***Perceived Issues and Successes Associated with Municipalization for Increased Renewable Energy Reliance: Case Study Analyses to Inform Boulder, Colorado on Municipalization and Renewable Energy***

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## ***INTRODUCTION***

Throughout the history of the United States, environmental issues have been addressed and regulatory action has been implemented gradually, with varying political factors. Within the energy sector, the extraction, distribution, and incineration of fossil fuels have been identified as significant sources of environmental degradation and social interruption. The urgency of attending to the issues associated with oil and gas has been increasing as world population and expectant quality of life have been accelerating. An increase in population and quality of life often increases energy demand. However, the increase in alternative renewable energy resources has the potential to threaten the economic standing of the oil and gas industry and can possibly reverse governmental support to renewable energy through lobbying attempts. Additionally, renewable energy advocates may eventually reduce the social support of oil and gas development through increasing media coverage of the advantages of renewable energy. However, the previously established industry of oil and gas holds deeper roots within the construct of the United States than emerging alternative resources. More funded research has been established over the years in support of the oil and gas industry than renewables. Alternative renewable energy projects must endure an extensive process in order to establish themselves as equal competitors within the energy market. Even though advocates for alternative energy sources face this obstacle, they may hold an advantage over the oil and gas industry. As nonrenewable resources use continues, the industry faces the limitations of product acquisition and meeting market deadlines. As energy demand increases, the diversity of energy sources, eventually, must follow suit.

The process of maintaining an efficient and sustainable ratio of energy sources is not simple due to the technological, economic, contractual, and regulatory hurdles associated with a

significant alteration within the energy sector. Noteworthy increases in renewable energy sources would first need to be demonstrated in a comparatively local setting. These endeavors often require alterations within the immediate local energy system such as political and social support, feasibility research and municipalization. The attempts of implementing new changes to a previously well-established and economically supported energy system have encountered, and are projected to encounter resistance from those benefiting from the current system. Recently, the city of Boulder has expanded its interest in increased renewable energy sources and must pursue difficult processes such as municipalization in order to act upon this interest.

The attempt of municipalization takes place for a variety of reasons. Some of these reasons include spatial, economic, and environmental concerns. Boulder, Colorado is undergoing a municipalization attempt for the purpose of attaining control over the composition of its energy sources. The city's desire for increased renewable energy sources conflicts with the source compilation of its current monopolistic utility, Xcel. The City of Boulder's pursuance of increased renewable energy investment via a municipalization attempt can be informed through the comparison of areas that have undergone municipalization efforts for varying reasons. In this thesis, I intend to provide a more in-depth analysis of previous areas of attempted municipalization in order to emphasize the importance of the municipalization process itself. I hope to highlight the amount of effort and planning that must be involved to successfully complete the municipalization step before implementing a higher proportion of renewable energy sources. In addition to the municipalization analysis, I will provide a quick glimpse into areas that have increased renewable energy sources in order to address renewable energy realistically and carefully. Analyses of the points of success and deficiencies in these municipalization and renewable energy cases may provide further insight regarding favorable approaches and

avoidances that the City of Boulder should consider as they continue exploring municipalization for their desired construct of energy sources. Considering the issues and benefits associated with previously implemented municipalization attempts and endeavors to increase renewable energy source reliability in cities and localities within the western U.S., what are the current and projected successes and hindrances facing the city of Boulder in its specific renewable energy-driven municipalization attempts?

## ***BACKGROUND***

To properly analyze municipalizations and renewable energy increase on a local scale, one must first consider the variability, fluidity, and unpredictability of regulation of environmental issues on a national scale throughout history. This funneling approach attempts to provide a greater historical context for both municipalization and renewable energy issues. In order to better understand the points of variability that have the power to act upon the municipalization and energy structure, I am going to first examine the evolution of how the country has perceived and handled the environment over time.

### *Early Environmentally Based Policy and Tort Law*

While some environmentally related concerns were addressed in the United States as early as 1652 when Boston, Massachusetts developed a public water supply and in 1800, when seventeen municipalities were created in an attempt to protect people from consuming water of excessively poor quality, a unified body of law that thoroughly addressed environmental issues had not truly been implemented within the United States until the mid-1960s to early 1970s (Wallace et al.

1984). Before this "Environmental Decade," tort law was the only legal medium in which environmental issues could be addressed (*Causation in Environmental Law*, 2015). According to Cornell University Law School Legal Information Institute, tort law is primarily associated with "civil wrongs recognized by law as grounds for a lawsuit. These wrongs result in an injury or harm constituting the basis for a claim by the injured party" (n.d). The dependence on tort law for environmental regulation shows how issues that are currently perceived as environmental were once viewed as social matters focusing on human well-being.

Since 1970, scientific and technological advancements have improved efficiency in accumulating, addressing and distributing scientifically significant quantitative and qualitative data on environmental issues. The increase in access to scientific information and political discussion has contributed to an increase in active and emotionally invested groups within the community. It is likely that the increase in information availability contributed to the regulatory shift from a perspective based solely on human concern to one that incorporated the maintenance of resources.

In the mid to late 19th century, before the Environmental Decade, the negative ecological consequences of excessive use of natural resources for economic and societal gain became exceedingly evident to the public (Kovarik, 2015). The industrial pollution, land degradation, and excessive extraction of natural resources were particularly apparent in the American West. Land speculators and developers commandeered and repurposed large sections of forested and grazing land (Kovarik, 2015). A positive correlation became prominent between population and land privatization. Land that was important in energy development such as acreage surrounding hydropower sites was seized and exploited. Mining companies practiced environmentally degrading methods and improper containment of secondary waste material. Regulatory protocol

was not considered an issue of necessary importance within the process of extraction, pollution, or ecological alteration (Kovarik, 2015; *Causation in Environmental Law*, 2015). The need for regulatory control became increasingly apparent as the environmental issues became noticeable through research strategies and direct societal contact with the issues.

*Conservation*

Conservationists raised support for federal supervision of the nation's resources and the protection of the quality and quantity of these resources for future generations. President Theodore Roosevelt (presidency: September 14, 1901 – March 4, 1909) acted as a political representative of the concerned conservationists and opened a line of communication between the increasingly invested citizens and the government (*Conservation and Preservation*, 2015; *Progressive Era to New Era*, n.d.). During the Roosevelt era, the conservation of natural resources became vital after marginalized extractions accumulated, the wastefulness of raw materials became evident, and the reclamation of large sections of neglected land was of great importance (*Conservation and Preservation*, 2015; *Progressive Era to New Era*, n.d.).

An influence of Roosevelt's environmentally driven actions was Gifford Pinchot, a fellow conservationist who Roosevelt appointed the first head of the United States Forest Service in 1905 (*U.S. Forest Service History*, 1998). Pinchot established federal conservation policy so future generations could continue to utilize sustained resources (*Conservation vs. Preservation and the National Park Service*, 2015; *U.S. Forest Service History*, 1998). During Pinchot's time, demand for natural resources increased while supply continued to decrease. This eventually led to a positive correlation between personal hierarchical status and the accumulation of natural

resources. Pinchot believed that the scientific organization of resources could prove to be more economically profitable than continued rapid unplanned development.

Roosevelt's environmentally related progress was partially influenced by naturalist and environmental philosopher, John Muir, with whom Roosevelt took a western camping trip. Muir advocated for the preservation of land from 1869-1909. He had established the Sierra Club to support his attempt to awaken the public from "stupefying effects of the vice of over-industry and the deadly apathy of luxury" (Muir, 1901). Muir was a preservationist, meaning he advocated for "protection of nature from use" rather than the conservationist's "proper use of nature." The idea of preservation has become increasingly prominent in the years following the conservation focus.

Some noteworthy products of the Roosevelt administration were the Reclamation/Newlands Act of 1902, which provided funds for irrigation and developed protected national parks; the Inland Waterways Commission in 1907, which analyzed the ecological relationship between rivers and water transportation with various elements and environments; the National Conservation Commission of 1909, which attempted to ensure the conservation of natural resources, enlarged national forests, and created national wildlife refuges and monuments (Kovarik, 2015).

*Ecology and Environmental Protection*

After Roosevelt's administration, demonstrations of societal discontent affected environmental protection as the Second World War enveloped itself into the United States' history (September 1, 1939 – September 2, 1945). At the end of the war, birthrate and suburban

settlement increased (Kovarik, 2015; Dunlap & Mertig, 1992). The prevailing middle class supported the protection of the intrinsic value of nature. The overarching perspective of the population gradually shifted from a focus on conservation to a focus on preservation.

The increase in population and frequency of industrial practices was proceeded by air pollution, water pollution, and human error in managing an increase in energy demand. These environmental problems were further proceeded by political pressures for regulatory practices. Social discontent regarding perceived environmental issues was a contributing factor to these increased political pressures and was expressed through different mediums. Literary representation of environmental support increased with works like Silent Spring (1962) by Rachel Carson, which unveiled the negative ecological and social effects of the excessive pesticide use occurring at the time (Rachel Carson Biography, n.d). The increase in societal involvement has increased the demand for governmental intervention in issues of ecological health. Social eagerness has influenced political representation as President Kennedy (presidency: January 1961-November 1963) and President Johnson (presidency: November 22, 1963 – January 20, 1969) incorporated elements of environmental preservation into their administrations. Examples of recognized environmental acts and regulations include the National Environmental Policy Act (NEPA) and the demand for Environmental Impact Statements (EIS). Environmentally conscious acts continued to develop as environmental regulation expanded and relevant administrations developed.

*The Environmental Protection Agency*

In response to a positive correlation between environmental representation and societal support, President Richard Nixon (presidency: January 20, 1969 – August 9, 1974) continued the

trend of national environmental regulation. Despite the contention about the amount of corporate representation in Nixon's National Pollution Control Council and his rejection of the second Clean Water Act, the president positively contributed to environmental policy by placing the responsibilities of federal environmental regulation under one agency (Environmental Protection Agency) (Kovarik, 2015). An administrative agency is a body created by a legislative branch to carry out particular responsibilities (Kubasek and Silverman, 2000). In order to effectively carry out related responsibilities, administrative agencies have been afforded the limited power of rulemaking, adjudication, and various administrative activities such as permit control, and property management while allowing varying degrees of public participation via written comment submissions and hearings. (Kubasek and Silverman, 2000).

President Nixon nominated William D. Ruckelshaus as the first Administrator of the EPA in November of 1970. The purpose of this specific agency was to provide the "establishment and enforcement of environmental protection standards consistent with national environmental goals" (*EPA Historical Publication-1*, 1992). In addition, this agency was meant to conduct research, collect data, and analyze results of the effects of pollution and other environmental issues. After which, the agency would provide recommendations for relevant policy changes.

The development of this environmentally regulating entity was partially attributed to the involvement of an educated public. The creation of the Environmental Protection Agency shows the increased importance of overarching environmental policy during this time. In addition to the development of the EPA, Nixon requested air quality standards and motor vehicle emission regulations (Kubasek and Silverman, 2013). He increased legal accountability for federal facilities that have excessively polluted air and water sources. Additionally, he proposed to increase enforcement on "seaborne transportation of oil," agreed on a National Contingency Plan

regarding the appropriate and efficient treatment of petroleum related spills, and suggested the implementation of a tax on lead additives in gas (Kubasek and Silverman, 2013). While Nixon responded to society's gravitation toward environmental issues, he also responded to the external factors in the energy sector. These factors contributed to the regulatory atmosphere of the time.

*Energy within the United States*

Issues concerning energy production became particularly apparent toward the end of Nixon's presidency. The energy crisis of the early 1970s emerged as an oil embargo was imposed by the Organization of Petroleum Exporting Countries (OPEC). The embargo terminated U.S. oil imports from the OPEC nations, and almost quadrupled the price of oil per barrel (*U.S. Department of the State*, 2013; Corbett, 2013). The U.S. oil industry did not have the production capacity to withstand the discontinued access of this influential source in the world market. President Nixon responded to the embargo by developing national energy planning, through the establishment of the Federal Energy Office, and Federal Energy Administration (*U.S. Department of the State*, 2013; Corbett, 2013). Nixon promoted the consumption of energy while simultaneously encouraging the exploration of alternative production methods like solar and nuclear (Jimmy Carter later reduced exploration of the nuclear power industry by rejecting the act of reprocessing nuclear fuel, which reduced its financial feasibility and increased waste). The embargo resulted in an increased importance of U.S. energy independence. President Gerald Ford (presidency: August 9, 1974 – January 20, 1977) faced similar energy production restraints and responded by implementing the 1975 Energy Policy and Conservation Act and by establishing the strategic petroleum reserve (Kovarik, 2015). Energy-efficient mortgage incentives were formed under his administration to improve residential energy efficiency. The

National Energy Plans (NEP) of President Nixon and President Ford emphasized federal energy research and regulation as they responded to external factors that had threatened the nation's energy production.

Once President Ronald Reagan (presidency: January 20, 1981 – January 20, 1989) took to office, threats of continuing energy crises dissipated and his National Energy Plan (NEP) reflected the decrease in regulation of energy consumption. In response to the decrease of energy source apprehension, President Reagan reduced the authority of regulatory agencies and bureaus responsible for energy production control (ex. Department of Energy) and cut funding for the research and production of alternative energy sources (Kubasek and Silverman, 2013). Irresponsible energy consumption habits resumed as public and political concern for energy sources decreased.

In the beginning of his term, President George H. W. Bush (presidency: January 20, 1989 – January 20, 1993) responded to the public's increasing concern over energy dependence following the invasion of Kuwait. Because of this external force, the importance of energy production and conservation returned on a national scale. Despite ambiguities in his NEP, energy advancements were made under his administration such as the U.S. Advanced Battery Consortium, the development of ethanol, and the Energy Policy Act of 1992 (Kubasek and Silverman, 2013).

Internal factors also maintain a role in the variability of national regulation of energy policy. A significant portion of regulation depends on the platform of the current administration. President Bill Clinton (presidency: January 20, 1993 – January 20, 2001) supported energy efficiency and alternative sources as he attempted to reduce greenhouse gases and energy

consumption. His NEP supported voluntary programs and environmental programs such as Energy Star and the Landfill Methane Outreach Program (Kovarik, 2015, Kubasek and Silverman, 2013). President George W. Bush (presidency: January 20, 2001 – January 20, 2009), on the other hand, supported national fossil fuel reliance and explorative drilling projects. (*Natural Resources Defense Council*, 2015). President Barack Obama (presidency: January 20, 2009 - present) began his presidency by addressing his desire of oil independence and his support of alternative energy production methods He increased automobile gas efficiency goals to 35.5 miles per gallon by the year 2016 (Gallucci, 2015).

Each president has had different National Energy Plans as variations occurred among external factors, population concern, and energy goals. All of these political leaders maintained a reliance on coal, oil, and gas and experienced varying levels of renewable energy concern. The fluctuation of energy regulation on a national level shows how vulnerable these issues are in the United States and how monetary, political, and social support of alternate sources can shift as time and administration vary.

Because of the difficulty associated with developing an effective long-term national energy policy, local energy decisions have become increasingly important. Some alterations on a local scale can potentially be preserved as political representation changes. Specific alterations of energy allocation on a local scale often require procedures such as municipalization in order to succeed.

## ***Municipalization***

Before describing the process of municipalization as it relates to energy, I will provide definitions of two important and relevant systems that are heavily discussed within the negotiation process of municipalization (transmission and distribution systems). After these term clarifications, I will provide some historical context of the development of municipalization and relevant federal regulatory information that affects localized municipalization efforts. After that, I will provide an overview of some previously explored municipalization cases. Finally, I will discuss the local case of Boulder, Colorado.

### *Difference between Transmission and Distribution Systems*

Transmission and distribution are both terms used to describe systems within the energy sector. Transmission systems contain high voltages (can be around 11,000 volts) to sub-stations that are located closer in proximity to a city, town, or group of energy consumers. Distribution systems contain lower voltages (can be around 220 volts) and transport energy from the local sub-station to the consumers in residential locations, business locations, and industrial locations.

### *Municipalization, the Energy Policy Act, and the Federal Regulatory Commission*

Appleton, Wisconsin became the site of the United States' first commercial electric distribution system in 1882, and Thomas Edison's Pearl Street Station followed suit in New York City less than a month later (Summer, 2015). At this time, each of these systems could only serve less than a square mile. As electric municipalization expanded, national regulatory factors played a part in its process. For the purposes of this paper, m*unicipalization* is the process or

event that allows a city to own, control, and operate its utility system and, subsequently, the composition of energy sources (Browning, 2013; Davis, 2015).

In 1992, the first Energy Policy Act (EPAct) emerged. According to Martin Schweitzer (1995), Order 888 in the EPAct allowed wholesale customers the choice of direct electrical suppliers. The transmission lines of the formerly dominant utility provider would be used after the establishment of the new structure. This Act gives the Federal Energy Regulatory Commission (FERC) the authority to order an electric utility to transmit electricity through their system to the wholesale consumer (Richardson, 1993). This practice of allowing a separate utility's transmission lines to be used in the power provision between a separate utility and a wholesale consumer is known as "wholesale wheeling" (Richardson, 1993).

This EPAct was intended to enable the provision of power from the desired producer to the willing consumer regardless of geographic location. The wholesale energy market involves a "sales for re-sale" arrangement in which the electricity generated is transferred through the market, and energy purchase becomes a broadened system involving many points of transaction. Within this system, the electricity generated by the original power company does not directly deliver to the end-use consumer. The electricity undergoes various transfers in ownership before it is consumed. The consumable energy is quantifiable in megawatt-hours. This market is available to those who have the means to generate electricity, connect to the power grid, and secure a transaction with a willing buyer after they undergo the required approvals (Schweitzer, 1995).

While Order 888 helps provide access between supply and demand, it states that "if a utility loses customers solely because of the order itself, those customers are obligated to pay the

generation costs—the stranded costs—associated with the generation capacity dedicated to those lost customers." (Daniel and Gegax, 2000). This means the consumer is responsible for the stranded costs determined by FERC.

Because of the presence of interstate transactions within the energy sector, FERC oversees the market on a national level. As an independent agency, FERC manages and provides appropriate regulation for the interstate transmission of electricity, oil, and natural gas (Blanche, 2015; *Federal Energy Regulatory Committee*, 1995; *FERC*, 2015). Proposals for related infrastructure development are reviewed by this agency. Additional responsibilities of FERC include: The regulation of the interstate transmission and wholesale sales within the energy sector; the oversight of various acquisitions and corporate transactions and mergers; siting application regulation for interstate transmission projects; the development of reliability projections for interstate transmission systems; and the administration of accounting and financial reporting regulations (*FERC*, 2015). FERC's regulatory control does not, however, apply to the Electric Reliability Council of Texas (ERCOT) which contains its own self-sufficient interconnection within the state.

There are two ways that the incumbent utility can recover stranded costs. Some stranded costs are included in the distribution system price to cover non-depreciated facility costs. The stranded costs that I commonly refer to in this paper are related to the transmission and generation assets.

FERC acts as a national regulatory system for aspiring municipalizations. Over the years, interest in and attempts of municipalization continued to increase while the number of municipal systems that have successfully entered the energy sector has not varied substantially in

approximately sixty years (Schap, 1986). This discrepancy between municipality establishment attempts and successes further highlights the importance of evaluating the difficulties associated with the process.

*Previous Scholarly Study of Municipalization Attempts*

The Office of Energy Efficiency and Renewable Energy within the United States Department of Energy sponsored a study that was conducted in Oak Ridge National Laboratory (Schweitzer, 1995). This study primarily focused on the method of new municipal utility development. The study also examined the procedure through which one existing municipal utility changed their wholesale supplier (Schweitzer, 1995). In this analysis, four municipal utilities were chosen (Washington, Utah; Brook Park, Ohio; Las Cruces, New Mexico; and Madison Maine) all of which were located at varying points along the spectrum of progress. The case of Madison, Maine was previously established while the others were in initial planning and proposition stages. The case of Brook Park, Ohio discontinued the process after negotiations. Las Cruces, New Mexico was still in the midst of the process of proposing municipal utility. The case of Washington, Utah had completed the process. In addition to conducting case study analyses, the Oak Ridge National Laboratory study incorporated information from direct interviews with energy professionals and representatives of the case study locations.

One of the results of Oak Ridge National Laboratory suggested that the difference between the processes of establishing a new municipality and switching to a different wholesale producer was minimal. The established utilities studied in their analysis faced profit reductions ranging from 0.2 percent to 8 percent if the city were to succeed in their municipalization efforts. The reduction of rates for energy consumers resulted in the actual reduction or projected reduction of

12 percent to 30 percent regardless of the successfulness of the effort. The decrease in energy rates of successful municipalization attempts was attributed to the new agreements made between the city and their new wholesale supplier of energy. Rate reductions within failed municipalization efforts underwent successful negotiations, and the reduced rates were upheld despite the failed attempt. In the case of failed municipalization, the study showed that the extent of ratepayer savings was determined by the concessions made by the specific utility. The study concluded that the low successful municipalization rate would continue within the foreseeable future because of procedural issues while the rate of municipalization attempts would remain constant as new attempts continue to arise. The study predicts that the competitiveness of the wholesale market will eventually increase for established municipal utilities. Overall, the paper maintained a relatively positive view on municipalization efforts.

***Boulder, Colorado***

Like the Oak Ridge National Laboratory, I am interested in examining the processes of previously established municipalization studies. I am also interested in analyzing previously attempted renewable energy increase. My case study analyses are intended to inform the city of Boulder in its municipalization efforts for increased renewable energy sources. This section will provide contextual information for the Boulder's specific situation.

The City of Boulder has expressed an interest in increasing reliability on renewable energy sources so these sources can maintain an additive function to the U.S. power grid, an interconnected system that transports energy from the producers to the consumers through transmission and distribution lines (Tansey, 2013; *Electricity Market Reform*, 2000). Increased renewable energy reliance, however, requires altering the previously implemented and currently

maintained business model that the large for-profit investor owned utility (IOU), Xcel, favors. There is a difference between the City's desired renewable energy portfolio and the standards with which the current utility complies.

Since 2005, attempted collaborations have taken place between the City of Boulder and Xcel energy regarding the Franchise Agreement renewal that was to take place after the previous agreement expired in 2010 (*Partnerships with Xcel Energy*, 2015). A Franchise is a right or privilege provided, by the government, to an organization or corporation (*Vocabulary*, 2015). The franchise agreement that was in place between Boulder and Xcel allowed the utility to maintain rights-of-way in transportation over streets, alleyways, or other sections of public property in order to facilitate the continuance of the utility's services (*A Local Electric Utility*, 2015; *City Files Petition*, 2014). After continuous discussions and initial negotiations, the city decided to allow the franchise agreement to expire. This meant that the city was no longer obtaining the franchise fee that accompanied the agreement. In 2010, Boulder citizens voted favorably for the approval the Utility Occupation Tax. This new tax provided the same amount of funding for the city that the franchise agreement once provided. Utility Occupation Tax money currently supports city services and the efforts associated with the city's municipalization attempt.

The city has filed a condemnation petition to the District Court which would transfer the ownership of some of the vital energy distribution mechanisms that are currently under the possession of the utility to the City of Boulder (*Partnership with Xcel*, 2015; *City Files Petition*, 2015). According to the State Constitution, cities maintain the right to obtain possession of property within city limits and surrounding areas to facilitate the provision of power to citizens and businesses (*Colorado Code of Regulations*, 2015). The original owners of the property have

the right to "due process" or a constitutional assurance that any legal proceeding will be justified, and the parties will be notified prior to governmental interference in life, liberty, or property (*Legal Information Institute*, 2015). Original owners also have a right to compensation. When a negotiation attempt regarding settlement cannot be agreed upon, a condemnation case can be filed by the city involved. Negotiations have remained open between Xcel Energy and the City of Boulder while the city continues its process. Despite the municipalization attempt and the loss of the franchise agreement, Xcel Energy is still the energy service provider to citizens of Boulder (Partnership with Xcel, 2015). The negation of the franchise agreement does not equally negate Xcel's responsibility for energy provision while this municipalization process continues.

*Similar Attempts of Municipalization and Renewable Energy Increase*

Municipalization goals and proceedings are not rare. In the State of Colorado, cities can gain electrical service from an Investor Owned Utility, such as Xcel, or these cities can develop their own electric/municipal utility (*Colorado Association of Municipal Utilities*, 2015). Within Colorado alone, there are 29 municipal utilities that have developed over the state's history. Some notable local examples of these utilities are Colorado Springs, Fort Collins, and Longmont (*Colorado Association of Municipal Utilities*, 2015. Additional locations within the United States include Texas, Hawaii, California, Arizona, Illinois, Minnesota, Washington, Michigan, New Mexico, Massachusetts, and Oregon. While the intention behind municipalization attempts vary from case to case, the most prominent one has been financially driven. The primary incentive for the City of Boulder lies in city's desire to be powered by an increasing amount of renewable

energy. Renewable energy increase attempts have taken place in areas like Oregon, California, Washington, Minnesota, Texas, New York, Utah, Michigan, Pennsylvania, Illinois, and Kansas.

The City of Boulder has been analyzing the efforts of Germany to gather information on potential processes and energy source structure (*Boulder's Long Term Energy*, 2015). Energy security has become an important issue within the European Union. Germany heavily finances climate mitigation, renewable resource protection, and electrical efficiency. In August of 2014, the German Government addressed alterations to its Renewable Energy Sources Act (EEG) which provided favorability of renewable energy sources in the power grid (*Energy Transition*, 2015). The financial supporters of these sources were to be monetarily compensated regardless of the "electricity prices on the power exchange" (*Energy Transition*, 2015). The combination of economic incentive and the lack of regulatory difficulties to renewable energy implementation has significantly decreased the cost of renewable energy. Passive energy collection within the housing sector has increased to encourage efficiency, taxation has increased on environmentally unfriendly activities, efficient cogeneration (combined heat and power) has been encouraged, grid expansion attempts have been instated, and the Ecodesign Directive (regulatory instrument for deactivating products with poor environmental performance) was created (*Energy Transition*, 2015; Morris, 2012; Electricity Market Reform 2000). All of these factors have been analyzed, thus far, by the City of Boulder as they prepare courses of action beyond the municipalization process. The impracticality of using a Country-wide energy structure to inform a city-wide template for action is discussed in the *Renewable Energy Analysis*.

In this paper, I provide analyses of a few localized municipalization attempts. I also provide localized cases of renewable energy increase. By analyzing local examples of relatively smaller

scale, I hope to find points of comparison that can be more beneficial than waiting for national regulatory action and more practical than analyzing the energy structure of an entire country. An expanded description of my methodology is provided below.

## ***METHODS***

Because the City of Boulder must municipalize prior to altering the source compilation, separate analyses will take place for municipalization and locations of increased renewable energy development. The combination of positive consequences and points of potential apprehension may contribute to the awareness of the decision makers involved in this multifaceted process. I provide two separate case study analyses in order to inform the City of Boulder in its municipalization attempt for renewable energy increase. The majority of the paper will focus on municipalization because of its immediate procedural importance. The renewable energy section intends to provide a closer look into some of the cases that have been referred to by various sources in support of renewable energy increase.

In this thesis, I first examine previously implemented attempts of municipalization and the contexts within which they were introduced, analyzed, supported and/or contested, and their current procedural status in the process. The analyses evaluate:

- The context of municipalization incentive,
- The financial incentives and demands associated with implementing a new utility,
- Utility resistance to the city's efforts.
- Additional case-specific details that help or hinder the process.

Cases chosen for the municipalization analysis are:

- Las Cruces, New Mexico;
- Hermiston, Oregon;
- Berthoud, Colorado.

By analyzing cases that have undergone municipalization efforts under varying contexts, I hope to broaden the sample size evaluated by the city as its municipalization effort continues. I hope to draw attention to the process and the basic procedural steps so important focuses can be condensed and highlighted.

In addition to analyzing cases of attempted municipalization efforts, I have conducted a separate set of case study analyses of areas, within the United States, that have attempted to increase renewable energy reliance. The analyses evaluate:

- The context of the renewable energy increase;
- The relevant political, financial, and social support;
- Available resources;
- And additional case-specific details.

Cases chosen for the renewable energy analysis are:

- Greensburg, Kansas;
- Aspen, Colorado;
- Georgetown Texas.

By analyzing cases that are attempting/have attempted increased renewable energy reliance, I hope to increase the amount of knowledge about the cases and emphasize the importance of context associated with these issues.

After comparisons have been identified and discussed in this paper, the addressed points will be related back to the City of Boulder's current municipalization attempt and its continuing interest in an increase in renewable energy source dependency.

The methodology that I have followed is similar to that of Oak Ridge National Laboratory in that it uses a case study comparison approach to determine similarities in procedure. A more detailed discussion about the results and the specific methodology of this Oak Ridge study is listed in the Background section under *Previous Scholarly Study of Municipalization Attempts*. While I have conducted various informational interviews with city employees within the energy sector, some of whom were directly involved in Boulder's municipalization process, this information was used for initial research and accumulation of knowledge. Direct interviews with representatives involved in each analyzed municipalization effort and location of renewable energy increase were not conducted. Extrapolation of relevant information and perceived trends was conducted from the available quantitative and qualitative information of multiple sources ranging from scholarly, technical, social and governmental.

## ***MUNICIPALIZATION ANALYSIS***

In this Section, I will discuss the municipalization cases that I have chosen and then I will expand the focus to include overarching regulation.

### *Las Cruces, New Mexico*

Perhaps the most prominent case brought forward by those in opposition of city/utility separation through municipalization is Las Cruces, New Mexico. Discussions of municipalization officially began to take place around 1990 under the governance of Mayor Ruben Smith and the Las Cruces city council (Kratzer, 2001; *City of Las Cruces*, 1994b). Prior to the point of this municipality attempt, the energy needs of more than 30,000 residents of the "City of the Crosses" were met by the investor-owned utility, El Paso Electric (EPE) (City of Las Cruces, 1994b). In 1988, the city had hired an Albuquerque firm to conduct a feasibility study to determine methods for energy related rate reduction. A triggering moment for this interest in alternate power systems research was when EPE anticipated an increase in total energy demand and employed precautionary actions to avoid potential disproportionate quantities of supply and demand of energy. As a result of this premonition, the utility financially supported the development of the Palo Verde Nuclear Generation Station throughout the late 1970s and 80s (Kratzer, 2001). Expected economic burdens of the anticipated project lead to the increase in monetary strain on the individual customer through increased electric rates.

The new economic burden incurred by the energy consumer was, ultimately, unsubstantiated by the realized supply/demand curve. Not only was the projected increase in energy demand above that of the realized demand, but the uranium industry collapsed and the projected profits

from Palo Verde Nuclear Generation Station were not realized (Daniel & Gegax, 2000). The EPE filed for Chapter 11 bankruptcy in 1992 after failed attempts to repay its creditors for the investment in the nuclear generation station (*Company News*, 1992). Prior to finalizing the bankruptcy process, EPE had failed in an attempt to increase electricity rates further in order to cover some of its debt. A municipal utility ordinance was pursued by the City of Las Cruces around the same time as this bankruptcy procedure.

The expiration date for the twenty-five year franchise agreement (1993) was a point of discussion between the city and the utility during this time. In 1993, the city permitted an extension of the franchise agreement that was to last for one year while negotiations continued to take place. While this negotiation extension took place, the utility was no longer obligated to make franchise payments to the city.

In 1994, consultants for the city only intended to purchase EPE's distribution system and estimated the cost to be approximately 30 million dollars. This was the original cost of the system after depreciation. They also projected consumer savings to be about 29 percent over a duration of fourteen years after the division from EPE. During this time, EPE attempted to use its bankruptcy to instill an automatic stay that would disallow the taking of any of its assets (Electricity Daily, 1994; Schweitzer, 1995). This effort was rejected and put to rest by a federal bankruptcy court judge in 1995.

After the initial negotiations had taken place and the primary stages of municipalization were conducted, further progression was contingent upon the results of the democratic process in 1994. Support for the development of a separate municipal utility exceeded opposition by 4,513 votes (9,672 votes in favor of municipalization and 5,159 against) (*Appendix C*, 2015).

Earlier that year, EPE signed a merger agreement with another IOU from Dallas, Texas called Central and Southwest Corporation (CSW). The City of Las Cruces issued the Requests for Proposals (RFPs) that attempted to find a supplier for wholesale electricity. Another intention of the RFPs was to find an energy company that could operate and provide maintenance for the electric distribution system upon the anticipated establishment of the municipalization (City of Las Cruces, 1994b; Schweitzer, 1995 Daniel & Gegax, 2000). Southwestern Public Service Company (SPS) was selected to assume these roles.

As shown above, the vote turned in favor of the acquirement attempt despite the 1.4 million dollar campaign instigated by CSW in opposition. Subsequent condemnation proceedings of the distribution system had faced adamant resistance and legal contestation from EPE for four years. Their opposition was partially motivated by the fact that the merger between EPE and CSW was substantially threatened if the utility lost Las Cruces as a consumer base (Schweitzer, 1995 Daniel & Gegax, 2000). The continuation of the merger was contingent upon keeping this consumer base.

1n 1995, two firms were selected by the city of Las Cruces to conduct appraisals on the distribution system. However, there was disagreement over what part of the distribution system the EPE should be compensated for providing. The city only wanted the distribution network to acquire the energy from its new system. The city approximated the cost to be 27 million dollars. However, EPE insisted upon the purchase of all facilities, which would have included the generation and the transmission systems as well. The Utility approximated this to be 170 million dollars. This disagreement of infrastructure procurement contributed to the length of the process.

In 1996, the city filed a petition for a declaratory order with the Federal Energy Regulatory Commission (FERC) to determine the estimation of stranded cost (amount of money that a utility has invested during the provision of service to the given customer base) owed to EPE after the completion of the municipalization process (Daniel and Gegax, 2000).

Before the stranded cost results were completed, condemnation proceedings of the distribution system were completely approved by the State in 1998. By this time, the State Legislature had already permitted the sale of no more than 90 million dollars' worth of tax-exempt bonds to fund the purchase of the distribution infrastructure that was under EPE's ownership (Kratzer, 2001; Summer, 2000; Stutzman, 2015). In an effort to purchase the EPE's distribution system, the city issued and sold 72.5 million dollars' worth of their bonds to help insure procurement. Subsequently, Las Cruces reserved 3.3 million dollars to develop an electric substation to provide energy for two industrial customers (and to show that they were serious about the effort) (*Appendix C*, 2015).

In 1999, FERC released its final order of estimated stranded cost obligation and concluded the final total to be 52.9 million dollars (Appendix C, 2015 Kratzer, 2001; Summer, 2000; Stutzman, 2015). Because of Order 888, the city was responsible for paying the total stranded cost to the utility (Daniel and Gegax, 2000). Legal disagreements over infrastructure purchase were not taken into consideration when the city developed their initial take over price of 30 million dollars. However, after the city of Las Cruces had readjusted their budget for procurement, the stranded cost was introduced. The actual municipalization estimation was slightly over 110 million dollars (*Appendix* C, 2015).

In January of 2000, the city council voted to discontinue the process and engage in an agreement with EPE that assured that the city would not attempt municipalization efforts for at least seven years. The negotiation process concluded with EPE providing Las Cruces with 21 million dollars to partially account for fees that the city had accrued throughout the legal process (*Appendix C*, 2015, Daniel and Gegax, 2000). The city was permitted to repurchase 10 million dollars in revenue bonds and the 3.3 million dollar electric system replacement was adopted into the reassured investor owned utility structure (*Appendix C*, 2015). In 1998, EPE rates reduced by 8 percent, though the EPE claimed that the reduction was irrelevant to the municipalization attempt.

While the whole municipalization effort required a substantial monetary commitment, the failure to include the stranded costs overwhelmed the city's allotted and re-allotted expenses and was the driving factor for the decision to retract the ten-year-long effort. Additional unexpected expenses included the issuance of bonds and the premature construction of the EPE distribution system before the completion of condemnation processes. In addition to the procedural expenses, the city of Las Cruces experienced adamant legal and publically expressed pushback from the EPE. "We had a winning hand, but we ran out of money" exclaimed Las Cruces City Manager, Jim Ericson (Kratzer, 2001).

The decision to discontinue the efforts was further strengthened by the fact that in 1999, three of the adamant supporters of Mayor Ruben Smith's municipalization attempt were voted out of the city council, and the new office did not see the value in municipalizing. While there were unconsidered costs to the effort, it is important to note that the variation within the political system can quickly alter preferential action.

Impact of Las Cruces Municipalization Failure on the City of Boulder

A former mayor of Las Cruces, Bill Mattiace was openly opposed to the municipalization process when he spoke to the City of Boulder and the Camera's editorial board about their intended efforts. However, information revealed that Xcel funded his trip when he traveled to Boulder to discuss downfalls associated with the municipalization process (*A Local Electric Utility,* 2015). During the same year, Xcel was lobbying in opposition of two measures that could progress Boulder's municipality efforts. Despite lobbying attempts, these efforts were fruitless and the measures passed in the city of Boulder. Mayor Mattiace made a second trip to Boulder to further implore the abandonment of the process which produced the same result.

While the city of Las Cruces did not anticipate the estimated stranded costs owed to the utility, the city of Boulder and Xcel have been in discussions about their varying estimated price of reimbursement for the utility. The stranded costs of acquisition have been estimated to range between 150 million dollars to 405 million dollars for the city of Boulder. The full consideration of potential costs has yet to be determined.

*Hermiston, Oregon*

After the initial incorporation of public and privately owned utilities across the Pacific Northwest after 1880, the city of Hermiston, Oregon developed its own electric utility in 1910 (*Appendix C*, 2015, *Hermiston, Oregon* 2001). The city council and the Hermiston Light and Power Company set a ten-year franchise agreement with the city, receiving a 2 percent return from the utility (*Hermiston, Oregon,* 2001). At this time, the fee per kilowatt-hour was

approximately 15 cents (normalized to present-day dollars). The necessary infrastructure was fully installed by late March of 1911. After the retirement of the franchise agreement, Pacific Power and Light (PacifiCorp) purchased Hermiston Light and Power Company and became the incumbent utility. PacifiCorp was created in 1920 and had gained successful momentum through gradually purchasing electric utilities along the Pacific Northwest (*Appendix C*, 2015).

In an effort to municipalize for a population of approximately 15,000, the city of Hermiston, Oregon began the process against its incumbent utility, Pacific Power and Light (PacifiCorp) in 1997 (*Appendix C*, 2015, Johnson, 2006). This was initiated by PacifiCorp's intention to close the local customer service building. This decision increased the population's discontent with the quality of service provided. A discrepancy developed between the quality of energy supply and the demanded cost.

The city turned to Umatilla Electric Cooperative (UEC), the utility for areas surrounding Hermiston, and placed a request for PacifiCorp to sell its distribution facilities within the borders of the city. In negotiations, PacifiCorp informed the city that electric facility purchase would be possible if the city and the utility were unable to settle in the negotiation process under their current provision agreement.

Years of negotiations took place, during which PacifiCorp implored that the issues be taken to the voters twice. Because of settlement disagreements regarding energy provision, the city began condemnation proceedings. Condemnation processes for local PacifiCorp-owned distribution infrastructure met with legal opposition from the utility. The incumbent utility contested the authority of the city to condemn within the city limits and contested its ability to condemn infrastructure on some property outside of Hermiston's city limits (*Appendix C*, 2015;

*Power Supply*, 2015). PacifiCorp also filed a complaint at the Oregon Public Utilities Commission against the UEC utility on the grounds that UEC had prematurely interfered with the territory rights of the PacifiCorp utility.

After all of the additional negotiations and legal proceedings, the court ruled in favor of the city, and the distribution system was sold to Hermiston for 8 million dollars. This value was significantly above the originally appraised book value of 2 million dollars. (*Appendix C*, 2015; *Going Local*, 2014) In October of 2001, Hermiston developed their own locally owned municipal electric utility called Hermiston Energy Services (HES). Under the new energy distribution system, HES is responsible for serving customers within a 4,900-meter distance. HES sells consumers energy purchased from the Bonneville Power Administration (BPA) in the wholesale market. HES also contracted out the facility operation, meter monitoring, customer billing, maintenance, customer service, and general operational duties to Umatilla Electric Cooperative (UEC) (Johnson, 2015; *Hermiston, Oregon*, 2001).

The task of supervision over the fulfillment of quality performance and monitoring rate recovery of these outsourced duties has been granted to the Electric Utility Superintendent under the City Manager (*Appendix C*, 2015). HES reduced the rates for energy customers, both residential and commercial, once the municipalization process was finalized. The acquisition costs were accessed through low-interest capital. The new monetary rates under the management of the municipality have remained below those of PacifiCorp since its initial development. The city has successfully provided energy for its entire population under the new system.

*Berthoud, Colorado*

In an effort to take advantage of the approaching expiration of the city's franchise agreement with its utility, Xcel, Berthoud, Colorado underwent municipalization efforts in 2001 for its population of approximately 5,000 (*American Public Power Association*, 2015). The city's research and feasibility analyses have favored municipalization and supported the attempt to subsequently form an electricity generating agreement with the Platte River Power Authority, the wholesale provider for the neighboring systems of Estes Park, Loveland, Longmont, and Fort Collins since 1973 (*American Public Power Association*, 2015; Regelson, 2006). Attempts to municipalize were informed through comparisons with other local systems. Underlying financial drivers played a significant role in the city's disassociation attempt from its incumbent utility.

If the newfound affiliation was realized between the City and Platte River Power Authority, the new utility would manage the associated infrastructure for the city after initial facility acquisition. This process would involve the discontinuance of one contract and the development of another under an altered system. Xcel simultaneously responded to this attempt through the intentional instilment of public misinterpretation and confusion surrounding the municipalization process and the resulting repercussions (Regelson, 2006). Xcel's reactionary campaign included advertisements in the newspapers and consumer interference through continual contact efforts with recurring phone calls to citizens of the city (Regelson, 2006).

At the time of acquisition attempts, the city council simultaneously experienced local water utility concern regarding qualitative issues with the available water supply. Due to its rural locality, the city was experiencing contamination from agricultural processes from surrounding projects. The water quality was approaching unacceptable levels permitted by the

Environmental Protection Agency (Regelson, 2006). The decline in water quality necessitated water utility negotiations with the Northern Colorado Water Conservancy District. This simultaneous negotiation process may have acted as an impeding factor in the pursuance of electric municipalization.

Additional issues arose that distracted the city council and the voters at the time of municipalization efforts. Concerns about population growth were becoming a point of contention among residents in the town. Many were opposed to measures that could increase the growth of the city because they valued the town's small quality and imbedded character. At the same time, many residents advocated for the growth of the city because they favored broader economic opportunity. When discussions were opened regarding the continuance or the removal of the no-growth policies, polarization continued, and tensions rose. These political disagreements acted as distractions, and they also distorted the lens from which the citizens viewed the intent of municipalization.

The combination of water utility structure alteration and constituency disagreement over policies created an environment in which Xcel could dominate and thrive. Intervention in the public's view of municipalization was likely a contributing factor in the democratic rejection of the electric municipalization process (20% for, 80% opposed) (Regelson, 2006;).

Xcel spent approximately $250,000 to counter the municipalization effort. The utility instilled negative connotations to the act of municipalizing away from the control of the Investor Owned Utility. This expenditure was internally justified through the predicted growth of the area and the potential future losses in benefit that could accrue (*Coloradopublicpowe*r, 2015). The utility faced a decrease in profit from the potential loss of this consumer base. By silencing

municipalization efforts, the utility was able to maintain control of the location. The success of Berthoud in their attempt could have sparked the municipalization movement of more areas and the potential loss in Xcel's profit could have grown.

*Case Study Summation*

The first figure that I provide in this paper is a chart that attempts to condense some of the relevant information provided in the analyses above. The initiation years of these studies are spread out fairly evenly. This is consistent with the relatively steady increase in municipalization. There are prominent variations in the number of consumers and the duration of municipalization attempts present between Las Cruces, Hermiston, and Berthoud. This is intended to show that municipalization is present in various scales.

Reasons for the pursuit of municipalization have varied between cases. The overarching reasoning behind each effort has been condensed and provided in the figure below. Additionally, I have listed whether or not the city has pursued condemnation proceedings. This attempts to provide some information regarding the status of each case within the process. The utilities before and after the attempt are provided as well. Because Hermison, Oregon is the only successful case in my municipalization analysis, a condensed version of the new utility structure is listed.

Some information on Berthoud, Colorado's municipalization effort could not be found. For instance, the amount of money that Berthoud Spent on the municipalization process was not available. However, it is known that the incumbent utility, Xcel, spent $250,000 in opposition attempts. Also, the exact duration of the Berthoud effort could not be found. Considering

factors like the influx of additional political issues occurring in the city at the time and the reduced amount of media coverage on the effort, it can be deduced that the duration of the attempt was not significant.

Despite the differences in status, each case study experienced lower energy rates for consumers after their municipalization effort was completed. This is discussed in further detail in the *Municipalization Discussion* section. Please see this section for additional deductions regarding these cases.

| | Initiation Year | End Year | Population Size | Reason for Municipalization | Condemnation Proceedings | Utility Before Effort | Utility After Effort |
|---|---|---|---|---|---|---|---|
| Las Cruces | 1990 | 2000 | 30,000 | Increased Rates/Utility Bankruptcy | Yes | El Paso Electric | El Paso Electric |
| Hermiston | 1997 | 2001 | 15,000 | Disagreement and increased rates | Yes | Pacific Power and Light | BPA and UEC * |
| Berthoud | 2001 | N.A. | 5,000 | Desire for Reduced Rates | No | Xcel | Xcel |

| | Municipality | Point of Progress | Total Costs | New Rates |
|---|---|---|---|---|
| Las Cruces | None | Discontinued | $111 million | Lower |
| Hermiston | (HES)** | Purchased Distribution System | $8 million | Lower |
| Berthoud | None | Discontinued | N.A. | Lower |



* = Bonneville Power Administration
** = Umatilla Electric Cooperative

*Figure 1*: *Case Study Synopsis.*
This table shows some of the relevant characteristics that have been present and prominent within the three municipalization efforts studied.

Now that I have analyzed specific municipalization case studies, I will expand my focus and take a closer look at broader factors within the municipalization process. First, I will broaden the scope to include utilities on a non-case-specific basis.

*Electric Utility Power Structure and Related Statistics*

Within the United States, local and state governments own approximately 2,000 utilities, with varied municipalization statuses, in 1995. There were approximately 250 investor owned utilities (IOU) like the ones involved in the case study municipalizations. However, there is an inverse relationship present between the quantity of categorized utilities and their relevant control of the power sector (as seen in Figure 2 and 3). The municipal utilities and those under the state had accounted for 14.3% of the total sales to energy customers while the IOUs were responsible for providing 76.4% of the sales (Hadley & Hill, 1995; Schweitzer, 1995). While the exact values were from 1995, the American Public Power Association 2015-2016 Annual Directory and Statistical Report values do not vary notably from these data. Figure 2 and 3 show a visual representation of the monopolistic trend occurring in the power sector.

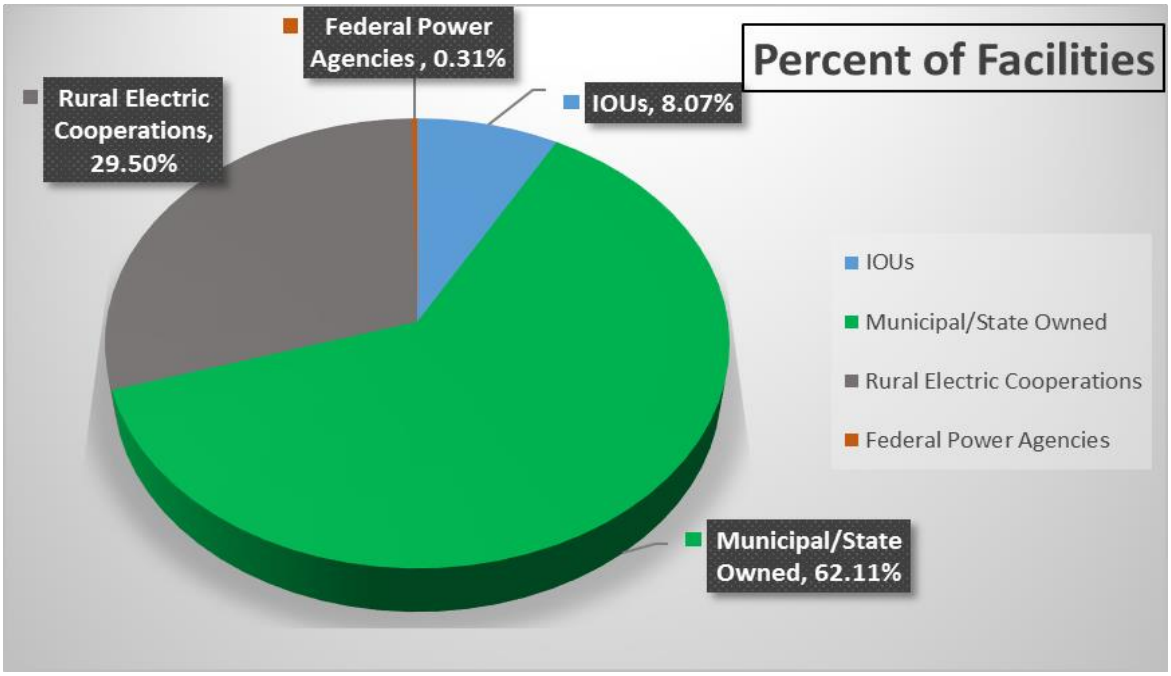


*Figure 2*: Percent of Facilities.
This graph shows the relevant amount of facilities that were present in the U.S. during 1995. According to APPA, the values have not changed a notable amount between then and 2015. Data for This graph originated in Hadley & Hill's 1995 paper as well as Schweitzer's 1995 study.

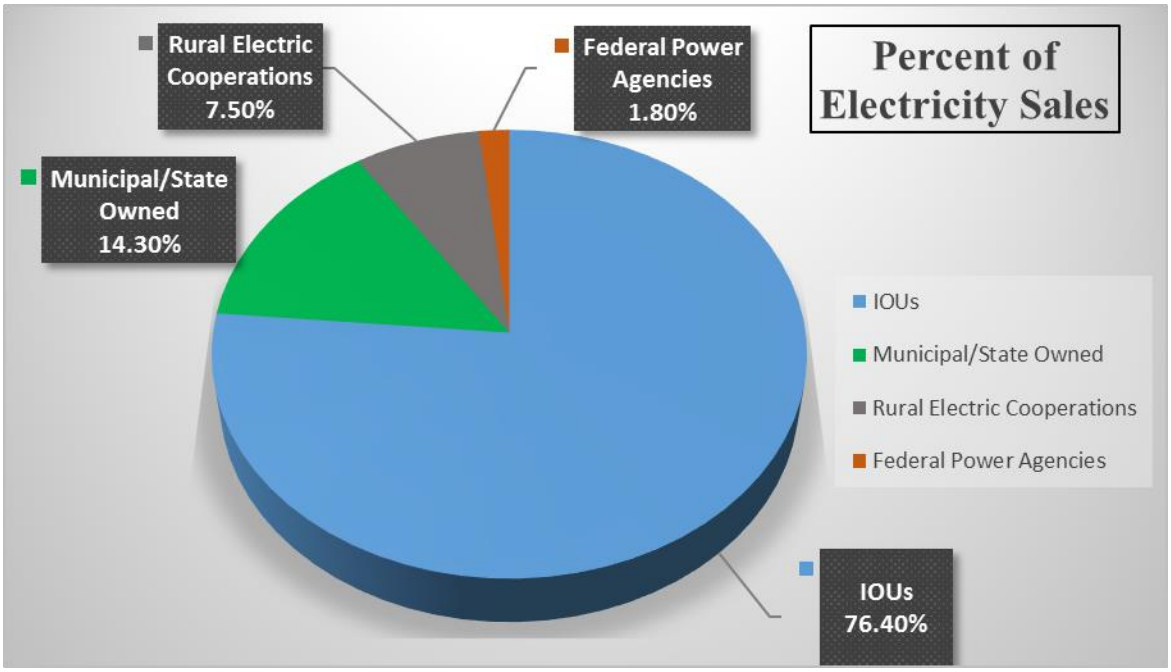


*Figure 3*: *Percent of Electricity Sales*
This graph shows the relevant control over electricity sales to consumers in 1995. According to APPA, these values have not changed a notable amount between then and 2015. Data for This graph originated in Hadley & Hill's 1995 paper as well as Schweitzer's 1995 study.

Despite the domination of IOUs within the current power generation sector, municipalization has become increasingly attempted. This has been significantly attributed to economic considerations. For instance, unlike IOUs, municipal utilities are not required to pay federal income tax, they are permitted to issue tax-exempt municipal bonds, and they can access lower cost federal power (Hill, 1988; Schweitzer, 1995). This is economically preferable for the interests of the individual electricity consumers because the absence of these additional costs allows decreased prices without sacrificing production value.

Municipal utilities are, however, restricted by a federal law enacted in 1987 that placed limitations on tax-exempt municipal bonds for the purchase or acquisition of private assets (Kemezis, 1994). Municipal bonds were discussed in the case study of the city of Las Cruces, New Mexico during its financial miscalculation.

Figure 4 shows my perception of the municipalization process and some of the factors that either help or hinder this process. I have also provided some recommendations for future consideration. To facilitate a better understanding of the graphic, I have provided the related discussion directly below Figure 4.

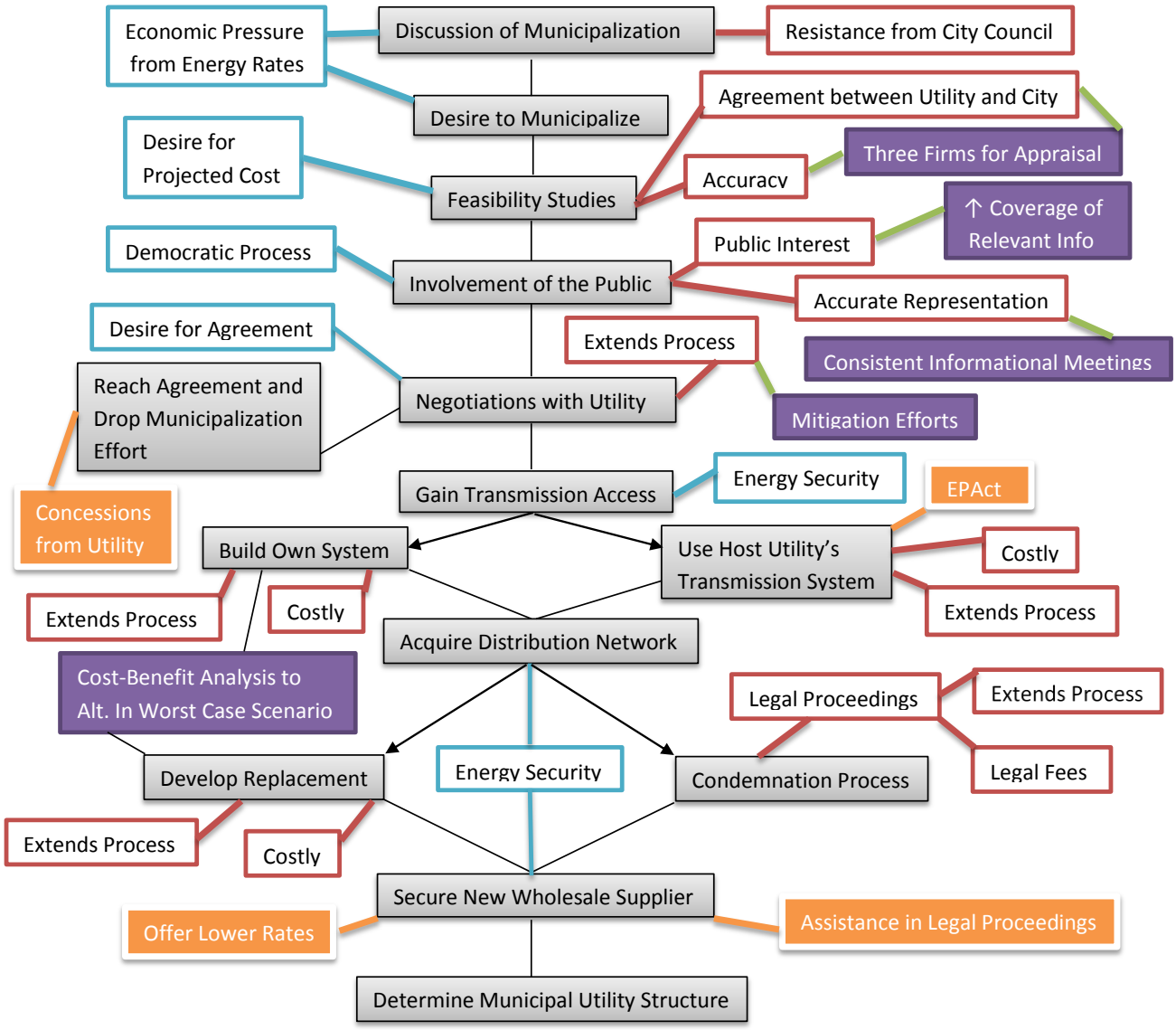


*Figure 4*: *Municipalization Process, Hindrances, Boosts, and Recommendations* : Discussion of this table takes place on Page

Key

Steps in Process — This box type shows the relevant steps within the municipalization process. They are listed in the order preferential to the study.

Helpful to Process — This box type shows the forces or entities that have helped implement or contribute to this step.

Hindrances/Difficulties — This box type shows the issues associated with this step.

Recommendations — This box type shows the relevant recommendations set forth in study.

Reason for Step — This box type shows the reasons for the listed step.

* = both helpful and hindrance

## MUNICIPALIZATION DISCUSSION

In this section, I will begin by discussing my perception of the municipalization process as depicted directly above in Figure 4. I will then discuss the factors that lead to the formation of my perception. I will discuss the trends that I have identified between the three case studies of Las Cruces, Hermiston, and Berthoud. Then, I will discuss the role that the utility plays within the trends. After that, I will discuss some of the contributions that the state and the federal government make to the process. To conclude my municipalization discussion section, I will discuss some of my thoughts regarding the study conducted by the Oak Ridge National Laboratory.

### *Procedure for Municipalization*

This section discusses in greater detail what has been visually represented in figure 4.

#### *Discussion of Municipalization*

The first step that I identify in this study is the initial discussion of the municipalization effort. This step is often motivated by high energy rates imposed by the host utility. This has been present in all three case studies. The economic driver of municipalizing can be introduced through an abrupt financial alterations in the system (ex. Las Cruces), through alterations in source quality that promote the gradual discontent and disagreement with the incorporated utility (ex. Hermiston), or through a relative comparison of rates to neighboring consumers (ex. Berthoud) Another relevant reasoning behind this initiation stage is the concern of energy reliability as observed in the Hermiston case.

A relevant hindrance to this step of the discussion of municipalization is the rejection of the process from members of the city council or the members of a decision-making committee. The Las Cruces case acts as an example of the variability associated within the political structure at a local level as well as a national level. Once the mayor and the subsequent anti-EPE/municipalization supporters left positions of power, the credibility of the process followed suit. While national efforts of environmentally related policy show more variability in progressive courses of action, local entities can maintain a similar construct of temporal variability in decision-making processes. The local scale, however, requires a force of less magnitude in order to convince a reluctant group to take a course of action. For instance, financial concern may become strong enough to initiate municipalization within a reluctant environment. The city of Boulder experienced this initial reluctance as well. However, their inability to compromise with Xcel on source reliability was the relevant force that persuaded municipalization action. The important consideration in this step is the force that drives a locality to municipalize.

*Desire to Municipalize*

Once the force (financial incentives, stability incentives, source mixture incentives, etc…) has convinced the city council or decision-making committee to pursue a municipalization effort, the city has to develop a plan for implementing this course of action. The agreement to municipalize entails careful consideration. Realization of the costs associated with each step must be considered before affirming the city's involvement in this process.

*Feasibility Studies*

Feasibility studies are conducted to determine the potential costs associated with the municipalization process. This stage includes making the municipalization effort known to the host utility. Relevant hindrances associated with this step include the potential issues regarding accuracy and reaching an agreement between the city and utility. Significant issues associated with preparedness arise at this stage of the process. Initial feasibility studies may not be completed to an extent that can adequately prepare a city to confidently undergo this procedure. For example, inaccurate cost calculation is prominently shown through Las Cruces' initial employment of a single Albuquerque firm to conduct the first feasibility study. While subsequent feasibility studies were conducted the city and utility (EPE), they took place years after the initial municipalization discussions and realistic approximations were still not conducted. Las Cruces had failed to incorporate the stranded costs owed to the utility as determined by FERC. A lack of recognition of this federal cost earlier in this process was, ultimately, a determining factor in the effort's failure and the extent of the newly formed economic burdens. Incorporation of scale and careful cost analysis should be implemented in this step to reduce the likelihood of unanticipated issues. Unsatisfactory attention to this step can counteract the original force of economic motivation that had initiated the consideration of municipalizing in the first place. Attention to and incorporation of scale is relevant in approaching potential solutions to these issues. The first sections of the ***Background*** show the overarching significance of national level regulatory action, despite its variance with the socio-political contexts of the time.

In an attempt to reduce the number of contentious proceedings, to increase accuracy, and to incorporate scale, I recommend that the initial feasibility study contain at least three sets of firms

to conduct the initial appraisals. The city attempting the municipalization would chose a firm or group of firms to develop a feasibility study in which they would make educated predictions of costs and incorporated factors. The second firm or group of firms would be employed by the host utility to incorporate their voice into the initial stages of the effort. Finally, a separate federally assigned firm or group of firms would also conduct feasibility studies. This decision would be made by a branch within FERC or a related entity. Once these ranges are collected and combined, a more realistic view of the municipalization study will result. While all of the factors cannot be determined to a completely accurate extent, this will potentially avoid further instances of misrepresentation of relevant categories. Decisions regarding the employment of firms for these feasibility studies may be further informed by the new wholesale supplier (if the city has agreed upon one) or companies with which the utility has signed a merger agreement (if applicable). The state may also maintain suggestions for feasibility companies.

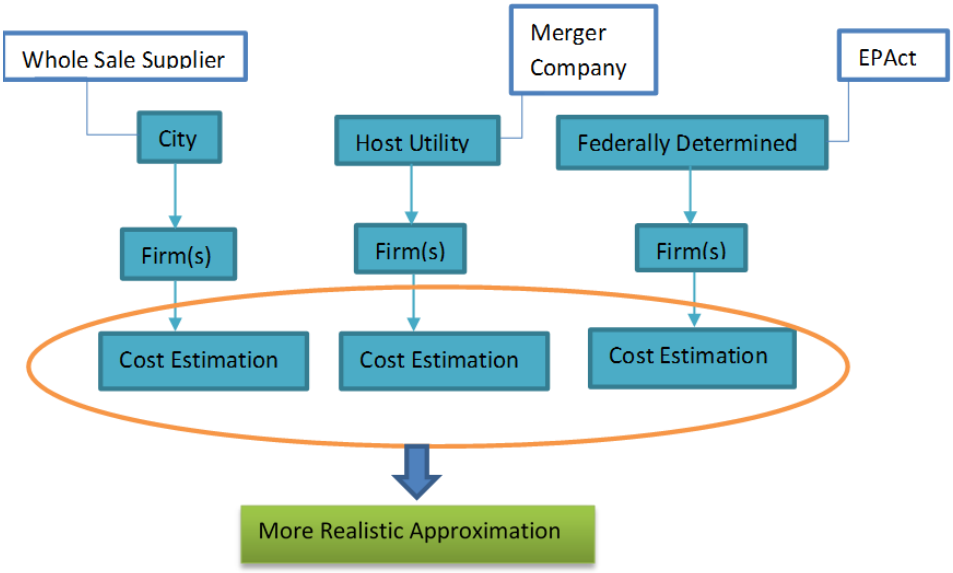


*Figure 5*: *Three Appraisal Recommendation*: This acts as a visual representation of the Three Appraisal Recommendation put forth in this paper. The Dark Squares show the procedure of separate feasibility studies. The Light boxes indicate one of the potential influencers in each decision-making sector.

*Involvement of the Public*

The next recognized step incorporates public involvement into the process. While the population plays a democratic role in pushing the process along, they often do not maintain a conspicuous presence throughout the duration of the issue's procedure. While there are invested citizens, many remain oblivious to the important municipalization effort and how these issues stand to affect their community and their households as local consumers. The significant hindrances faced in this step are the challenges of maintaining public interest on the issue and its details. Another hindrance within this step relates to the provision of an accurate representation of the issues at hand. For instance, Berthoud, Colorado was faced with distortional efforts set forth by the host utility (Xcel) in an effort to decrease public support for municipalization and, consequentially, decrease accurate representation of the city's efforts. In one of his works, Chaim, Perelman discussed how an individual is more willing to accept an argument's conclusion as the quantity of exposure to this argument and entity increase (1969). He considers this relative favoritism to be "presence." In the Berthoud case, Xcel put effort into making the argument against municipalization present for as many citizens as possible.

In an effort to minimize the negative effects discussed in this section, I recommend that cities considering municipalization provide increased coverage of information that is likely to be relevant to consumers. While it may be unreasonable to suggest that a public interest can be significantly bolstered through the provision of information on a complex issue, the increase in availability of relevant information may help create an invested community throughout the entire municipalization process, or at least through more of it. This can be done through commercials, news broadcasts, pamphlets, community webpages, etc. Additionally, I recommend that consistent informational meetings be held for the community to provide a more balanced

depiction of the municipalization issue. While informational meetings may not initially reach an excessively wide audience, the increase in available information may broaden these audiences, and the word of mouth may create a notable impact on the attentiveness to this issue.

As discussed in the background section, citizens were able to illicit change on a national level through altering their perceptions of the environment and turning these perceptual developments into action through voting. Their reconstruction of environmental perception provided opportunities for politicians to gain favor with the masses and increased environmental policy discussion. This is possible on a local scale with the population's informed consensus on municipalization.

*Negotiations with Utility*

While negotiations are often longer processes that maintain high attention to detail, additional measures can be taken to continue to facilitate the discussions between the utility and the city. Negotiation processes often extend the municipalization procedure in order to allow further discussion that may or may not produce a beneficial result. However, efforts that are more similar to mitigation have not been exceedingly popular in these proceedings. The introduction of alternative settlement methods can extend to efforts of mediation and arbitration. While the result may rely on a higher level of concessions by both parties, alternative resolution strategies may decrease required time and money that could be otherwise invested in the system. This would likely include third party involvement. The detailed recommendation of what third party entity would provide this service is case specific. However, I recommend an increased consideration of mitigation proceedings in further interactions between city and utility.

*Gain Transmission Access and Acquire Distribution Network*

The transmission system and distribution system acquisition both involve the decision between using the utility's structure through procedural means and the development of new systems from scratch. Both acquirement and development would require significant financial contributions as well as temporal ones. In the acquirement processes, legal proceedings increase due to attempted transmission system access or condemnation proceedings. System replacement also contains costly and temporally extensive repercussions due to startup costs and building time. The planning process emphasized within the feasibility study section maintains its importance in system acquisition decisions as well.

A cost-benefit analysis must be thoroughly considered when deciding the course of action. Attention to this detail in the planning stage may avoid unnecessary losses from the city to the utility. Furthermore, an ill-planned step in the preparation process can result in the abandonment of the procedure, the utility agreeing to only partial legal fee coverage, and the utility's adoption of the newly developed system, as seen in Las Cruces.

*Secure New Wholesale Supplier*

Despite the fact that the procurement of an alternate supply of energy occurs at varying times (often towards the beginning as seen in the case studies), it is listed as one of the last steps in Figure 4. It is constructed this way to show the potential benefits associated with securing an alternate energy arrangement. However, there is no guarantee that searches for reduced-cost energy producers will be fruitful. While wholesale energy suppliers are within an increasingly

competitive system, risks associated with straying from the current system may be great and rates with the new supplier may increase over the years. However, the securement of the alternative energy provider can act as a benefit in the municipalization process. While this alternative is often helpful within the process, it is important to note that over-attachment to a new system may create more significant hardships and negativity if the municipalization process is abandoned. Additionally, without the proper planning stage, securement of alternative energy generation sources may be fruitless and temporally wasteful.

*Determine Municipal Utility Structure*

This stage is similar to that of the wholesale supplier securement because overzealousness can increase tensions, and improper planning of the municipalization process itself can render this post municipalization planning useless.

Now that I have discussed my perception of the municipalization procedure, I will discuss the case study trends and additional factors that affect municipalization.

## ***Comparing Municipalization Case Studies***

Despite the circumstantial variations between the three case studies, Las Cruces, Hermiston, and Berthoud, commonalities within the municipalization process can be identified. The most apparent similarity among these individual processes was the establishment and solidification of the desire to municipalize. While this decision may not have been considered an ideal solution during the negotiation processes with their utility, because of increasing energy demand and the

financial costs associated with litigation, it was nevertheless agreed upon within the city council. The pursuit of this procedural decision was made after discrepancies arose between desired concessions of the city representatives and the actual concessions that the utilities were willing to afford them. These discrepancies were discussed in extended detail in negotiation processes with the initial attempt to reach an agreement.

The decision to municipalize was temporally correlated with the expiration of the franchise agreement between the host utility and the city. The initiation of municipalization discussions were often recorded during these times of presented opportunity. The municipalization effort would be comparatively less costly and less legally challenging in times of transition than under binding and restrictive agreements. One of the points often discussed in the negotiation process are requests for ballot initiative content which broaden the involvement of the public and assisted in the solidification of the attempt.

Before the voting process takes place, feasibility studies are conducted. They take place in the beginning of the municipalization effort and after the failure of settlement with the host utility in negotiation processes. One of the vital categories in the feasibility study is the estimation of the financial burden that the effort will likely create and the development of a plan to acquire the funding to cover the estimated cost. While there have been contention associated with the acquirement of the transmission system, condemnation proceedings for the procurement of the distribution system within the city limits have been a significant point of contention between the cities and utilities discussed in this study.

The projected financial costs attributed to the post-municipalization responsibilities (providing funding for an accessible electricity distribution system, finding wholesale suppliers

that better accommodate the city's expectations for electricity sources, etc.) were estimated in each study with varying degrees of accuracy and consideration. Consideration of the post-municipalization management has been explicitly expressed by all of the studies in their incorporation of the preferred energy provider(s) within the wholesale market and the provider that would ideally manage the city's energy system.

### ***The Role of the Host Utility in Procedural Difficulty***

An overarching theme surrounding all of the municipalization studies has been the presence of financial incentives to varying degrees. Within the construct of this study from a utility prospective, the point in the municipalization attempt that determined relative success was financial costs considerations in distribution system and transmission system acquisition. Miscalculations of stranded cost and utility pushback can result in abandonment of the project, as seen in two of the three case studies provided above (Las Cruses and Berthoud). Even in successful endeavors, the abundance of incorporated costs necessary in procedural completion can create substantial financial burdens for the city.

While the inclusion of the associated costs are vital to the success of the attempt, the prioritization of the costs should be considered prior to acting upon the municipalization effort. The Las Cruces case acts as a representation of the potential hindrances associated with incomplete feasibility studies and expenditure planning. The premature purchase of post-municipalization infrastructure contributed to the financial struggle associated with the effort. While preparations are important and inherently pragmatic, an accurate account of procedural costs must be fully attempted prior to the commitment of funds associated with its completion.

The degree of unpreparedness and the necessity for adequate consideration in expense calculations gains high levels of importance as a city's most prominent and direct force of opposition, the host utility, reacts to the projected loss in sale derived revenue. These prominent utilities establish roadblocks such as the refusal to comply with distribution network acquisition attempts. If successful condemnations by the city follow suit, these utilities will seek an inordinate amount of compensation for their established facilities. Additional reimbursement attempts by the established utility include stranded cost collection for transmission systems. All of the financial burdens that these utilities place on the city occur after a long process of negotiations to establish a compromised alternative to the municipalization process. If these negotiations are not successful, additional steps take place to address the public with self-supporting propaganda prior to the voting process. Additional pushback efforts are introduced during regulatory and judicial proceedings. These efforts take a considerable amount of time and money from the parties involved.

The necessity for pushback from the utility in the Oak Ridge National Laboratory case studies becomes more evident in areas with larger industrial customers. While the prospect of losing business with individual consumers is negatively viewed by the utility, industrial consumers make up a large portion of the business that may be lost upon successful municipalization efforts by the city. Additionally, these industrial consumers maintain a relatively high amount of local governmental influence and play an active role in the decision to municipalize. This shows the importance of considering the relative weight of the utility's projected losses prior to engaging in legal proceedings with them.

***State Control***

Figures 2 and 3 show that the State can maintain a level of control over certain facilities represented in electricity production. It has been expressed that the state can also provide direct influence on the process through the issuance of bonds that can be used in acquisition attempts (as discussed in the Las Cruces study), the approval or denial of acquisitions, the approval of mergers (as seen in Las Cruces), the determination of the value of condemned acquisitions, the establishment of municipalization requirements, determining related boundaries, and overseeing contracts between producer and consumer. One way that the City of Boulder interacts with the state is through the Colorado Public Utility Commission.

Colorado Public Utility Commission

The Colorado Public Utilities Commission (PUC) was developed with the Public Utilities Law in 1913. Its creation developed the "Public Utility" which includes "every common carrier, pipe line corporation, gas corporation, electrical corporation, telephone corporation, telegraph corporation, water corporation, person, or municipality operating for the purpose of supplying the public for domestic mechanical, or public uses, and every corporation, or person now or hereafter declared by law to be affected with a public interest" (*Coloradopublicpower*, 2015) Because of the explicit wording in the text of the Public Utilities Law, there are often points of controversy over the authority that the PUC has over municipalities. One of the responsibilities that the public utility maintains is the decision of whether a public utility should continue service (*Coloradopublicpower*, 2015).

***Federal Scale***

One of the ways FERC has exercised its authority of interference has been to provide support for "wholesale wheeling" by permitting the distribution of electricity between a wholesale producer and consumer on another company's infrastructure. FERC does this through the authority it gained through the EPAct and Order 888. The stranded costs play a significant role in the monetary requirements of the city as it is supposed to represent the appropriate amount of reimbursement that the utility deserves for the transmission system acquisition upon the separation between consumer base and incumbent utility. Therefore, the decision of FERC can have a significant effect on the transmission rates incurred by the city (and potentially, the consumers). This stranded cost issue has been involved in all of the municipalization studies listed above. Stranded costs are also incorporated in the distribution system cost. These costs were present in each case in negotiated prices for the distribution system acquisition. FERC's role as the "primary forum for public utilities to seek recovery" adds to the difficulties that the cities face (FERC, 1995). However, the intention of this step is to assure an equitable solution. FERC also contributes to the process through the reinforcement of electricity transmission contracts.

***Oak Ridge Study Optimism on Municipalization***

The Oak Ridge Laboratory Report preceded this study. It maintained a consistent level of optimism in its municipalization analyses. The optimistic nature of the Oak Ridge Laboratory report may have been due to the selection of cases discussed within their study. For instance in the case of Washington, Utah, a contractual obligation to eventually relinquish local distribution

systems to a municipality was already acknowledged from the beginning of the provider-customer relationship. Additionally, the dominating utility (UP&L) had previously allowed the use of its power lines to different providers, establishing precedent for the process when the city created a municipality. In this case, the host utility only lost 1,500 of its half-million energy consumers.

Another case study analyzed in the Oak Ridge Laboratory study was Brook Park, Ohio which housed one of the top five customers (Ford Motors) of the host utility, the Cleveland Electric Illuminating company (CEI). This was a driving factor in the concessions that the utility made in reducing the price of a consumer electricity bill by more than 20% in exchange for securing a determined number of years of maintaining the city as a customer base (Schweitzer, 1995; The Plain Dealer, 1993). Upon settling with the utility, the city was completely reimbursed for the municipalization costs and secured a free feasibility study for potential efforts after the agreed time period ended.

Oak Ridge's study of Las Cruces, New Mexico took place prior to the decision to discontinue the process due to substantial cost requirements and the political shift in positions of power. While the utility did reduce rates, they were not substantial in comparison to the entirety of the economic burden placed on the city after the municipalization effort. The optimism conveyed in the Oak Ridge Laboratory study was unfortunately, unsubstantiated due to the final results of the process.

Finally, the last study analyzed by the Oak Ridge Laboratory, Madison, Maine, had already born the cost of municipalization and was undergoing a switch of energy providers. While the new municipality (Northeast Utilities) provided lower energy rates for the consumers, the

remaining consumers received lower rates from the original utility (Central Maine Power Company) because in the absence of a consumer base, it has made an effort to keep the remaining consumers. While this municipalization effort did produce some benefit, it subsequently benefited those who did not switch users and it dissuaded many neighboring towns from considering municipalization due to the increased precautions developed by the utility and the perceived disproportionate benefit.

The decision of one established municipality decreased the likelihood of other municipalization efforts. Neighboring areas to successful municipalizations are also hindered in their own municipalization attempts because once the utility loses a consumer base, future efforts become more difficult to succeed in. However, lower rates are often acquired.

## ***RENEWABLE ENERGY ANALYSIS***

In order to provide additional information and recommendations to the city of Boulder, I will analyze and discuss renewable energy considerations. I will do this by providing a similar case study analysis structure in order to discuss the varying contextualization of renewable energy increases. I have chosen these three cases for further analysis because they have all been mentioned in sources that were discussing the benefits of renewable energy and they have been mentioned in sources that discuss Boulder's efforts. Additional discussion will be provided in the *Renewable Energy Discussion* section.

*Greensburg, Kansas*

On May 4th, 2007, national disaster swept over Greensburg, Kansas in the form of a tornado approximately three kilometers in width. The resultant examination of the site suggested that there had been damage to approximately 95% of the city's buildings (Heeter & Ksenia, 2015). In order to sustain the population of 1,574, the city decided to take advantage of the inevitable reconstruction of the area by using renewable technology and methods to increase building efficiency while reducing long term costs that may otherwise be incurred further along in the process. It is the first area within the United States to actively become "completely green" or renewable energy dependent (Heeter & Ksenia, 2015, Hettipola, 2015). The median income of the area had been approximately $28,500 and the community was tasked with the architectural construction that would ensure the same quality of life as the people had previously enjoyed (Hettipola, 2015). An efficient combination of sources within the construct of sustainable development was vital to the successful rehabilitation of the area in accordance with the town's goals and in consideration of the severe damage to the previous systems of energy development. The process required the engagement in discussions with the Green Building Council, the inclusion of citizens, the discussion of and the solidification of the Federal Emergency Management Agency (FEMA) plan, and the development of a community reconstruction plan which was initiated by the Kansas City professional architects (*Renewables First*, 2015).

The Department of Energy granted 2.15 million dollars through the National Renewable Energy Laboratory (NREL) for the development of technical equipment and the consultation regarding proper developmental methods as they relate to the geographical context (*Renewables*

*First*, 2015). While the process inevitably includes retrofitting and reformation, its primary emphasis was communal construction after unexpected destruction.

The available natural sources for the community are wind energy, solar energy, biofuels and biomass that could result from future agricultural projects, and methane from landfills. These available sources have become means to the end renewable energy goal of 100% (Light, 2015). Architectural aspects such as geothermal temperature regulation systems have been incorporated. Wind turbines have been installed to act as the primary source of energy and because of favorable geographical location, wind energy can also generate revenue through excess. Residents from other communities have adopted various architectural tips from Greensburg that they can utilize in the development of their own sustainable structures. Without the natural disaster, the residents would not have voluntarily supported renewables so adamantly. There was not a prominent renewable energy demand from the population prior to this natural disaster.

*Aspen, Colorado*

City officials of Aspen, Colorado have expressed their interest in the development of a completely renewable conglomeration of energy sources. Prior to this decision to completely incorporate renewable energy to the structure, Aspen was dedicated to approximately 75-80% renewable energy standards (Hettipola, 2015). This decision was coupled with an agreement to negotiate with and, ultimately, sign a contract with Municipal Energy Agency of Nebraska (a wholesale energy provider). The pursuit of the previously established "Canary Initiative" (2005) emphasizes the importance of efficient and comparatively less environmentally degrading strategies in areas that are more likely to experience noticeable effects of climate change (Heeter, 2015).

Additional goals have accumulated within the structure of the city. An intention to reduce greenhouse gas emissions 30% below levels experienced in 2004 by the year 2020, and an additional 50% decrease by 2050 (80%) has resulted from the inherent knowledge that comparatively extreme effects might be experienced in mountain towns if continued inefficiency is present within the energy sector (*Going Local*, 2015). Operational emissions have decreased by 42% in February and 7% total emission decline was present in the city in July (*Clean Energy Local Control*, 2015).

Their primary sources of energy are hydroelectricity, wind energy, solar energy, and methane emissions from landfill continuation. The city intends to launch a public platform for the pursuit of 100% renewable localities.

*Georgetown, Texas*

Georgetown, Texas has agreed to the instillation of a 100% renewable goal to provide electricity for the 50,000 citizens that reside there (*Georgetown, Energy*, 2015). The exclusive driving goal of this decision was the realization of a competitive rate of energy production while simultaneously decreasing potential monetary risk for consumers.

Texas follows a deregulated structure where energy consumers are afforded the right to decide their provider and their plan (*Georgetown, Energy* 2015). Texas is effectively the only place within the United States that has a fully competitive and organized wholesale electricity market. Houston provides a significant array of plans (approximately 70) that constitute different combinations of renewable energy. The dominant utility of Georgetown, Texas determined that the production of renewable energy was comparatively less expensive than that

of non-renewable energy. The city decided to associate itself with SunEdison, a solar energy company (*Georgetown, Energy,* 2015). The estimated point of wind and solar domination is January of 2017.

In 2014, the city agreed to the implementation of a 20-year agreement with EDF for the production of wind power from Amarillo (*Georgetown, Energy,* 2015). The combination of wind and solar in the local energy system domination accounts for the lapses in temporal productivity. The adoption of these sources does not represent the sociological ideologies of the city. A considerable amount of pride in this city is ascertained through the maintenance of historic consistency (*Georgetown, Energy,* 2015). While the city does contain a comparatively liberal university, more than ¼ of the population is past their middle age in life and the trends deducted from polls within the city suggest that these individuals often prefer the economic benefits associated with a fixed rate plan than the fluctuating prices associated with non-renewable energy rates (Hettipola, 2015).

The Georgetown citizens continue to benefit from the dominance of renewable energy within the area because these sources, generally, do not require the mass consumption of water to the same degree that non-renewable energy sources do. This is particularly important to these consumers because of the degree to which they are affected by drought in this area. Despite the general reluctance of notable people in the area to support the theory that climate change is partially attributed to anthropomorphic factors, Texas allowed the expenditure of $7 billion dollars to contribute to the Competitive Renewable Energy Zone (infrastructure project to connect Texas wind supply to urban demand) (*Georgetown, Energy,* 2015). Despite progress in renewables, Texas legislature stated that the reliability of renewable energy was questionable and hindrances to continued progress may be enacted.

## RENEWABLE ENERGY DISCUSSION

The case studies discussed above have been mentioned by varying sources as notable locations for renewable energy increase. They all maintain different justifications for their increases. It is important to discuss the forces that have contributed to the success of the renewable energy structure.

Greensburg, Kansas set its renewable goals following a natural disaster that required the redevelopment of its energy related infrastructure. Due to the unfortunate event, their redevelopment process was facilitated by separate organizations that financially contribute in times of tragedy as well as organizations that helped generate an entirely new construct of the residential, business, and industrial systems within the limits of the area. While replication of architectural design strategies may be feasible on a smaller scale, the replication of the set renewable energy goal would be comparatively unrealistic. Because of the necessity of reconstruction of infrastructure, I will call this strategy of renewable energy increase the *Constructionist Strategy*. Using the constructionist strategy, alterations to the energy sector would require large scale energy source reformatting. This strategy, within alternate contexts would require a considerable amount of time, money, pushback from the dominating nonrenewable energy system, and property right advocates. It may create public wariness of the scale, aesthetics, or cost of the required points of construction. Without diffusing cost of the process to separate entities, the consumer would likely face an increase in energy rates or tax rates to facilitate the procedural costs.

Aspen, Colorado has also maintained a degree of relative urgency in its establishment of renewable energy goals. As a mountain town, the citizens of Aspen face more extreme weather

variations under normal living conditions. This geographical vulnerability to climatic repercussions of continued non-renewable energy dependence has increased Aspen's support of increased renewable energy dependency. Potential realized consequences of unsustainable energy reliance do not correlate with the continued quality of life to which many Aspen residents have become accustomed. Additionally, the area's relatively small population size, high citizen salary rate, and comparatively low opposition costs have facilitated the raises in renewable energy goals. Without similar economic advantages and a geographical sense of urgency, it would be difficult to maintain this renewable energy increase goal within a short term process in other locations. Because of these specific considerations, I will categorize this strategy as both a *Geographic Vulnerability Response Strategy* and a *Strategy Assisted through Homogenized Economic Affluence.*

Georgetown, Texas has increased renewable energy goals through an interest in economic pragmatism. This incentivized structure is not realistically replicated without large scale alterations to the energy system. As discussed in the background section, national action often requires time and favorable socio-political context to facilitate progressive change. Without a similar overarching regulatory structure, replicating this specific renewable energy increase method would be an unattainable goal. Because of Georgetown's underlying financial focus in this process, I will categorize this case as an *Economic Pragmatism Strategy.* Georgetown officials have made modeled their decision for renewable energy increase after market considerations and monetary benefit accumulation. The energy structure is significantly different than the Western Interconnection which maintains little organization and has the least amount of market competitiveness of the three U.S. interconnection regions.

***The City of Boulder***

An effort of renewable energy increase in the city of Boulder has arisen within a different context than those previously mentioned. While the case studies have each approached renewable energy increase through a practical lens, the City of Boulder has approached similar goals through a moral lens. The other locations were afforded opportunistic structures such as the ability of complete redesign, relatively homogenized economic affluence, the response to geographic incentives, small populations, and a favorable overarching governmental regulatory system. Boulder, on the other hand, faces additional and significant municipalization costs prior to renewable energy implementation.

While many city officials are confident in their post-municipalization visualization of renewable energy increase, considerations about municipalization costs must be made in relation to renewable energy costs. The accurate representation of municipalization may deter the city from prematurely resigning from the related effort. This is because the monetary requirements would be presented more realistically and decisions can be made through an informed lense. However, if the costs affect citizens negatively through city imposed efforts to retain funds, they may be less supportive of subsequent costs. Their sense of moral obligation may be slightly deterred after the economic burdens are imposed by the method required for the attainment of renewable energy. While the attainment of a wholesale consumer is expected to be economically preferable, this is not always the case in the long term.

While the median household income of Boulder is approximately $57,112 and median family income is approximately $113,681, this does not depict the variations within the city's socio-

economic standing. Rejections of costly post-municipalization efforts may increase in certain sections of the population.

Additionally, access to renewable energy on such a large scale must be carefully considered and planned. One of the projected strategies of securing enough solar energy in Boulder is rooftop solar paneling. This has already received a degree of opposition from various companies and groups that are concerned about the aesthetics, the reflections, the heat accumulation, property rights, and other issues.

Because renewable energy increase is the motivation behind the city's municipalization process, both renewable energy increase and municipalization must be considered for an accurate depiction of the effort. However, accuracy toward the beginning of the entire process must be considered the primary concern. Additionally, renewable energy increase must continue to explore realistic combinations of energy sources that can predictably provide adequate energy for the growing population. It must also address renewable energy increase realistically and consider the alternate factors that may be involved in the cases they use to support their effort.

Officials and citizens within Boulder must educate themselves about the differences between their effort for renewable energy increase and the related efforts before them. Attempting to justify efforts and proposed strategies through referencing the success of other case studies will not be successful unless differences are presented. For example, when Boulder praises Germany for its renewable energy dependence and attempts to follow in its path, it must consider the systematic differences between a Country's energy policy and structure and those of a city in a different Country. Additionally, when Boulder looks toward previous cases of renewable energy increase, like Greensburg, Aspen, or Georgetown, it is important to note and categorize the

contextual differences. The acknowledgement of various points of comparison can subsequently increase realistic views and approaches.

I recommend that the public and city officials seriously consider the complexity of each "role model" case that has come before it. The group of cases that I have analyzed show how different opportunities can present themselves. The opportunities afforded to the successful cases must be considered when attempting to follow in their footsteps. This sense of realism is increasingly important considering the fact that Boulder must undergo the difficult process of municipalization in order to increase renewable energy reliance. The motivation behind Boulder's attempt is not one that has come from points of opportunity. Unlike the cases listed above, a significant reason behind Boulder's pursuance of renewable energy increase is morally based. The concern for sustainability is significant within Boulder. However, this goal attainment is not simple and the opportunities and benefits that were associated with the previously stated cases are not prominent in the City of Boulder. While Boulder's goals may be attainable, realistic approaches and individual case considerations must be considered.

## CONCLUSION

Adamant attention to detail, cooperation of the procedural effort, and realistic considerations of potentially limiting effects may prolong an already arduous process. But, it will lessen the likelihood of encountering the associated hindrances at their worst. Because the process of municipalizing threatens a utility's profit margin to a certain degree, pushback is to be expected and can be prepared for. Hindrance reduction can be attained through:

- The implementation of Three Firms for Appraisal

- Increased Coverage of relevant information pertaining to consumers
- Consistent informational meetings within the local community
- Alternate Resolution Efforts in interactions
- Cost-benefit analyses to determine the proper course of acquisition.

While unexpected costs are always likely to arise (such as Berthoud's mandatory water prioritization), a more concrete account of costs can be attainable. Citizens can maintain a role within politics and inspire the next Theodore Roosevelt to act as a representative of concerned municipalization supporters for renewables. Preferential exclamations of municipalization and renewable energy increase can make a difference just as environmental protection was supported by the public after World War II. The next Rachel Carson can reveal the truths of nonrenewable energy reliance, and the monopolistic utilities that support them.

Environmentally related regulations have been evolving in the United States since 1650. We can be on the cusp of a new section within our nation's history. Municipalization for renewable energy increase can be realized on a broader scale. But, preparedness is a key aspect of realizing this potential. While Boulder has been doing fairly well in its effort, it is important to call attention to how vital preparedness is and the potential repercussions of inadequate procedural calculation and action. While complete accuracy may not be possible, diligent cost configuration on a broader scale can reduce the risk of unfounded optimism that results from uncalculated and hidden costs. Reducing risk enhances the opportunities for the makings of history.

If the process is closely analyzed and cooperation maintains a higher degree of importance in the negotiation process, compromises are more likely to be achieved. The remaining environmental goals of the city may be realized elsewhere. For instance, the process of

weatherizing homes could prove to be more environmentally beneficial in the short term, by reducing energy demand, than continuing in the municipalization effort for renewable energy increase. Discussions about the practicality of renewable energy increase may initiate further discussions about the cost differences involved with the different geospatial capabilities for renewable energy infrastructure. If the city considers these factors and decides to continue in its effort to achieve its environmentally conscious goals by municipalization, it must consistently analyze the associated costs and benefits. A cost-benefit analysis could help to identify the point at which the costs begin to outweigh the benefits. At which time a change in approach may be warranted.

In the 1870s, the state of Colorado established general municipal enabling statutes (Schryver, 2014). This had originally provided state permissions for water distribution service municipalities in the state. In 1887, municipal gas utility services were specifically addressed in the statutes. In 1893, they were amended again in order to allow municipal electric service. During the same year, the state had approximately 412,198 citizens within 107 towns and cities. The law required the municipalization rates to be set at reasonable values that could provide for the operation and the maintenance of the systems that were to be used for the production of the purchased energy (Schryver, 2014; Kelly 1997). Municipalization can maintain a larger role in history if the procedure is demonstrated with a significant amount of planning and consideration. Municipalization can gain a role in environmental history if these procedures are carefully implemented and role models are analyzed through a critical lens of contextual comparison. Attention to detail and careful planning can create history.

***BIBLIOGRAPHY:***


“American Public Power Association - Municipalization " American Public Power Association Municipalization American Public Power Association Web 15 Oct 2015

"American Public Power Association - State Local Elections On Public Power Issues Produce
Mixed Results " Http //www publicpower org/ American Public Power Association - State Local Elections On Public Power Issues Produce Mixed Results 7 Nov 2002 Web 15 Oct 2015

A local electric utility Municipalization 22 Sept 2015 Retrieved from < https //bouldercolorado>
gov/energy-future/local-electric-utility

American Public Power Association 2015 U S Electric Utility Industry Statistics Data file Retrieved from <http //www publicpower org/files/PDFs/USElectricUtilityIndustryStatistics pdf>

“Appendix C Municipalization Efforts” Colorado Bar Association Colorado Bar Association Web 2015

Berthoud City Council Archive Board Meeting Minutes 2000-2005

Bhave Mahesh "Microgrids Create Municipalization Benefits "Http //www renewableenergyworld com/ Renewable Energy World 2 June 2014 Web 15 Oct 2015

Blanche Theodore "FERC NOPRA App D RECOVERY OF STRANDED COSTS BY PUBLIC UTILITIES AND TRANSMITTING UTILITIES - LIST OF COMMENTERS " FERC NOPRA App D RECOVERY OF STRANDED COSTS BY PUBLIC UTILITIES AND TRANSMITTING UTILITIES - LIST OF COMMENTERS Web 15 Oct 2015

Bluvas, K. (2007). DISTRIBUTED GENERATION: A STEP FORWARD IN UNITED STATES
ENERGY POLICY.

Boulder’s long-term energy strategy renewable energy credits and the Xcel franchise Retrieved from <https //www-static bouldercolorado gov/docs/Renewable_Energy_Credits-1-201306171515 pdf>

BROWNING KATHRYN "Electric Municipalization in the City of Boulder Successful Greening or Path to Bankruptcy "Http //scholarship claremont edu/ CLAREMONT McKENNA COLLEGE Web 17 Apr 2013

Causation in Environmental Law 2015 June 9 Retrieved November 3 2015

Cengage Learning Evolution of global electricity markets 1st Edition Retieved from http //www cengage com/search/productOverview October 17 2015

"Clean Energy Local Control " Empower Our Future Home Comments Empower Our Future Web 15 Oct 2015

"Coloradopublicpower " Coloradopublicpower Colorado Association of Municipal Utilities 2015 Web 15 Oct 2015

Colorado Archives, Historical & Genealogical Societies. (n.d.). Retrieved November 4, 2015.

City files petition to acquire Xcel energy property to create a local electric utility Retrieved from https //bouldercolorado gov/pages/july-17-2014-city-files-petition-to-acquire-xcel-energy-property-to-create-a-local-electric-utility

City of Las Cruces 1994b Watts Up 17 How will Southwestern Public Service Company Deliver

Electricity to the City of Las Cruces Las Cruces New Mexico Condemning 2011 In Merriam-Webster com Retrieved from <http //www merriam-webster com/dictionary/condemning> Conservation and preservation 2015 Retrieved from <http //tdl org/txlor-dspace/bitstream/handle/2249 3/246/09_cnservtn_prsrvtn htm sequence=5>

Conservation vs preservation and the national park service 2015 Retrieved from <http //www nps gov/klgo/learn/education/classrooms/conservation-vs-preservation htm>

“Company News; El Paso Electric Seeks Chapter 11 Protection” 1992. The New York Times. Retrieved from <http://www.nytimes.com/1992/01/09/business/company-news-el-paso-electric-seeks-chapter-11-protection.html>

Corbett M 2013 November 22 Oil shock of 1973-1974 Retrieved from http //www federalreservehistory org/Events/DetailView/36

Coyle Eugene and Richard Simmons "Understanding the Global Energy Crisis " Understanding the Global Energy Crisis Purdue University Purdue E-Pubs 15 Mar 2014 Web 26 Sept 2015

Daniel David and Gegax Douglas "A Cautionary Tale on Municipalization " Forum for Applied Research and Public Policy 15 2 2000 pp 49-53

Dart Tom "Texas City Opts for 100% Renewable Energy – to save Cash Not the Planet " Http //www theguardian com/ The Guardian 29 Mar 2015 Web 15 Oct 2015

Davis Elaine "Policy Notes " Paying For Power The Challenge of Municipalization Washington Policy Center 7 Jan 1997 Web 15 Oct 2015

Due Process of Law (n.d.) West's Encyclopedia of American Law edition 2 2008 Retrieved from <http //legal-dictionary thefreedictionary com/Due+Process+of+Law>
Dunlap R & Mertig A Eds 1992 American Environmentalism Retrieved November 3 2015

Electricity Market Reform 2000 Retreived from http //www eia gov/forecasts/aeo/pdf/nerc_map pdf

Electricity primer- the basics of power and competitive markets 2015 Retrieved from <https //www epsa org/industry/primer/ fa=wholesaleMarket>

Energy Transition – the german energiewwende, 2015. Retrieved from <http://energytransition.de/>

Evolution of global electricity markets new paradigms new challenges new approaches Retrieved from http //www wadsworthmedia com/marketing/sample_chapters/2015/9780123979063_Samples pdf in 2015

Federal Energy Regulatory Commission 1995 Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Services by Public Utilities Docket No RM95-8-000 and Recovery of Stranded Costs by Public Utilities and Transmitting Utilities Docket No RM94-7-001 Notice of Proposed Rulemaking and Supplemental Notice of Proposed Rulemaking Washington D C March 29

Fenn Paul Samuel Golding Robert Freehling Local Power Inc 2013 San Luis Obispo Renewable Energy Secure Community California Energy Commission Publication number CEC-500-2014-004

FERC Electric power markets – southwest Retrieved from http //www ferc gov/market-oversight/mkt-electric/southwest asp

"FERC About FERC - What FERC Does " FERC About FERC - What FERC Does The Federal Energy Regulatory Commission 24 June 2014 Web 15 Oct 2015

Franchise - Dictionary Definition n d Retrieved November 3 2015 from <http //www vocabulary com/dictionary/franchise>

Frenzen P, 2015 October 30 Gifford Pinchot National Forest - News & Events Retrieved November 3 2015 from Gifford Pinchot National Forest - News & Events

Gallucci M, 2015 June 19 Obama Administration Fuel Efficiency Standards EPA Truck Rules Will Boost US Clean Transportation Industry Retrieved November 3 2015

Georgetown Energy, 2015. Retrieved from < http://www.georgetownenergy.com/>

"Going Local How Municipalization EmPOWERs Communities - Public Power Chat " Public Power Chat American Public Power Association 24 July 2014 Web 15 Oct 2015

Hadley Stanton W and Edward L Hillsman 1995 Electric Retail Market Options Draft ORNL/CON-418 Oak Ridge National Laboratory Oak Ridge Tennessee May 28

Heeter Jenny Kathy Belyeu and Ksenia Kuskova Burns "Status and Trends in the U S Voluntary Green Power Market "Http //www nrel gov/ National Renewable Energy Laboratory 1 Nov 2014 Web 15 Oct 2015

Hettipola Sharmen "U S Cities Commit to 100 Percent Renewable Energy " U S Cities Commit to 100 Percent Renewable Energy Environmental and Energy Study Institute 29 May 2015 Web 15 Oct 2015

Hill Lawrence J 1988 Public Power in the US Electric Utility Industry Regulatory Issues and

Comparative Financial Indicators Across Ownership Vpes ORNL/TM-10497 Oak Ridge National Laboratory Oak Ridge Tennessee January

Hirst Eric "Policy Choices for Electric-utility Stranded Cost "Http //www elcon org/ Consulting in Electric-Industry Restructuring 1 July 1998 Web 15 Oct 2015

"IN4C " IN4C Innovation Network for Communities 2007 Web 15 Oct 2015

Johnson, R. (2006, July 1). Municipal Electric Utilities - Analysis and Case Studies. Retrieved November 2, 2015.

Kovarik 2015 Environmental history timeline Retrieved November 3 2015 from <http //www environmentalhistory org>

Kratzer D 2001 Las Cruces' plan for electric utility set off 15-year battle Wichita Business Journal Retrieved from

Kubasek N & Silverman G 2000 The Legislature as a Source of Statutory Law Retrieved November 3 2015

Lachenmaye Bob Richard Rosenblum Ben York Ron Binz Kyle Datta and Hunter Lovins

"Electric Utilities The Future Is Not What It Used to Be " Http //mauienergyconference com/ Electric Utilities Maui Conference 1 Mar 2014 Web 15 Oct 2015

Light John "12 Cities Leading the Way in Sustainability "Http //billmoyers com/ MOYERS & COMPANY 4 Jan 2013 Web 15 Oct 2015

"LOCALLY OWNED UTILITY FACT SHEET " Http //www cobar org/ Web 15 Oct 2015

McEwan, W., & Nadel, P. (1996). Regulation of Energy by the Colorado Public Utilities Commission. Retrieved October 8, 2015, from Journal of the National Association of Administrative Law Judiciary

Mellino Cole "Third U S City Goes 100% Renewable " EcoWatch Ecowatch 3 Sept 2015 Web 15 Oct 2015

Morris C Pehnt M 2012 Energy transition E-Reader Version Retrieved from <http //energytransition de/wp-content/themes/boell/pdf/en/German-Energy-Transition_en pdf>

Muir J 1901 Our Forests and National Parks by John Muir 1901 Retrieved November 3 2015 NEWS AND INFORMATION Shofar 13 1 Special Issue Perspectives on Zionism 1994 219-36 Retrieved from https //static bouldercolorado gov/docs/2014 08 19_Boulders_Energy_Future_Transition_Work_Plan_IP_Final-1-201408141043 pdf

Oil Embargo 1973–1974 - 1969–1976 - Milestones - Office of the Historian 2013 Retrieved November 3 2015 from U S Department Of State

Oregon, H. (2001). LOCALLY OWNED UTILITY FACT SHEET. Retrieved November 2, 2015.

Owens, D. (2013, July 1). Changing Circumstances, Common Challenges. Retrieved October 28, 2015

Partnership with Xcel energy Retrieved from https //bouldercolorado gov/energy-future/partnership-with-xcel-energy

"Power Supply | City of Hermiston " Power Supply | City of Hermiston Hermiston Web 15 Oct 2015

Perelman Chaim and L Olbrechts-Tyteca The New Rhetoric A Treatise on Argumentation (n.d) retrieved 2015

John Wilkinson and Purcell Weaver South Bend IN U of Notre Dame P 1969 Progressive era to new era 1900-1929 Retrieved from <http //www loc gov/teachers/classroommaterials/presentationsandactivities/presentations/timeline/progress/conserve/>

Rachel Carson Biography n d Retrieved November 3 2015 from <http //www biography com> "Renewable Energy " Renewable Energy United States Environmental Protection Agency Web 15 Oct 2015

Richardson Alan H 1993 Public Power and the Energy Policy Act of 1992 Public Power Vol 51 No 1 pp 25-31 January-February

"Renewables First " Http //www ucsusa org/ Union of Concerned Scientist Web 15 Oct 2015

Schryver Ursula "Going Local How Municipalization EmPOWERs Communities - Public Power Chat " Http //blog publicpower org Public Power Chat 24 July 2014 Web 15 Oct 2015 Schweitzer M 1995 Municipal electric utilities Establishment and transformation ORN/CON-416 ON DE95015661 Tennessee Oak Ridge National Laboratory

Snider Laura "Boulder Municipalization Fact-checking A Look at Colorado's Municipal Utilities " DailyCamera com Boulder Daily Camera 15 Oct 2011 Web 15 Oct 2015

"Solar Planning & Zoning Data Search " Solar Search Results American Planning Association Web 15 Oct 2015

"Southwest Power Pool " Southwest Power Pool IRC/RTOCouncil Web 15 Oct 2015 Stutzman Erika "The Problem with Las Cruces " - Boulder Daily Camera Dailycamera 24 Aug 2014 Web 15 Oct 2015

Summer Daniel "A Cautionary Tale on Municipalization "Http //forum ra utk edu Ra utk edu 1 Aug 2000 Web 15 Oct 2015

"Transition Energy " Transition from Non-Renewable Energy to Sustainable Energy Altenergy org Web 15 Oct 2015

Tanaka Nobuo "Cities Towns & Renewable EneRgy "Http //www iea org/ International Energy Agency 2009 Web 15 Oct 2015

Tansey Ben "American Public Power Association - Municipalization Article The New Californians " Http //www publicpower org/ American Public Power Association 30 July 2007 Web 15 Oct 2015

The Bush Administration's Dirty Legacy n d Retrieved November 3 2015 from 2015 Natural Resources Defense Council

The Electricity Daily September 14 1994

The Electricity Daily September 21 1994

The Plain Dealer Cleveland Ohio April 30 1993

Tort n d Retrieved November 3 2015 from Cornell University Law School Tort ” Legal Information Institute n d 3 Sep 2014 <http //www law cornell edu/wex/tort>
United States Department of Energy Glossary Retrieved from <http //www eia gov/tools/glossary/index cfm id=E>

UTILITIES, PUBLIC UTILITIES COMMISSION. (2015). Retrieved November 2, 2015, from COLORADO STATUTES ARCHIVE DIRECTORY

Wallace F 1984 September 1 A HISTORY OF THE DEVELOPMENT OF THE METROPOLITAN DISTRICT COMMISSION WATER SUPPLY SYSTEM Retrieved November 3 2015

What is public power 2015 Retrieved from <http //www whypublicpower org/WhatIsPublicPower/DefinitionHistory aspx>