroscio, in 1999 concluded that the ways in which local governments coordinate with other policymakers have important implications for both policy promulgation and democracy. Cities may possess room to maneuver and respond to public concerns i.e. pass greater setback distances, the prevailing structural bounds limit the range of acceptable public policy outcomes i.e. development will still take place. In short, the dominant structural system, characterized by the need for continuous economic growth constrains the actions and behaviors that public officials may take in response to public opinion.

Texas' Second Order Dynamics Revisited

Environmental factors are weakly associated with more robust municipal oversight of natural gas development. What seems to be driving Texas' cities to pass policies that go beyond the state and in some cases challenge the state, are micro-level variables. Higher home values, likely by contributing to higher social capital and NIMBY attitudes, are associated with caring about the issue of urban drilling. When combined with greater levels of municipal decision-making authority, Texas municipalities appear to be more willing to pass policies, such as zoning policies with large setbacks that exceed the state's land use policies. These municipal land use plans stand in contrast to the all or nothing bans and moratoria that are increasingly appearing on the agendas of municipal lawmakers in Colorado, Ohio, New York, California, Pennsylvania, Illinois and Michigan.

By comparison to Colorado and Ohio, Texas' municipalities have considerably more authority and latitude when it comes to establishing setbacks and other restrictions. Bottom up researchers (Hjern and Porter 1981; Lipsky 1980; Palumbo, Maynard-Moody, and Wright 1984) identified multiple reasons for why empowering bottom up forces may produce better outcomes

– in this case quieter intergovernmental relationships. Street level bureaucrats and organizations tend to possess more information as compared to higher level or executive actors since they are closer to the problem's origins and its target population. In other words, city leaders are likely more aware of how urban gas development impacts their residents' quality of life. This asymmetry may be even more important during episodes of policy change. Municipal government's proximity to citizens also affords city leaders with more opportunities to immediately respond to citizens through site security measures, larger setbacks and other restrictions on development.

The outright challenges to the state's preemptive authority have yet to come to Texas and the state is not actively involved in any lawsuits that deal with the extent of municipal authority to regulate natural gas development. With this relative 'calm' Texas cities have become active institutional venues addressing fracking and its consequences relative to quality of life. Texas' second order issues are ebbing and flowing. Recently, HB1496 (in 2013) appeared on the agenda of state lawmakers. The bill's sponsors, Van Taylor and Gary Elkins (Republicans) argued it would promote uniform policies, encourage economic development and protect private property.[72] The law forces municipalities to accept drilling with few, if any, restrictions on where it may occur including near schools, homes, hospitals and water wells (Southwell 2013). City of Lewisville Mayor Dean Ueckert, responding to the proposal, summarized the municipal viewpoint, while maintaining his city's pro-growth ideology and policy orientation:

[72] Under the proposed bill, most, if not all, municipal regulation would constitute regulatory takings if it devalued the property by more than 25 percent.

> It is clear that HB1496 will drastically impact municipalities since city residents live in much closer proximity to one another than rural residents in the State, and neighboring property uses in municipalities naturally impact each other to a much greater degree and therefore, the need for municipal regulatory authority is paramount, particularly when there is drilling or production of natural gas…since drilling operations have distinct implications upon the surface estate and the owners of neighboring surface estates (Ueckert 2013).

While future research may be able to pinpoint the causes or identify whether or not lawmakers are aware of the second order and inherent tension, the exchange between lawmakers illustrates key differences between state and municipal perspectives even when they enjoy similar policy goals.

Chapter 7
Summary and Implications

This project addresses three major questions concerning second order relationships relative to hydraulic fracturing and urban drilling. The first two address the general institutional landscape governing state and municipal governments in relation to urban natural gas drilling. The third question probes why some municipalities challenge their state's preemptive authority while other communities do not. The answers to each of these questions add depth and a degree of explanatory power to the second order federalism/devolution literature (See Bowman and Kearney 2012; 2011; Davis 2014; Stephens and Wikstrom 2000; Stephens 1974; Woods and Potoski 2010). The answers paint a complicated picture of the politics and point to multiple explanatory factors (municipal environmental support, median home values, voter turnout and the percentage of owner occupied homes) all of which may be associated with challenges to state preemptive authority.

Unlike the three previous chapters that specifically examine three states, Chapter 7 follows and considers in greater detail a number of theoretical and practical implications. I begin by summarizing my findings and placing them within the context of a larger body of second order federalism research. In general, they support the hypotheses but also generate considerable uncertainty and generate numerous possibilities for future inquiries (addressed in the last section). The second section pays closer attention to the findings and makes some general observations regarding second order federalism, proximity, collective action problems and environmental policy.

Summary of Findings

The fracking renaissance in the Rocky Mountain West, Texas and the Mid-Atlantic has continued relatively unabated. Despite touting new layers of regulatory oversight and new legal provisions to better protect people and the environment, political conflicts are contentious, 'loud' and reframing state-local relationships. The disputes between state elected officials and regulators and municipal policymakers reveal a status quo under attack and the emergence of new venues for opponents of urban drilling but also localities that support expanded drilling opportunities. Opponents are strategic actors and have identified municipal audiences receptive to a variety of frames: sustainable economic development and threats to quality of life (owner occupied and median home value). These broad frames are not associated uniformly across the three states.

The reader should exercise significant caution, municipal characteristics and structures and political climates appear to be associated with and can help shape the politics of second order federalism when it comes to oil and natural gas development. In Ohio and Colorado (the middle ground and centralized state), municipal challenges to the state's authority met with litigation and threats of future lawsuits and are associated with increasing receptiveness to sustainable economic development, mobilization through turnout and home ownership rates. Despite 'loud' relationships garnering much more space/time on local newspapers, for both states, the majority of sampled cities align (soft and collaborative relationships) with the statehouse policies.

Municipal challenges can also reset the state legislative agenda. Activists have filled Colorado's legislative 'to-do' list with proposals to devolve some powers including setback authority to municipal governments. The State Courts are also busy with cases stemming from

natural gas second order disputes. Ohio's lawmakers following earthquakes are calling for more restrictions on development.

Texas, on the other hand, has yet to experience the highly oppositional (and publicized) relationships observed in Ohio and Colorado. Yet, Texas state-municipal politics are not quiet and appear to be simmering. Industry has called large municipal buffers arbitrary and de-facto bans and one city (Denton) has enacted a complete ban. Its decentralized nature has likely contributed to cities enacting a variety of setback distances in line with their preferences and until recently fairly calm (quiet) state-local relationships. This flexibility has also engendered uncertainty as to where the second order 'line in the sand' is drawn and when exactly municipal legislation runs afoul of state goals. The bubbling activism in Denton, Texas too, may lead towards more litigious strategies by state and industry interests.

State Summaries

Colorado, which has centralized much of the decision-making authority in the COGCC, produced a number of interesting results. Second order relations in Colorado are fairly schizophrenic. With few options available to municipal government, Colorado communities are active and in some cases, attractive decision making venues for the opponents of fracking. Multiple jurisdictions like Fort Collins, Boulder, Longmont and Broomfield have passed bans and multi-year moratoria in opposition to the state's policy of uniform development. These communities tend to be more receptive to green policies and home to more engaged citizens. In more mobilized and greener communities, residents may see fracking as a generalized threat to the environment and believe that local action is called for to protect it. In other communities, municipal elites determined that more 'middle ground' responses are the best policy response and are, therefore, working with industry and the state to sign voluntary agreements that exceed

COGCC requirements. Yet, the vast majority of cities are following the state's lead and deferring oil and gas decisions to state lawmakers and regulators.

Ohio communities, representative of a more middle ground approach, are also engaged in second order conflicts, many of which have worked their way into the state's judicial system. The evolving intergovernmental system has produced considerable uncertainty for Ohio's city and township governments even with the recent amendments to Ohio's oil and gas laws. Cities, in response, have enacted, upheld or passed a variety of policies both supporting and opposing state goals. In fact, the second most frequently used municipal policy option, zoning regulation, according to industry, violates state law with the most popular being deference to the state. What factors might be driving these potentially conflictual relationships? The sample of communities' reveals that micro and macro factors are associated with challenges to Ohio's preemptive authority and to heightened risk perceptions among city residents. At a more micro level, the housing mix of a city matters. Those cities with higher levels of home ownership are likely populated with a greater number of individuals worried about fracking and willing to work together to push for and support restrictive drilling policies and zoning. Environmental support, a more macro level factor, also contributes to heightened risk evaluations and may help explain a city's willingness to voice its opposition to state policy.

Like Ohio and Colorado, Texas cities are active participants in the intergovernmental management of natural gas resources. By comparison, however, they enjoy more autonomy than either Colorado or Ohio. Cities may pass zoning regulations that better balance development with concerns over protecting residents' quality of life. The Texas sample shows that stricter municipal policies are associated with a concern that fracking may have harmful effects on home values. Despite the wider degree of latitude, second order politics are far from inert. Industry has

charged several communities with passing arbitrary buffer zones and de facto bans and two state Republican lawmakers have introduced legislation that centralizes urban drilling policies within the Texas RCT.

The tables below (Tables 7.1-7.2) show the summarized results:

Table 7.1 Summary of Descriptive Findings

	Colorado (Centralized)		**Ohio (Middle Ground)**		**Texas (Decentralized)**	
	Number of Cities	**% of Sampled Cities**	**Number of Cities**	**% of Sampled Cities**	**Number of Cities**	**% of Sampled Cities**
Most Popular Municipal Policy	24 (No Action)	50%	22 (No Action)	35.5%	31 (No Action)	51.7%
2nd Most Popular Municipal Policy	8 (Actions increasing development)	16.7%	14 (Zoning Regulations)	22.6%	15 (Zoning Regulations)	25%
2nd Order Challenges	8 (Bans, Zoning, Public Restrictions)	16.7%	18 (Bans, Zoning)	30%	7 (Bans)	11.7%

Sources: Municipal websites, Lexis Nexis News Articles

Table 7.2 Factors Associated with 2nd Order Challenges

	Colorado (Centralized)		**Ohio (Middle Ground)**		**Texas (Decentralized)**	
Variable	Model 1 Going Beyond the State	Model 2 Challenging the State	Model 1 Going Beyond the State	Model 2 Challenging the State	Model 1 Going Beyond the State	Model 2 Challenging the State
Sustainable Economic Development	**Support**	**Support**	**Support**	No Support Observed	No Support	No Support
Turnout	No Support Observed (highly correlated with home value)	**Support**	**Support**	No Support Observed	No Support Observed (highly correlated with home value)	**Support**

Income	No Support Observed (highly correlated with home value)	No Support Observed	No Support Observed	No Support Observed	No Support Observed (highly correlated with home value)	No Support Observed
Owner Occupied	No Support Observed (highly correlated with home value)	No Support Observed	No Support Observed	**Support**	No Support Observed (highly correlated with home value)	No Support Observed
Median Household Value	**Support**	No Support Observed	No Support Observed	No Support Observed	**Support**	**Support**
Municipal Structures	No Support Observed	No Support Observed	No Support Observed	No Support Observed	No Support Observed	No Support Observed
Race	No Support Observed	No Support Observed	No Support Observed	No Support Observed	No Support Observed	No Support Observed

Sources: Chapters 4-6

Explanations and a Return to Motivation

The data supports both macro and micro level explanations for a city's willingness to challenge its state government. Sustainable economic communities, especially in Colorado and Ohio are prone to view fracking as an environmental and public health issue. This belief may elevate the nuisances and dangers of being located near a frack site and, thus, may help to explain why these cities are associated with stricter land use policies and oppositional relationships. Micro level relationships shape the politics of fracking and municipal perceptions as well. Those communities better suited to overcome collective action problems, whether through higher levels of turnout, higher rates of owner occupied homes or concerns over property values also correlate with challenges to the state's preemptive authority. The latter two

suggest that when residents view fracking as a hindrance to their quality of life or their home values, they are more likely to support tougher zoning/land use policies. Both sets of explanations also give credence to the idea that municipalities are responsive to their constituents and that accessibility matters. These factors may be especially important when city leaders consider passing policies that challenge the state's preemptive authority.

The proximity to a frack site is an influential factor throughout the policy life cycle and of second order federalism (Ajzen 1991; Davis and Fisk 2014). The causes of perceived risk are complex and likely interact with ideological leanings, education and other socio-economic characteristics. Data show a complex set of second order relationships and show an association between that cities having a higher number of owner occupied homes, greater home values and a commitment to sustainable economic development orientation are all prone to view fracking as a perturbation to quality of life. Individuals, however, do not view all nuisances and dangers of frack sites equally (Ajzen 1991; Dietz, Fitzgerald and Shwom 2005; Mobley, Vagias and DeWard 2010; Sjoberg 2000; Slimak and Dietz 2006). Greener citizens and parents, for example, may be more concerned with human health and safety (illnesses related to exposure or vehicle collisions) than impacts to personal property (property devaluation and property crimes) or vice versa. Homeowners, while unconcerned about faraway water contamination, may press local leaders to restrict fracking after having experienced nearby earthquakes.

Proximity and Collective Action

Municipal anti-fracking policies are a collective action problem because the environmental benefits of such policies cannot be withheld from non-participants. Under this scenario, rational individuals will free ride. The logit models identify a number of factors that

activate and transform free riders into active and engaged citizens (Aldrich, 1993; Downs, 1957; Lubell, Vedlitz, Zahran and Alston 2006).

City officials and residents may support drilling and extraction "elsewhere" but not in their community (Swofford and Slattery 2010). This explanation may help explain the dynamics undergirding the relationship between home values, home ownership and quality of life with municipal anti-fracking policies. Opposition in this case is place specific rather than based on a general concern over the environment. Western Colorado resident, Sonny Lindauer, who lives along a creek, epitomizes the subtle distinction between self-interest rational choice and environmentalism when he observed "oil and gas companies shouldn't have the right to affect people's homes by introducing odor and noise…"I know they need the natural gas. I wouldn't object if they were honest and did it right…but a lot of it is sloppiness and a lot of it is lying" (Lindauer quoted by Cockerham 2013).

In addition, scholars have repeatedly found relationships between socio-economic standing and support for environmental protection. Abel, Stephen and Kraft's (2007) model, for example, linked higher levels of citizen affluence and educational attainment with greater levels of environmental awareness and support. Other studies have found a similar connection and note that elevated levels of education and wealth generally lead to a greater level of awareness of ecological vulnerabilities, a well as jurisdictions that are more supportive of environmental protection (Daley and Garand 2005; Davis, Davis and Peacock 1989; Howell and Laska 1992; Matisoff 2007; Ringquist and Garand 1999). Awareness aside, wealthier communities may pursue environmental protection because they are better able to meet other needs such as economic development and public safety (Daley and Garand 2005).[73]

[73] While identifying the particular source of municipal opposition is a noteworthy future project, it is less important for a study on second federalism.

Proximity and the Environment

The bivariate results and logit models point to environmental support as a factor associated with challenges to the policy goals of state lawmakers in Colorado, Texas and Ohio. The environmental policy literature identifies multiple explanations for why 'greener' cities may be associated with anti-fracking regulations and environmental policies that challenge the state. This is in line with most environmental attitudinal research. Davis and Fisk (2014) found that when individuals hold pro-environmental beliefs, they are more likely to possess attitudes supportive of additional regulation of gas development and other restrictions. Rabe and Borick (2011), while finding a general degree of optimism about fracking's economic benefits also identify a strong degree of concern (60 to 28 percent) among Pennsylvania residents about its effects on water quality.

Second Order Federalism and Venues

The relationship between venues and problem definitions, according to Baumgartner and Jones (1991) is partially shaped by the goals of political actors. Supporters of the status quo, for example, are likely to seek out venues that already possess the jurisdictional right to hear claims or the power to adjudicate the question. For fracking, industry-friendly and durable state subgovernments have historically been that venue (Davis 2012). Opponents wanting to enlarge the conflict, typically seek out new and friendlier venues like a city government. This change permits the introduction of new problem definitions and the inclusion of new solutions. Venue shopping has profound implications for the politics of second order federalism. By strategically selecting to work through municipal governments, activists are often trying to expand the scope of conflict, mobilize supporters, bring new attention to their issue and force the issue onto the agenda of a higher level of government (Pralle 2006).

Second Order Federalism and Public Policy

In a significant majority of states, second order relations, while not immutable are fairly one sided in favor of the states. States enjoy centralized authority and establish the basic rules that local governments and other entities must follow. State power, however, is not unidirectional. The language used in most legal documents is frequently ambiguous and provides 'room' for displays of informal power. Utilized by local policymakers and stakeholders, informal power mechanisms (mobilization, agenda setting, problem definitions, and ballot initiatives) can be utilized by those who are seeking to change the status quo and exert some degree of control over urban drilling operations.

Second order dynamics are often about issue boundaries, venues and powerful political frames, with both states and local entities making reasonable claims over who should have the authority to adjudicate the issue. Policy research (Pralle 2006) defines boundaries as those informal and formal delineators that signal the end of a problem or resolution, its reach and jurisdictional claims. Second order boundaries are especially difficult to categorize and are subject to change through legislative, regulatory or judicial action. Where states and local governments draw their second order boundaries determines who may participate and whether or not participation is meaningful. In the case of centralized systems, municipal participation may be limited to procedural roles rather than policymaking activities. In more decentralized jurisdictions, municipal participants are more likely to enjoy some legislative and regulatory authority.

The lines separating legitimate and illegitimate participation also influence the behavior of issue networks, the formation and/or destruction of alliances and the ways in which groups

design and frame solutions. Networks in centralized systems may include less inter-local interaction and more state-local tension as compared to decentralized policy realms.

Benefits and Future Directions

Second order politics and challenges to state preemptive authority are not purely partisan disputes. Political context, problem severity, the goals of policymakers, motivation, commitment to sustainable economic development, home ownership and home values each contribute to the ephemeral web governing state-substate natural gas land use decisions. The passions of participants representing both sides amplify the stakes of natural gas development and oppositional relationships are often transformed into more than purely legal questions of operational conflicts. There are genuine concerns over public health, safety and the toll that fracking can take on the environment. There is also a need to find employment for the unemployed and for governments to protect private property. More fundamentally, second order politics are debates about the role, powers and scope of democratic governments and the ability of policymakers to respond to citizens with effective and innovative programs that solve pressing public problems.

The dissertation catalogs three disparate state experiences and the municipal responses to those policies. It generates a number of benefits to both practitioners and academics. For practitioners the project offers a historical and descriptive account of natural gas politics in three states. Through a sample of municipal governments, a second benefit is an accounting of how municipalities are responding to increasing urban and suburban drilling. With each sample, I identify different policy responses, measure their frequency and categorize them by type. Importantly, the sample is limited to those cities experiencing the most acute costs and benefits

of expanded urban drilling. When combined, the research reveals an in-depth account of second order relationships in three different states of a very specific policy area.

The project's final benefit is the building of second order federalism/devolution theory. This dissertation's last question focuses on the introduction and testing of possible explanatory factors associated with strained or conflicted state-municipal relationships. My findings suggest that municipalities act in the context of both macro (environmentalism) and micro level factors (home ownership and property values) and frames, which may result because of prevailing state structures, degrees of municipal autonomy and second order institutional design. By tracing how natural gas intergovernmental relations have evolved over time and how multiple factors (greenness, turnout home ownership rates and home values) and institutions (court decisions, regulations and statutes) shape the state-municipal relationship, my conclusions suggest a more nuanced yet complete picture of two key political institutions.

Future Directions

State and municipal legislatures are dynamic institutions. They respond to a variety of frames, actors and arguments and each contributes to a unique and idiosyncratic set of second order politics. This comparison shows an association between a variety of factors and challenges to the states' status quo. The study, however, has a number of weaknesses. It is notable that I do not address causality directly between these potential explanatory factors, municipal fracking or urban drilling policy and state institutional design. The nascent state of second order federalism and fracking policy research may in part explain this shortcoming. Ostensibly, this is problematic but at the same time, it also suggests objectives for a variety of future projects.

This project did not include a direct measure of risk. Risk, however, may underscore many of the associational relationships observed in Texas, Ohio and Colorado (Braiser,

McLaughlin, Rhubart, Stedman, Filteau, Jacquet 2013; Schafft, Borlu, Glenna 2013). With this in mind, a number of future projects are possible that can dig deeper into how municipalities respond and treat objective (number of wells) and subjective risks (unwanted proximity). How might time shape objective and subjective risk perceptions and second order actors? Future projects may center on elites (council members and city managers) and members of the public and how each form perceptions of risk relative to fracking. What filters do they apply when they receive information, and from whom or what institutions do they collect their information. What is seen as credible and trustworthy and what is dismissed? Other projects can link and evaluate measures of risk and trust in governing and non-governing agencies and institutions. Do differing levels of citizen' trust shape second order relationships and/or expectations of citizens? Again, are there differences between municipal/state leaders and citizens when it comes to trusting their state/municipal counterparts?

Future research should more clearly identify and explicate potential causal relationships. Future scholarship can accomplish this task in a variety of ways. Subsequent work might retest the typology presented here or scholars might develop new methodologies based on an alternative set of factors/criteria. Later work might also increase the number of cities considered and the number of states. Other work can dig deeper into state and municipal perceptions over their intergovernmental working relationships. Framing analyses may further explain how strategic activists behave in varying institutions with each often having complementary but sometimes competing goals. Both municipal and state legislatures frame natural gas development through combinations of environment, land-use, democracy, and economic development and property rights. It is likely that they adopt differing issues frames and use them strategically. Finally, researchers might also examine second order relationships relative to other natural

resource policy areas, economic development pursuits or social issues such as gun control and criminal justice.

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Appendices

Appendix 1- Interview Questions

1. How would you describe the overall state of state-municipal relations in your jurisdiction relative to fracking?

2. How would you describe your interactions with municipal governments?
    a. What is a typical interaction like with appointed city officials?
    b. What is a typical interaction like with elected officials?

3. Can you describe to me how the state's policy governing fracking has played out at the municipal level?
    a. What have been the **overall** impacts to your state since the advent of hydraulic fracking in your area?
    b. From your perspective have municipal actors such as municipal officials or municipal businesses **benefited** from fracking?
    c. From your perspective have municipal actors such as municipal officials or municipal businesses **been harmed** from fracking?

4. How would you describe a supportive/collaborative relationship with municipal governments?
    a. What is an example?
        i. Why is this relationship positive?
        ii. What characteristics make this relationship positive?

5. How would you describe an oppositional/conflictual relationship with municipal governments?
    a. What is an example?
        i. Why is this relationship negative?
        ii. What characteristics make this relationship negative?

6. Could you describe how you communicate with city officials with regard to hydraulic fracturing?
        a. How do you communicate with elected municipal officials?
        b. How do you communicate with city managers?

7. To your knowledge, in what ways have municipal actors been involved in regulating and/or shaping the state's policy towards hydraulic fracturing?

8. Do municipal governments need more autonomy when it comes to regulating fracking?

Post – Interview Questions

Is there anything that I have not covered that you would like to discuss?

Is there anyone else that you think I should contact and who would be willing to speak with me?