ENERGY SUSTAINABILITY IN TEXAS

CORPORATE SOCIAL RESPONSIBILITY AND GREEN PRACTICES

A Dissertation

by

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ABSTRACT

Research shows that greenhouse gases warm the planet by trapping infrared radiation with fossil fuel production being a major source of greenhouse gas production. If the atmospheric concentrations of carbon dioxide (CO_2) and other greenhouse gases continue to rise, the planet's current life support systems will be degraded. There is a need for more efficient and climate friendly sources of energy by adopting environmentally friendly practices (green practices).

This research evaluates the extent to which municipal utility organizations in Texas adopt corporate social responsibility and green practices. The study examines the reasons why some municipal utility organizations adopt corporate social responsibility and green practices while others do not. The research also looks at the impediments to adopting these practices.

In the first step of analysis, the research empirically validates cities' behaviors with regard to adoption of corporate social responsibility and green practices. Practices such as reduction in waste, reduction in emission, usage of renewable sources of energy, usage of recycling, being efficient and being socially responsible corporations are examined.

Green practices adopted by municipalities are analyzed in detail. Results show that the non-profit nature of municipalities is not an impediment to adoption of green practices. There is also evidence that styles of management did play a role in the intensity of green practices adopted. Finally, the research analysis sheds light on the organizational behavior that facilitates or impedes adoption of green practices. Results indicate that there are several green practices adopted by cities which can impact climate change management. The research also shows variation in the degree of adoption of these practices across cities.

This is a pilot study which represents a stepping stone for similar studies in the future. The study concludes with an exploration of the policy implications of such behavior and practices and the overall contribution to the sustainability debate. This

work explores what kind of policies might be useful for rural communities regarding adoption of renewable energy.

DEDICATION

To my late parents

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1. INTRODUCTION

1.1 The Statement of the Problem

The current situation with fossil based fuels and nuclear power has posed a great challenge to humanity because the production at oil fields globally is declining at about 4–6% a year. It is believed that oil's tipping point has already passed. It is also believed that the economic pain of decline in supply will trump the environment as a reason to curb the use of fossil fuels (Murray & King, 2012).

There is a need to look for alternative sources of energy with less waste matters. The main three alternative sources of energy are the sun, water, and wind energy, together known as green, renewable, clean, and endless sources of energy. There are calls for change in behavior so that more efficient and climate friendly sources of energy are used. As a result, new concepts such as corporate social responsibility, green practices, alternative fuels, and renewable energy are being sought to remedy the problem of greenhouse gas emissions, which leads to warming of the earth climate.

The renewable energy sector is being shaped by many forces such as economics, energy security issues, climate change, fossil fuel depletion, new technologies, and environmentally conscious consumers. The future of renewable energy depends, to a great extent, upon how powerful these forces are and which combination of forces prevails (Sadorsky, 2011). There are, however, several problems associated with renewable energy. First reliability issue is a factor to take into consideration. For example, night-down times, in the case of solar energy, and lack of wind, in the case of wind generated energy. Secondly, the technology associated with renewable energy is still in its infancy and very expensive. Thirdly, even though biofuels, for example, have been hailed as key to reducing dependence on fossil-fuel, yet their environmental and social impacts remain uncertain (Robbins, 2011).

Currently, renewable energy's contribution to the overall consumption of energy is low and will require serious measures to be taken by businesses and governments to make alternative source of energy more attractive as well as cost effective. According to Sadorsky (2011), renewable energy is expected to be the fastest growing component of global energy demand over the next several decades. The International Energy Agency (IEA) expects global demand for renewable energy to grow at a compound average annual growth rate of 7.3% between 2007 and 2030 (Sadorsky, 2011).

All countries are faced with the challenge of securing reliable sources of energy to fuel their needs. Eemerging economies such as Brazil, India, and China are competing over resources that are limited in nature, hence adding tremendous pressure to the performances of the world economy. The current production of fossil fuel is unsustainable and will not meet the increase in consumption presented by new emerging economies. Conventional crude-oil production has not increased to match increasing demand (Murray & King, 2012).

As such, a complex task lies ahead for policy makers. Energy producers, on the other hand are not only under pressure to meet the increase in demand for energy but they are also required to behave in an environmentally responsible manner by adopting climate-friendly practices which will positively contribute to solving the climate change problem. The challenge is that nobody has come up with a set of policies that can make renewable energy sources a viable near-term substitute for fossil fuels (Robbins, 2011).

Corporations are also coming under growing pressure from internal and external stakeholders to consider the environmental and social impacts of their operations. In response to this pressure, many corporations have taken steps to implement a variety of sustainability initiatives (Searcy et al., 2012). Many corporations have vested interest in viewing themselves, and would like to be viewed by the public, as socially responsible entities that care about the wellbeing of the environment and the communities in which they are operating. They portray themselves as pioneers and adopters of new technological advancements and concepts that they have put in place to provide good products and services and, at the same time, to actualize their goals.

Details on the initiatives taken by corporations are increasingly reported publicly and shared in corporate reports. Stakeholders, however, often struggle to make sense of the information reported to reflect corporations' sustainability performance, ratings, and awards. Global sustainability indices linked to financial markets, including the Dow Jones Sustainability Index (DJSI), the Financial Times Stock Exchange (FTSE4) Good Index, and the Morgan Stanley Capital International-Environmental, Social, and Governance index (MSCI-ESG) (formerly known as the KLD and Domini 400 Social Index) are being used for reporting purposes. However, in spite of the growing body of literature which focuses on sustainability indices, relatively, little is known about how they are used in practice (Searcy et al., 2012).

1.2 Research Objectives and Significance

The general aim of the project is to determine the extent to which municipalities operating in Texas adopt corporate social responsibility and green practices. The project also aims at finding out if there are systematic differences between these municipalities in the way they adopt corporate social responsibility and green practices in their processes of energy production, transmission, and distribution, and if such practices have environmental and climatic implications.

The term corporation, generally, refers to entities which have profit making as their primary goal. However, the field of corporate sustainability and corporate social responsibility looks at all types of organizations, both public and private, and it, therefore, defines corporations within both contexts of for-profit as well as non-for-profit. For the sake of this study, corporate sustainability and corporate social responsibility are defined within the context of municipalities as non-for-profit public utility organizations. This study also looked at sustainability within the limited framework of green practices adopted by municipal utility organizations; therefore, sustainability is narrowly defined to suit this framework.

Corporate social responsibility and green practices provide bases for sustainable operations. They are important tools for accomplishing organizations' goals, as well as, positively contributing to the environment and to the ecological debate. Specific environmental regulations may be mandated by the State of Texas or the Federal

Government. These regulations may be adopted or implemented by public utility organizations at varying degrees. Survey data collected from utility organizations is examined to identify why there are such variations. Few comprehensive studies have been conducted to examine the effectiveness of green practices on the overall impact on the environment. Such studies, even though limited in scope, may help shed light on the subject.

The research seeks to better understand and find answers to the following three questions:

1. What types of corporate social responsibility and green practices have they adopted and to what extent?
2. Why do some municipality utility organizations adopt corporate social responsibility and green practices while others do not?
3. What are the impediments to adopting corporate social responsibility and green practices?

The significance of the problem stems from the fact that energy is central to our modern living standards and without a steady, dependable, and cost effective energy supply we can't continue enjoying the products and services available to us. There is a need to mitigate and change our behaviors because it is costly to maintain our current lifestyle. The significance of the problem is also derived from the need to find ways of adopting corporate responsibility and green practices while ensuring that we still have enough energy sources to support our way of life. Majority of the sources of energy we rely on today are being depleted, which means that the energy sector needs to look for alternative sources.

The research looked at corporate social responsibility and green practices on the basis of the following five dimensions – structural, spatial, temporal, legal, and operational.

- Structural dimension refers to the way municipalities approach corporate social responsibility and green practices and reflect it in their internal mission statements, policies, ethics and core values, which are governed by a strict set of guidelines and rules precisely put in place to positively impact its operations. Accordingly, a survey questionnaire was developed to include scaling questions to address the following:

    - The philosophy of the municipality in regards to corporate social responsibility and green practices;
    - Whether corporate social responsibility and green practices are part of its core principles for doing business and are spelled out or incorporated in a mission statement;
    - Its future goals in regards to implementing corporate social responsibility and green practices; and
    - The degree of directors' involvement in taking lead in adopting corporate social responsibility and green practices.

- Spatial dimension refers to the physical location of the municipality. Spatial dimension determines if size and geographical locations are factors in decisions to adopt corporate social responsibility and green practices.
- Temporal dimension is concerned with the time when situations and events took place. In this context we are referring to a specific time frame when a municipality adopted green practices so that we could compare the results with times when such practices were not adopted. Locating events demonstrating the adoption of green practices at particular points over the continuum of time is the basis for understanding how often such practices take place and what impact they make.
- Legal dimension refers to local, state, federal, or international laws or policies imposed on organizations operating in certain jurisdictions, which influences their daily business.
- Operational dimension involves corporate social responsibility and green practices adopted in the processes of production, transmission, and distribution of electricity.

Each of these dimensions presents a unique aspect of corporate social responsibility and green practices.

1.3 Research Contribution to Policy

Energy plays an important role in fueling economic development. Research shows that there is a relationship between economic growth and price of energy. Energy use does cause economic growth, but it can also be a limiting factor in the growth of the economy (Stern, 1993). It is important to specify the ways in which energy use should be reduced. For example, there could be policy implications for raising taxes on energy or adopting other policies that lead to reduction in energy use without specifying the ways in which such reduction should take place. This may result in the reduction of economic growth and, if severe enough, may reduce the level of output (Stern, 1993).

This is the case in developed economies such as the United States where increase in oil prices, due to events such as wars or political instabilities, may negatively impact the performance of the economy and, in certain cases, may lead to stagnation. This condition may motivate governments and businesses to invest in alternative sources of energy.

The findings of this study contribute to the sustainability debate. Accordingly, finding out the response to green practices in municipalities may help policy makers make informed decisions about energy policies. However, the increasing share of renewable energy sources is expected to have an impact on the energy sector. This poses a challenge to the transformation of the power sector to a more sustainable energy production. The entire structure of the industry is likely to change (Richter, 2012). The guiding question is: how do utilities shape their business model for renewable energies? (Richter, 2012).

There will be an increase in the need for the distribution of small scale renewable energy technologies. This development will have an impact on the way energy is produced and distributed to the customer (Richter, 2012). Richter (2012) is of the view that utilities, on their own, cannot shape the future of the business models for renewable energies and those policy-makers should closely follow development. This is particularly important since renewable energy business models are highly dependent on the regulatory framework. Since policy-makers have direct influence on their future development, they should set the framework for a truly sustainable energy future.

This research may contribute to policy by identifying organizations which are more sustainable in their practices so that their expertise could be reflected in policies. Corporate social responsibility and green practices may lead to environmentally friendly results, a factor which urban planners may also take into consideration when designing communities. The 1990 and early 2000 saw a rapid expansion in public support for renewables. Policies were enacted by the US government explicitly designed to promote renewables, power sector restructuring, and environmental protection. These policies have indirectly affected renewables but experience with renewable energy polices is still emerging (Beck & Martinot). It may take some time for policies such as financial incentives in the form of tax breaks and grants to produce tangible results with the development of clean/alternative sources of energy.

1.4 Research Goals and Contribution to Theory

The study of the subject of green and corporate responsible practices among municipalities is relatively new and there exists a gap in our knowledge that is addressed. The literature review section, below, discusses a body of knowledge and literature on the subject of green practices. Researchers, generally, find positive impacts of such practices on material, physical, social, and environmental aspects of life. However, there is need for further research to understand how effective are green and corporate responsible practices in helping public utility organizations such as municipalities achieve their goals and why some of these organizations apply such practices while others do not. This research will explore these gaps in literature.

Another goal of this research is to seek to identify the conditions under which a corporation would be deemed as adopting green practices as well as operating in a socially responsible way. This may help policy makers make distinction between the performances of different public utility organizations, according to specific indices, based on examining corporate responsible and green practices they have adopted. In addition to the goals stipulated above, this research is intended to be a pilot research to help articulate some implications, as well as, to prescribe some analytical techniques and procedure for future research of similar nature.

1.5 Dissertation Structure

This dissertation seeks to understand why some municipalities adopt corporate social responsibility and green practices while others do not. The dissertation consists of seven sections. Section1 states the problem and presents research purposes, objectives, as well as problem significance. It also talks about research contribution to policy and theory. Section 2, reviews literature related to sustainability, green practices, and corporate social responsibility. It also explores green practices in the energy sector and sheds light on current attitudes and behaviors towards energy. The literature reviews major U.S. energy sources and sectors as well as renewable energy in the State of Texas. It also examines challenges faced by policy makers in their endeavor to mitigate the situation pertaining to the need to change behaviors towards the environment. The literature is evaluated within the context of the research goals and objectives. Section 3, outlines the framework for the dissertation. It gives an overview of a conceptual framework, based on literature reviewed in Section 2. This section broadly discusses the interdependent relationship of variables leading to adoption of green practices. The model provides basis for a quantitative analysis, which uses statistical test to evaluate relationships among certain variables. The literature reviewed in section 2 also establishes a foundation for the research's main hypotheses discussed in Section 4. Section 5 describes research design, methodology, and procedures for framing the population studied in this research. It talks about variable constructs and concept measurement of key variables. It also details the processes and criteria for data collection and steps taken to do that. This section also discusses data analysis. It gives summary of descriptive statistics and statistical test of research hypothesis and test of means. Section 6, describes research discussion of findings and policy recommendations. Finally, Section 7 discusses summary and conclusion. It also discusses threats to validity of the research and its reliability for generalization and implementation of findings to different environments. It also talks about limitations and areas for future research.

2. LITERATURE REVIEW

Several areas of literature are explored to develop an understanding for the nature of green practices and socially responsible processes adopted by municipalities, being the focal area of this study. Also, on the basis of understanding the motivation for embracing green practices, a conceptual frame work for the research problem was constructed.

2.1 Sustainability Overview

The term sustainability is increasingly viewed as a desired goal of development and environmental management (Brown et al., 1987). The term has been used in many different settings, disciplines, and contexts ranging from sustainability in the field of forestry and fisheries expanding to management to the vision of a sustainable society with a steady state economy (Brown et al., 1987).

The sustainability term is clearly becoming a popular word particularly in the environmental policy and research arena. “Sustainable development”, “sustained use of the biosphere”, and “ecological sustainability” are terms increasingly being used by institutions and individuals concerned with the relationships between humans and the global environment (Brown et al., 1987; IUCN 1980; Repetto, 1985).

According to The Oxford English Dictionary the term sustainable is defined as “capable of being upheld; maintainable,” and to sustain as “to keep a person, community etc. from failing or giving way; to keep in being, to maintain at the proper level; to support life in; to support life, nature etc. with needs.” The etymology of the terms originates in the French verb soutenir, “to hold up or support.”

By examining the definition above we can view sustainability from many different angles. The definition given by Tivy and O’Hare (1982) to explain sustainable yield in the context of biological yield is “management of a resource for maximum continuing production, consistent with the maintenance of a constantly renewable stock”

(Brown et al., 1987) (p. 714). It is clear that sustainability may have different meaning to different groups. The views held by researchers and practitioners of what can be deemed as green management could fall along a continuum ranging from simple and basic environmental programs to prevent damage to the environment to more complex ones involving strategic planning to prevent environmental damages from happening in the first place (Stephanie et al., 2009).

According to Anderson (1997), the need for environmental awareness evolved and rose from a variety of wrongdoings that have taken place over time. He concluded that it is debatable as to the exact moment in history at which point these environmental wrongdoings occurred or originated. However, Anderson (2004) supports the view that the industrial revolution can be singled out as the point in time most noticeable for having an adverse impact on the environment. He also argued that present day "restorative" organizations are now responsible for reinvesting in natural capital to rectify the centuries of damage to the environment starting during the industrial revolution period more than three hundred years earlier.

Most importantly, scientists, climatologists, and policy-makers confirmed that the greenhouse effect was a real phenomenon and would eventually have a substantial and negative impact on the climate and environment (Buchholz, 1993; Stephanie et al., 2009). Tragic environmental events call for actions compatible with the size and nature of the problem; therefore, such actions can be painful to stakeholders involved. Such a reality makes the adoption of sustainable practices, which may come in the form of green practices such as generating energy from renewable sources, of particular importance, due to the central role energy plays in our daily lives.

Traditional energy sources are represented by fossil energy generated from burning of oil, natural gas, and coal. Fossil based fuel is finite in quantity but currently available in nature and can be extracted at a reasonably low cost. However, processing it releases pollutant materials in the form of carbon dioxide and other gases into the air causing extra pollution to the atmosphere. According to literature on global warming, it is considered a fact that carbon dioxide contributes to global warming even though there isn't a clear cut evidence to support that claim (Wessel, 2001).

In a recent view of sustainability in the energy sector, Afgan et al. (1999) suggest that the criteria for the energy system sustainability assessment have to reflect four aspects; resource, environment, social, and economic. Jaccard (2005), however, argued that there are two conditions to be met by an energy system to be sustainable; first the energy system must have good prospects for enduring indefinitely in terms of type and level of energy services it provides. This ideally needs to be coupled with growth in the global energy system to meet the significant increase in demand and use for energy during this century. Jaccard (2005) also argued that extraction, transformation, transport, and consumption of energy must be benign to both people and ecosystem. Accordingly, there has to be a balance between the flows of the energy system's material and energy byproducts so that it doesn't exceed the ability of the land, air and water to absorb and recycle them without significant negative disruption (Jaccard, 2005).

2.2 Green Practices

Going green or adopting green practices, to an individual or a community, involves living life in a way that is friendly to the natural environmental and is sustainable for the earth. This can be done through contributing towards maintaining the natural ecological balance in the environment, with the view to preserving the planet and its natural systems and resources (What does going green mean, 2015). This also involves taking steps to reduce harm on environment resulting from carbon footprints. Going green means adopting five basic principles (What does going green mean, 2015):

- Pollution reduction;
- Resources conservation;
- Energy conservation;
- Reduction of consumption and waste; and
- Protection of the earth's ecological balance.

These principles can be translated into action by taking steps to adopt practices such as recycling, waste reduction, energy efficiency, carbon dioxide emission reduction, changes in policies and attitudes, and financial capacity to implement these practices.

There have been numerous planning movements within the United States over the past several decades. These movements have carried titles such as urban renewal, eco cities, healthy cities, garden cities, smart growth, and sustainability (Kemp & Stephani, 2011). Increasing numbers of citizens, local public officials, and non-profit organizations are embracing growth and development management practices as means to facilitate positive planning practices in their cities and communities. Public officials are gradually learning that they possess the municipal powers to shape their environment in their cities and suburbs. This is with the ultimate goal of enhancing the quality of life of citizens they serve (Kemp & Stephani, 2011).

Modern planning measures and green practices evolving in communities include creation, protection, preservation, restoration, and enhancement of man-made, as well as natural environment. These measures are directed towards air quality, water quality, prudent use and reuse of land, and enhancement of citizens' quality of life (Kemp & Stephani, 2011).

The book titled "Cities Going Green", by Kemp & Stephani (2011), describes some of the innovative trends in the "cities going green" movement in the United States. It compiles case studies of best practices in 41 U.S. Cities in 24 states, including Texas, with two cities (Austin and Dallas). These case studies represent significant research effort to obtain a body of knowledge containing the best practices available in the environment-related planning and practices in the municipal level of governments. The list contains 42 best practices, which include implementation of emerging green (local) government practices, reduction of air pollution, improvement in water quality, and participation in the urban "greening movement".

This study looks at green practices within the context of municipal utility organizations. Merriam Webster Dictionary defines Municipality as a primarily urban political unit having corporate status and usually powers of self-government. As such, in the United States, a municipality is an urban unit of local government. It is a political subdivision of state within which a municipal corporation has been established to provide general local government for a specific population concentration in a defined area. A municipality may be designated as a city, borough, village, or town, except in the New England States, New York, and Wisconsin, where the name town signifies a subdivision of the county or state by area. The municipality is one of several basic types of government, the others being counties, townships, school districts, and special districts.

Interest in adopting green practices by both for profit and non-for profit organizations is evidenced in the high number of companies (7700) in 130 countries that have signed the UN Global Compact (2008). Environmental management and corporate sustainability were the main topics of discussion (Lozano, 2012). However, embedding such principles into operational systems pose significant challenges due to the complexities and multi-dimensional issues involved (Langer & Schon, 2003). According to World Business Council for Sustainable Development (2002), changing market conditions represented in many factors such as technological innovation, increasing trends towards deregulation, mean that these and other environmental, economic and social issues must be addressed at a time when the industry is undergoing unprecedented change.

One of the most important factors in the implementation of green practices in an organization is the degree to which members of senior management are committed to the cause, and what motivates them to be so. Some managers have extrinsic motives in the form of financial performance (profitability and enhancing shareholder values), while others are guided by intrinsic motives represented in ethical norms established by company CEO's and senior managers, which is based on moral duty or the expression of altruism, (Hemingway et al., 2004; Graafland, 2012).

Not much is known about extrinsic motives or local governing policies pertaining to green practices in rural communities in Texas. Decisions made by city managers to adopt green practices are internally motivated and that local government, state or Federal Government has little to do with that (Heiskanen et al., 2010). Heiskanen et al. (2010) suggest that programs such as Green Office serve to align some of the intrinsic and extrinsic motives of the organizations participating in the scheme. The goal is to empower individual employees who would like to do more, but often lack the requisite skills, knowledge and powers (Heiskanen et al., 2010). Green Office empowers these intrinsically motivated employees through provision of competencies and a legitimate context for environmental improvement. The feedback on effectiveness of other employees who are not equally motivated serves to alleviate some of their concerns. The effectiveness of Green Office in serving the individual employees' interests depends on the management style of each participating organization (Heiskanen et al., 2010).

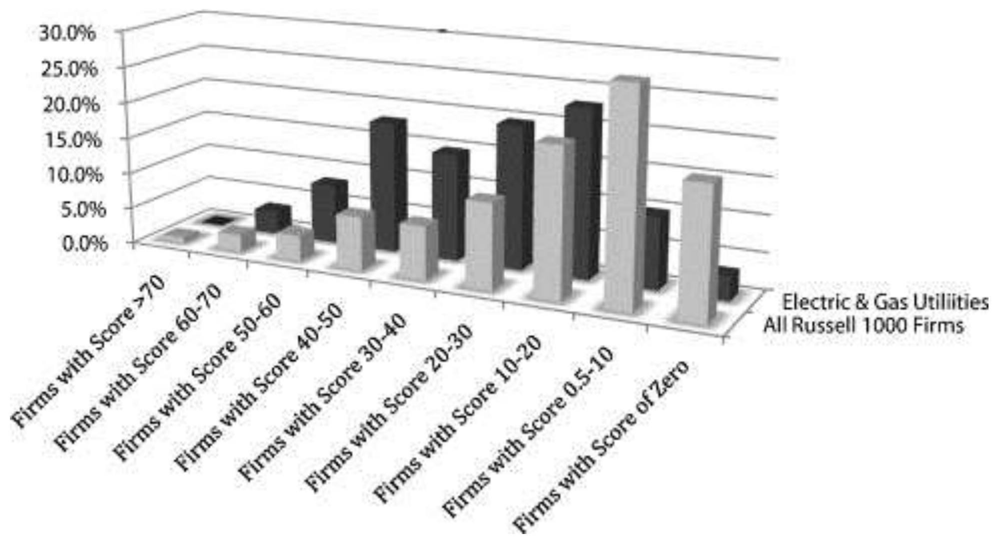
Sound governance could mean voluntarily adopting green practices such as producing less waste, producing less CO_2 emission, using energy from renewable sources, recycling, efficient use of energy, and becoming a socially responsible corporation. Such a principle may apply to both for-profit and non-for-profit organizations such as municipalities. The typical utility, in general, has more well-developed policies, programs, supporting infrastructure, and tangible results than the typical large company (Soyka & Bateman, 2011). But there remain many areas for improvement, including enhancing the coherence of environmental systems and infrastructure, and effective management of sustainability/financial issues. Soyka &

Bateman (2011) examine the extent to which electric and gas utilities have provided evidence that they are prepared to actively and effectively manage their exposure to the GHG emissions issue. It evaluates the extent and quality of these companies' disclosed GHG and broader environmental management practices.

Soyka and Bateman (2011) conducted a comparison of 61 firms in the utility sector and 962 firms in the diversified Russell 1000 index. The results of their analysis, shown in figure 2.1, below, reveals that none of the utility companies ranks in the highest decile (requiring a total score of 70 or higher), a much lower percentage of utility companies has a low score (less than 10) than in the total population of companies. On the other hand, the Russell 1000, has an overall median score of 10.5, which mean that fully half of the largest U.S. publicly traded firms have only 49 indicators of sound GHG/environmental governance and management practices, and a large percentage have none at all. In contrast to the Russell 1000, the electric and gas utility sector has an overall median score of 27.0, nearly three times as high. This analysis concludes that greater percentages of firms in the electric and gas utility sector have scores in the upper deciles. For example, 3.3 percent of utilities have scores between 60 and 70, as compared with only 2.4 percent of all Russell 1000 firms, while 8.2 percent of utility firms have scores between 50 and 60 (versus 3.5 percent for all Russell 1000 firms) (Soyka & Bateman, 2011).

Figure 2.1

The Big Picture-Total GEMS Rating Scores. Source: (Soyka and Bateman, 2011).



Some companies are reactive in their commitment to embedding green practices while others are proactive and initiative takers. Reactive environmental strategies to implement regulations may prove to be costlier than proactive because, being proactive enables firms to take advantage of the adaptation process to introduce innovation that improves their overall operations (De- Francia & Ayerbe, 2009).

Organizations that are guided by a clear mission statement embodying their commitment to sustainability are proactive and have a clear goal to achieve. Wisconsin Energy Corporation (WEC) is one leading company embracing sustainability and being guided by a set of sustainability principles. According to Marco et al. (2013), WEC is a leader in the field of sustainable practices. The company's mission statement clearly reveals its plans to address and implement sustainability in its daily operations. Marco et al. (2013 p. 98) stated that WEC's mission statement reads: "to create brighter futures for the communities in which we do business, enhancing the growth and success of our company". They stated that WEC's vision is to "achieve maximum community benefit and business value per dollar invested" (Marco et al., 2013 p. 98). Marco et al. (2013 p.

98) also stated that the company's goals are to "pursue a sustained, consistent approach to funding within our focus areas, better enabling the organizations to achieve lasting results, to foster mutually beneficial relationships between Wisconsin Energy Corporation subsidiaries and community organizations, and lastly to fully leverage company resources". WEC, according to their published 2011 CSR Report, also expresses commitment to the environment through committing to improving the quality of life in the areas the company serves while ensuring compatibility of its operations with the environment (Marco et al., 2013). The company pledge environmental accountability for their business activities and leads by example in the communities they serve (Marco et al., 2013). WEC includes environmental factors as an integral part of its planning and operating decisions and recognizes employees' contribution (Marco et al., 2013). It operates according to a set of sustainable strategies, and that is what differentiates it from other companies.

Austin Energy, a Texas based organization, is another example of top US energy efficient company. The company estimates that it has saved energy equivalent to the output of a 660-megawatt power plant since 1985, when it launched the first in an extensive lineup of innovative energy by adopting conservation and renewable resources programs (King, 2008). Austin Energy has ambitious goals. It aims at increasing total saving by an additional 750 megawatts of power by 2020. Among all U.S. electric utilities, it is, for the sixth year in a row, the city-owned power company ranks as the No. 1 seller of green energy, including solar and wind power, among all U.S. electric utilities (King, 2008). Austin Energy is a good example of a corporation that has adopted green technology to reach its goal of implementing energy-saving initiatives involving less reliance on electricity, thus lowering overall carbon dioxide emissions. To reach this goal, it plans to use technologies such as smart appliances to monitor and control power usage at customer sites. That is in addition to its plans to implement new server and storage technology (King, 2008). Through what is so-called smart power grid, Austin Energy plans the utility to communicate with customers about their time-sensitive power so as to deliver power when needed and conserves power when it is not needed (King, 2008).

A third utility company which has instituted an active sustainable development program is Case Electric Utility. Case is one of the largest electric utilities in Canada. Case is a provincial crown corporation that employees over 5000 people. It provides electricity to nearly 750,000 customers in its home province and also exports electricity to over 50 electric utilities in Canada and the United States. The utility company operates in a regulated energy market and that it is fully integrated and provides generation, transmission, and distribution services to its customers. The company instituted an active sustainable development program over the last decade. It is well positioned to develop a system of sustainable development indicators and policies at all levels of the corporation. These include environmental stewardship, efficiency, equity, stakeholder participation and continuous improvement. The company has also adopted the ISO 14001 environmental management system (EMS) program but it struggles with the integration of sustainable development principles into its decision-making processes (Searcy et al., 2007).

As seen in the above three cases of Wisconsin Energy Corporation, Austin Energy, and Case Utility, it is clear that they have taken steps to establish systems for implementing green practices into their operations, even though at varying degrees. On the other hand, there are challenges facing utility organizations which hamper their abilities to incorporate sustainable practices into their operations. Utility executives, for example, fear, with good reason, that if they spend heavily on an old coal plant to reduce sulfur, nitrogen and mercury emissions, they may run the risk of losing their investment if they have to shut down the plants because of new limits on CO_2 (Wessel, 2001). According to Linde (1995), businesses spend too many of their environmental dollars on fighting regulations and not enough on finding real solutions. Regulators and companies should come together and focus on relaxing the trade-off between environmental protections, on one hand, and encouraging innovation, on the other hand (Porter & Linde, 1995).

In the end, electric utilities will be forced to reduce CO_2 emissions while producing more electricity. They bear the burden of accepting CO_2 limits. Doing away with rules that discourages them from making old plants more efficient, which also reduces pollution can be a an incentive for accepting CO_2 limits (Wessel, 2001).

The literature reviewed so far establishes some understanding of the meaning of green practices within the context of municipalities and the utility industry. Implementing green practices could be viewed as something as simple as incorporating a business wide recycling program but researchers in the field and some business leaders demand that much more rigorous objectives be achieved in order for an organization to be recognized as green organization (Stephanie et al., 2009).

Now we begin to understand that these green concepts cannot contribute to restoring the environment on their own. There is a need to translate these concepts into action by taking green initiatives such as conservation, reduction in resource consumption, waste reduction, pollution reduction, and innovation. There is also a need to go beyond complying with regulations and legal requirements to planning strategically to make a real difference. The concept of green, to corporations, involves integrating its goals and sustainability initiatives in both strategic and operational levels.

Because the emphasis is on corporations operating within the utility industry, there is a need for some criteria for system sustainability assessment. There is also a need to identify a range of variables which can affect the adoption of green practices. According to Afgan et al. (1999), such criterion has to include four aspects, namely: resource, environment, social, and economic. Geis & Kutzmark (1998) view that the criterion for selecting variables must be based on the following six parameters:

1. Reflect sustainability concept;
2. Reflect measurable indicators;
3. Be based on timely information;
4. Be based on reliable information;
5. Reflect the strategic view of the company’s sustainability goals; and

6. Give possibility to optimize the system energy cost, material use, government regulations, financial resources, protection of the environment, coupled with safety and reliability of the system.

Based on the above, Geis & Kutzmark (1998) developed a model to reflect the following four indicators:

1. Resource indicator;
2. Environmental indicator;
3. Social indicator; and
4. Efficiency indicator.

Brody, et al. (2008), looked into the question of households' willingness to install solar thermal technologies for heating purposes. They categorized variables according to:

1. Environmental variables;
2. Economic variables; and
3. Sociopolitical variables.

Hart (2011), identified key areas for his theory of the Natural-Resource-Based View, based on strategic capability areas for enquiry. His theory was based on the following principles:

1. Pollution prevention

   How do resources combine to affect environmental performance? What is the genesis of key resources that drive the link between environmental and financial performance?

2. Product stewardship

   How do firms develop resources and capabilities in stakeholder integration that allow for improved product stewardship? What factors enable and constrain product stewardship strategies in complex global supply chains?

3. Clean technology

   Which firms are best positioned to develop the dynamic capabilities needed to bring clean technologies to market? What firm resources and capabilities are likely to be associated with clean technology commercialization? Can clean technology capabilities lead to sustained competitive advantage?

4. Base of the pyramid

   What are the capabilities needed to enable firms to succeed with base of the pyramid strategies? How is legitimacy gained and maintained among firms in the base of the pyramid? Do our existing theories adequately address how firms can succeed in the base of the pyramid, or do we need to augment or even replace these theories?

2.3 Corporate Social Responsibility (CSR) and Green Practices

Corporate Social Responsibility can be defined as an operational approach taken by an organization to frame the manner in which its activities may impact upon different stakeholders (Nehme and Wee, 2008). CSR is defined as the following:

> Corporate social responsibility relates primarily to achieving outcomes from organizational decisions concerning specific issues or problems which (by some normative standard) have beneficial rather than adverse effects on pertinent corporate stakeholders. The normative correctness of the products of corporate action has been the main focus of corporate social responsibility (Epstein, 1987 p.104); (Carroll, 1999 p. 287).

Both for profit and not-for profit organizations can engage in activities that are of corporate social responsibility and green practices nature, which may impact differently on different stakeholders, hence the relevance of CSR to this study. The adoption of green habits and practices by societies and companies amounts to fulfilling some aspects of social responsibility (Freeman & Low, 2014).

Corporate social responsibility has evolved over time to mean different things to different people. To some, it means the corporate compliance with the spirit as well as the letter of the law while others deem it to mean a business approach by which an organization takes into account the manner in which its activities may impact upon different stakeholders (Nehme & Wee, 2008). It is important to differentiate between corporations as legal entities and corporate social responsibility as the manner in which such corporations meet their responsibilities towards the society.

Since the World Commission on Environment and Development Report of 1987 (commonly known as the "Brundtland" Commission Report) was published, corporate managers and management scholars have been grappling with the questions of how and why corporations should incorporate environmental concerns into strategic decision making (Sharma & Vredenburg, 1998). The Brundtland Commission Report coined the term "sustainable development" and explicitly postulated a positive role for corporations in furthering the cause of environmental protection (as opposed to the negative traditional role of corporations being the "problem" and governments being the "solution") by integrating environmental protection with economic performance (Sharma & Vredenburg, 1998).

There are ethical and philanthropic considerations stating that corporations have general responsibility towards the society they function in (Suchman, 1995). These considerations stem from the idea of 'noblesse oblige' (the obligation of nobility); the idea that a corporation as an entity, in comparison to an individual, bears a far greater responsibility towards the society because of the power it possesses (Carroll, 1991). The literature contains theories such as legitimacy theory, stakeholder theory, and instrumental theory, all justifying corporate social responsibility. However, discussing these theories is beyond the scope of this research.

The four dimensions of corporate social responsibility are shown in figure 2.2 (Carroll, 1991).

1. Philanthropic responsibility: Involves good citizenship and positively contributing toward the communities' quality of life.
2. Ethical responsibility: Fairness and commitment to what is right.
3. Legal responsibility: Obeying the law and playing by the rules.
4. Economic responsibility: Being profitable. However, municipalities, the subject of this study, being non-for-profit organizations, can be economically responsible by adopting prudent financial and physical policies.

Figure 2.2

The pyramid of corporate social responsibility (CSR). Source: (Carroll, 1991)

In conclusion, corporate social responsibility involves five dimensions; environmental, social, economic, stakeholder, and voluntariness (Dahlsrud, 2008). Each of these dimensions interacts with organizations’ decision making process. The economic dimension, for example, poses a great challenge to decision makers in the sense that there are economic consequences to adopting positions which could come in the form of financial commitment to reduce pollution, investing in new technology, or deal with new regulations. The dilemma faced by decision makers is that investing money to meet these goals may be an immediate commitment, whereas, the pay back or return on investment could be long term. This is one reason why commitment to corporate social responsibility comes at varying degrees from one organization to another. Managers are faced with a broader range of stakeholder views to consider in the process of decision making and the outcome of such decisions may not be acceptable to all parties involved.

2.4 Green Practices and Policies in the Energy Sector

Public utility corporations involved in production, transmission, or distribution of energy, impact the environment in which they operate. Generally, utility organizations have more well-developed policies, operational programs, supporting infrastructure, and tangible results, if compared with typical large companies (Soyka & Bateman, 2011). However, there remain numerous areas for improvement (Soyka & Bateman, 2011). This includes enhancing the coherence of systems put in place to deal with the environmental and other infrastructure, as well as providing better systems for effective long term sustainability and management of financial issues (Soyka & Bateman, 2011).

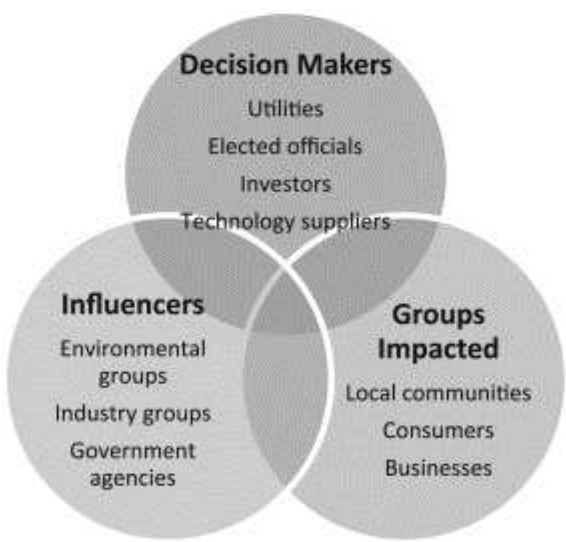
Scientists consider it likely that if the atmospheric concentrations of carbon dioxide (CO_2) and other so-called greenhouse gases continue to rise, the planet life support will be different and that is going to impact human's life style. The problem is that it may not be easy to adjust human behavior. It is important that we strike a balance between maintaining our lifestyle and at the same time take environmentally friendly measures to curb greenhouse gases. There is a need to define the types of practices which can be adopted to change behaviors. Lovins (1979) and Cooke (1976) argue that the term sustainable has not been widely used in the energy literature but it is discussed in terms of renewable energy. It is also being discussed in terms of the transition that must be made from current use of exhaustible sources of energy to renewable.

In the U.S.A., the Renewable Portfolio Standards (RPS) was first implemented in the 1990s as means to accelerate the adoption of renewable technologies. As of 2012, 29 states plus Puerto Rico and Washington, DC require that a percentage of electricity generated by power plants come from renewable sources. Wiser et al. (2007 p.1) stated that "RPS requires electricity suppliers (or, alternatively, electricity generators or consumers) to source a certain quantity (in percentage, megawatt-hour, or megawatt terms) of renewable energy". Each state sets its own standards and timetables, which can be adjusted by policy makers over time (Wiser et al., 2007). Energy executives fear that CO_2 limits may force them to shut down plants. Wessel (2001 p.1) quoted Jim Rogers, chief executive of Ohio utility Cinergy Corp, who wrote "If CO2 requirements are imposed that compel massive expenditures, and the sizable investments we will make to install pollution-control equipment over the next 10 years could be wasted".

Another challenge facing organizations is their inability to strike a balance between different stakeholders who have varying interests in the organization. Decision makers are constantly met with the challenge of how to address the interest of influencers such as environmental groups, industry groups, and government agencies, on one hand, and impacted groups, such as local communities, consumers and businesses, on the other hand (Stein, 2013). Figure 2.3, below, shows the relationship between decision makers, groups impacted, and influencers and how they interact and affect each-others.

Figure 2.3

Stakeholders Impacting or Impacted by Energy Production Technology Decisions. Source: (Stein, 2013)



Electricity producing technologies have been criticized for their reliance on non-renewable fuels (coal, oil, natural gas, and uranium) (Shafiee & Topal, 2009). The problem is that most of these fuels will be depleted. It is calculated that the time depletion is to be around 35,107 and 37 years for oil, coal, and gas, respectively (Shafiee & Topal, 2009). The concern is that the cost of these fuels continues to rise. Another factor is the collapse of several tightly controlled political states has heightened the fragility of the geo-political world order. This unstable and turbulent political environment threatens global supply chains associated with most non-renewable sources of energy and especially oil. Technological disasters such as the Fukushima Daiichi meltdown also play a role by prompting Japan and other countries to abandon nuclear and seek alternative sources of energy (Stein, 2013). The long term comprehensive solution to the problem rests on resorting to renewable fuels in the forms of solar, wind, hydropower, geo-thermal, and biomass.

While renewable fuels offer many benefits such as being free and plentiful, power plants face problems associated with limitations in production and capacity, because of variability of solar radiation and thermal currents throughout the day and year. These problems coupled with other financial, technical, and socio-economic trade-offs pose immense problems for policy makers and investors as they struggle to assess which renewable technological options are "best" in both the short and the long terms (Stein, 2013). This situation prompts many valid questions faced by corporations, which could include the criteria for evaluating energy alternatives; how much "better" are renewable sources in comparison to non-renewable sources of energy, what is the best mix of renewable and non-renewable energy sources, and which renewable energy sources are preferred over others and should be offered incentives (Stein, 2013).

Stein (2013) implemented a comprehensive multi-criteria decision making model to evaluate nine different types of electricity-producing power plants. He used both renewable and non-renewable energy sources according to 11 key metrics with the view to help answer the above questions. Stein's (2013) model ranks electric power plants using wind, solar, geothermal, biomass, hydropower (i.e., renewable sources), nuclear, oil, natural gas and coal. He also uses four comprehensive clusters based on financial, technical, environmental and socio-economic-political criteria. The purpose of the model is to rank various renewable and non-renewable electricity production technologies according to these multiple criteria to help with formulating policies and decision making. The model was built using the Analytic Hierarchy Process with empirical data from government and academic sources. The weights of criteria clusters according to the various scenarios (financial, technical, environmental, and socio-economic/political) are given in table 2.1.

Table 2.1

Weights of criteria cluster according to various scenarios. Source: (Stein, 2013)

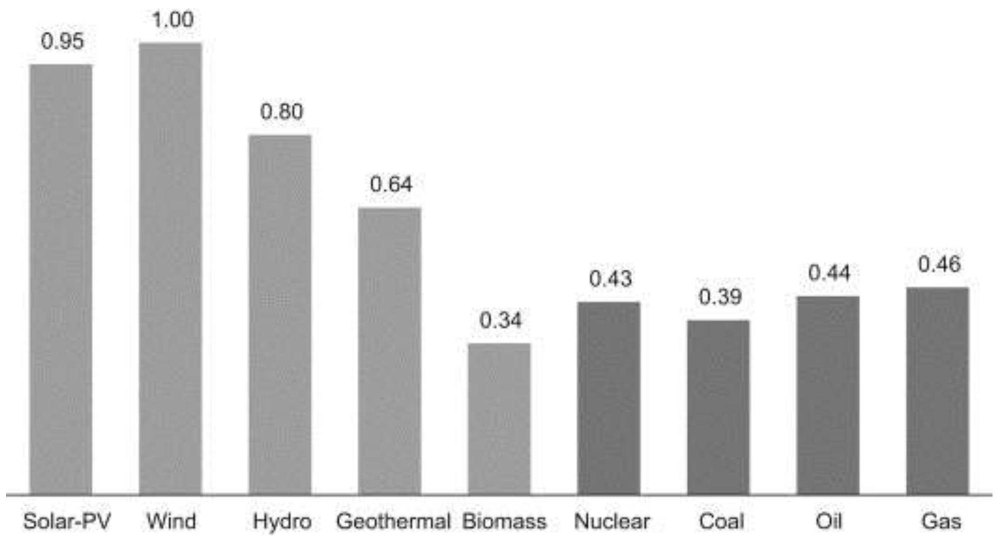
Criteria cluster/scenario	Financial return (%)	Operational efficiency (%)	Community interest (%)	National priorities (%)
Financial	60	25	5	5
Technical	25	60	10	10
Environmental	10	10	60	25
Socio/economic/political	5	5	25	60

The results of the analysis are found in table 2.1. These results represent the normalized scores of power production technologies according to the four criteria clusters (e.g., financial, technical, etc.) while assuming that each cluster and its components have equal weight, Eric Stein (2013). The ranking of power technologies assuming equal weights for all criteria (solar, wind, hydro, geothermal, biomass, nuclear, coal, oil, and gas) are shown in figure 2.4.

Figure 2.4

Ranking of power technologies assuming equal weights to all criteria.

Source: (Stein, 2013)



The figures, 2.5 and 2.6, below, show the ranking of power technologies weighted for financial return and production efficiency scenarios.

Figure 2.5

Ranking of power technologies weighted for financial return scenario.

Source: (Stein, 2013)

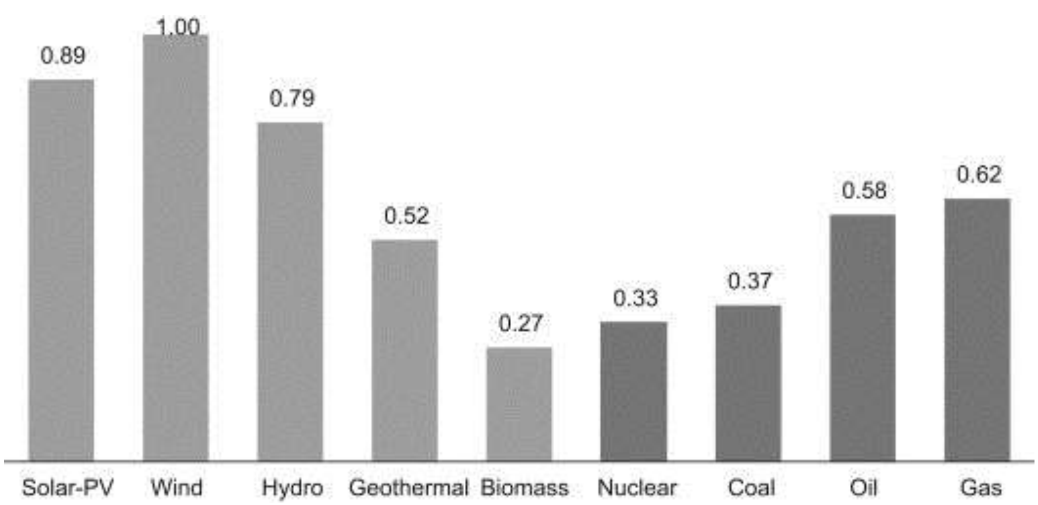
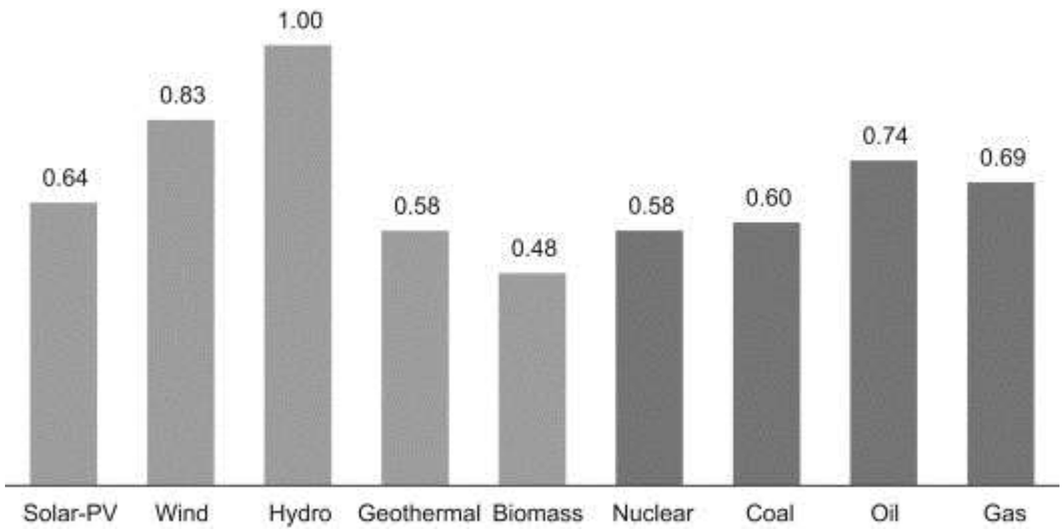


Figure 2.6

Ranking of power technologies weighted for production efficiency scenario.

Source: (Stein, 2013)



The figures, 2.7 and 2.8, below, show the ranking of power technologies weighted for community interest and national interests scenarios.

Figure 2.7

Ranking of power technologies weighted for community interest scenario.

Source: (Stein, 2013)

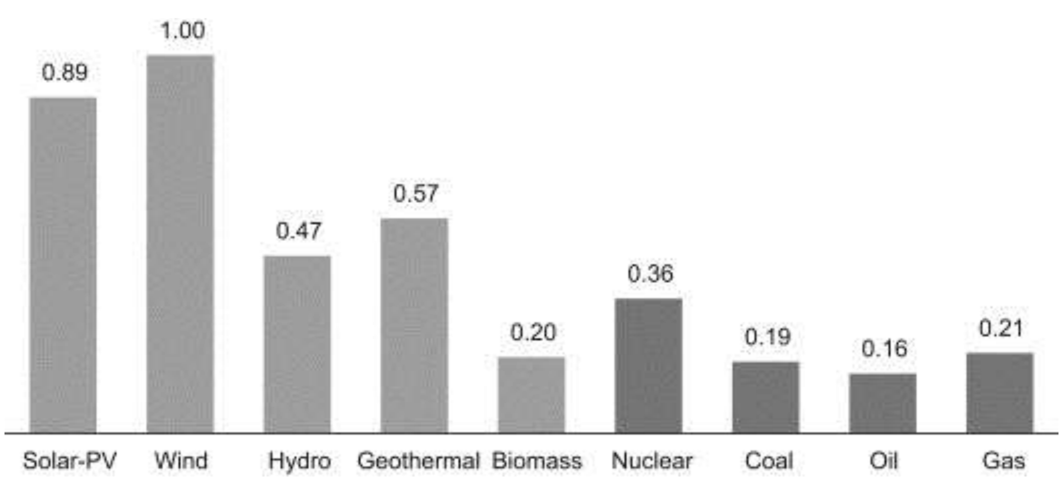
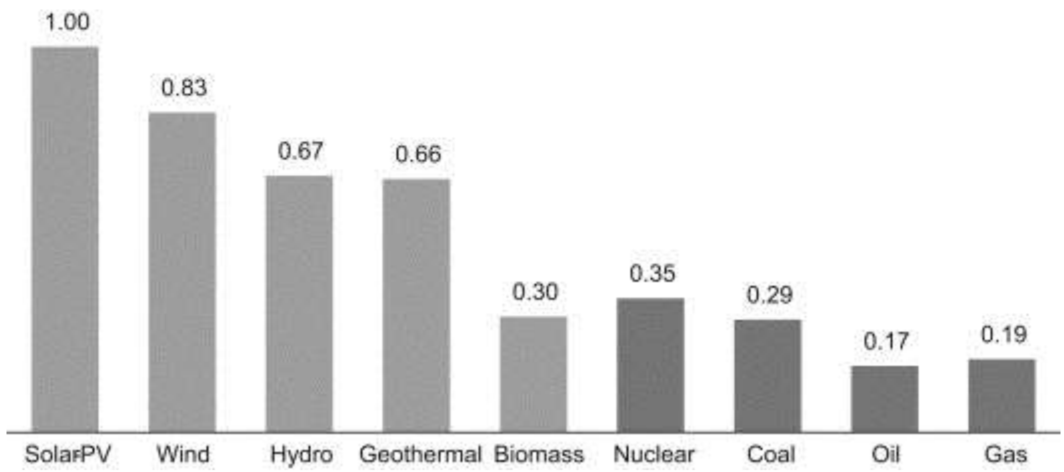


Figure 2.8

Ranking of power technologies weighted for national priorities scenario.

Source: (Stein, 2013)



The model show that wind, solar, hydropower and geothermal provide more overall benefits than the rest of the electric power sources, even when sensitivity analysis is used to adjust the weights of the primary criteria clusters. Gas and oil are the only non-renewable sources that appear in three of the 20 top positions, while the rest are populated with renewable energy technologies (Stein, 2013). One conclusion of Stein (2013) is that financial incentives for solar, wind, hydropower and geothermal are sound and should be expanded. To the contrary, subsidies for non-renewable sources could be diminished. Stein's (2013) work concludes with ideas for future research such as exploring a full range of sensitivity analyses to help determine an optimal mix of renewable and non-renewable technologies for an overall energy system. The scope of the model could also be expanded to include demand as well as supply side factors.

A public utility company, which operates within municipalities, is any organization which provides services to the general public, although it may be privately owned. Public utilities include electric, gas, telephone, water, and television cable systems, as well as streetcar and bus lines. They are allowed certain monopoly rights due to the practical need to service entire geographic areas with one system, but they are regulated by state, county and/or city public utility commissions.

Utility companies do have interest in embedding sustainability into their operational systems even though at varying degrees depending on many factors. Their interest stems from both extrinsic (financial) and intrinsic (ethical, altruistic, and environmental) factors (Graafland, 2012). There are multiple driving forces pushing organizations in the electric utility industry to adopt sustainable and green practices (Searcy & Cory, 2007). Among the most significant are the need to meet or exceed regulatory requirements, conditions of operating licenses, and taking part in voluntary initiatives to meet stakeholder demands for increased transparency, accountability, and corporate social responsibility (WBCSD, 2002).

Betsill (2001) examines opportunities for and obstacles to the mitigation of climate change in US cities. The study used example of the Cities for Climate Protection (CCP) campaign sponsored by the International Council for Local Environmental Initiatives. Betsill (2001) suggests a number of ways in which municipal governments can control greenhouse gas (GHG) emissions. It also highlights several obstacles and difficulties faced by local officials in their endeavor to control greenhouse gas emissions. One of the difficulties is that climate change is generally framed as a global issue. The CCP experience suggests that climate change is most likely to be reframed as a local issue that can be linked to issues such as air quality, which may already be on the local agenda (Betsill, 2001). The second difficulty stems from institutional barriers. Even when local governments recognize the need to take action to control GHG emissions, institutional barriers make it difficult for municipalities to move from political rhetoric to policy action. The third difficulty is that, in the absence of policy changes at the state and national levels, it is questionable whether local initiatives can make meaningful contributions to climate change mitigation (Betsill, 2001).

The findings of Betsill (2001) suggest that the most effective strategy to get municipal governments to mitigate global climate change is by not talking about global climate change. The best approach may be to ‘think locally, act locally’. The findings also suggest that all levels of government and society must be actively involved in efforts to control GHG emissions "so that complementarity and mutually reinforcing measures are concurrently implemented" (DeAngelo & Harvey, 1998, p. 134).

Rayner & Malone (1997) conclude that there are problems with the way most city governments organize themselves. This is coupled with the issue many city governments lack the administrative capacity to monitor their GHG emissions and there are often budgetary constraints that make it difficult for cities to invest in emissions' reduction activities. This is why, ultimately, motivating local action to mitigate global climate change calls for an indirect strategy which involves focusing on the ways in which emissions-producing activities are embedded in broader community concerns (Rayner & Malone, 1997).

Localizing global climate change is an important first step in developing municipal responses to global warming. This also helps generate political support for reducing local GHG emissions. It really does not matter whether the credibility of global climate change science is in question since the emphasis is on how reducing GHG emissions can help the city address other (more pressing) problems (Rayner & Malone, 1997).

2.5 Current Attitudes and Behaviors towards Energy

The need to adopt green practices stems from the fact that traditional energy sources in the form of fossil based fuel energy generated from burning of oil, natural gas and coal, is finite in quantity even though currently available in nature and can be extracted at a reasonably low cost.

There is substantial literature that explains the reasons for companies to behave in a socially responsible manner that will reward them financially (Epstein & Roy, 2001). Epstein and Roy (2001 p. 586) stated that "managers are increasingly asking how companies can improve sustainability performance, and, more specifically, how they can identify, manage and measure the drivers of improved sustainability performance and the systems and structures that can be created to improve corporate social performance".

Research suggests that there is a need for change in attitudes and behaviors towards the environment and the way resources are being used (Ockwell, Whitmarsh, & O'Neill, 2009). Such need has been dictated by factors such as global warming and environmental degradations which, in turn, are attributed to other factors such as deforestation, carbon dioxides emission, and burning of forests. Communities, organizations, and governments are under pressure to come up with solutions to tackle these problems.

Assurance is perceived as a fundamental element in gaining credibility and reliability of sustainability reports. It is also perceived as instrument for creating added value for improving internal learning as well as enhancing growth chances (Manetti & Toccafondi, 2012). There are growing numbers of organizations reporting on their sustainability practices through voluntary processes whose costs are generally borne by the assured corporation. The reporting is done on the basis of standards and guidelines that are totally discretionary. Such a process casts some doubt on the credibility and reliability of these processes (Manetti & Toccafondi, 2012).

According to Olsen (1981), many surveys indicate that about half of all Americans believe that the energy problem is real and serious, while less than one-fourth are completely unconvinced of the problem. Olsen (1981) also suggests that large proportions of the public support relatively strong conservation policies. This is especially the case if they feel personally responsible for helping solve the problem and hold a broad environmental ethic (Olsen, 1981). It seems that values that are linked with ideas of “voluntary simplicity,” appear to be replacing traditional American beliefs in material consumption. Olsen (1981) believes that the general attitudes toward the energy problem are not associated with reported conservation actions. He thinks that people who anticipate experiencing direct personal consequences from the energy problem are likely to take action to save energy. Accordingly, factors linked to one’s health and comfort are critical in predicting actual reductions in household energy consumption and that the two most commonly expressed reasons for conserving energy are to save money and to help solve the energy problem (Olsen,1981). Olsen (1981) also believes that, while experts argue at great length over the dimensions and magnitude of the world's energy problem, individual energy consumers stand on the sidelines of this debate wondering who to believe and what to do.

Krohn & Damborg (1999) suggest that cross country public support for renewable energy sources, in general, and for wind power, in particular, is very high, even though the level of public support is believed to vary with people's local experience with wind power. Krohn & Damborg (1999) also suggest that renewable energy sources have more credibility with the public than non-renewables such as fossil fuels and nuclear power. A national opinion survey conducted in the U.S. showed that 42% of Americans believe that renewable energy sources like solar, wind, geothermal, biofuels, and hydroelectric should be the highest priority for continued federal funding of energy research and development. The public's support for fossil fuels and nuclear energy come in last by seven and nine per cent, even though they are the energy sources generating the most energy in the USA (Krohn & Damborg, 1999).

On the other hand, it is widely recognized that public acceptability often poses a barrier towards renewable energy development. Devine-Wright (2005) reviews existing research on public perceptions of wind energy, where opposition is typically characterized by the NIMBY (not in my back yard) concept. The author identifies, summarizes and critiques six distinct strands of research: 1) public support for switching from conventional energy sources to wind energy; 2) aspects of turbines associated with negative perceptions; 3) the impact of physical proximity to turbines; 4) acceptance over time of wind farms; 5) "not in my back yard" as an explanation for negative perceptions; and, 6) the impact of local involvement on perceptions. The findings showed that research across these strands is fragmented and has failed to adequately explain, rather than merely describe, perceptual processes. Devine-Wright (2005) argues for more theoretically informed empirical research, grounded in social science concepts and methods. Devine-Wright (2005) also proposes the creation of a multidimensional framework that goes beyond the "not in my back yard" (NIMBY) label and integrates previous findings with social and environmental psychological theory (Devine-Wright, 2005).

Climate communication approaches require significant resources promoting attitudinal changes, but research suggests that encouraging attitudinal change alone is unlikely to be effective (Ockwell, Whitmarsh, & O'Neill, 2009). One way to engender mitigative behaviors would be to introduce regulation that forces green behavior. The government fears taking this approach and thinks that it leads to loss of precious political capital (Ockwell, Whitmarsh, & O'Neill, 2009). According to Ockwell, Whitmarsh, & O'Neill (2009), communication approaches that advocate individual voluntary action ignore the social and structural impediments to changes in behavior. They argue that engaging the public would require two crucial, but distinct, roles that communication could play in low carbon lifestyles: first, to facilitate and encourage public acceptance of regulation and second, to stimulate and involve grass-roots action through affective and rational engagement with climate change. The authors also argue that using communication to stimulate demand for regulation may reconcile these “top-down” and “bottom-up” approaches to decisions about attitudinal change.

In the case of utilities, renewable energies have not been of much interest to most of them. However, this situation is changing rapidly (Richter, 2012). Recent polls among utility executives indicate that the companies see themselves confronted with fundamental changes arising from introduction of new technologies, changing policy requirements, and higher customer expectations (Richter, 2012). Richter (2012) suggests that renewable energy technologies represented the top concern for utilities. It was clearly ranked over all other issues. Renewable energy technologies are expected to have the greatest potential for disrupting the current energy system.

The common assumption is that attitudes and behaviors need to be modified to manage demand and achieve step-changes in energy efficiency. This is also to secure a sustainable energy supply for the future (Owens & Driffill, 2008). Owens & Driffill (2008), suggest that pro-environmental attitudes are not reflected in significant shifts in behavior and that there is inconsistency in attitudes held by individuals. They attribute this finding to the complexity of attitudes, behaviors and the relationship between the two. They also suggest that public education and behavioral change can sometimes be effected through government campaigns, regulation or through economic instruments such as pricing, taxation and incentives. This can be achieved without an explicit change in attitudes.

Owens & Driffill (2008) summarize the current 'state of science' toward change in attitudes and behaviors pertaining to energy efficiency, in the following seven points:

1. Attitudes and behaviors are complex, so any strategy aimed at change will require interdisciplinary understanding;
2. Regulation, economic instruments and provision of information have all been used in attempts to modify attitudes and/or behaviors;
3. Physical, social, cultural and institutional contexts act as constraints and shape people's choices and options;
4. Interaction between technical infrastructures and social norms affect behavior over time, even though both norms may be resistant to change;
5. There is a strong instinct to target attitudes and behaviors through education and raising of awareness. However, information is unlikely to be effective if it runs counter to other powerful influences, such as social norms or prices;
6. Conflicts over energy facilities may not be resolved simply by recourse to 'the facts'. Opposition to particular technologies, or specific sites, may be rational, and is not adequately characterized as NIMBYism; and
7. Recent work concerned with attitudes and behaviors points to the need for more interactive, deliberative communication between stakeholders (decision-makers, technical experts and the public).

Attitudes and behaviors do change even though they may seem relatively stable at any particular moment. That change may be a radical one. Therefore, understanding this process is an important consideration in the shift towards a more sustainable energy economy (Owens & Driffill, 2008). The change in attitudes and social acceptance of energy conservation policies is demonstrated in figure 2.9 (Wüstenhagen, Wolsink, &

Bürer, 2007). They suggest that there are three interdependent dimensions to social acceptance, namely socio-political, community, and market acceptances.

Figure 2.9

Conceptualizing social acceptance. Source: (Wüstenhagen, Wolsink, & Bürer, 2007)

2.6 Major U.S. Energy Sources and Sectors

According to Energy Information Administration (EIA, 2008), Energy sources can be classified into two types: nonrenewable and renewable. Nonrenewable resources, such as fossil fuels and nuclear material, are removed from the earth and can be depleted. These resources have been the most used type of energy in the modern era. On the other hand, renewable resources, such as wind, solar, and geothermal, come from sources that regenerate as fast as they are consumed and are continuously available. The depletion in nonrenewable sources has given rise to energy such as biofuel, produced from food crops and other plants which are replenished every growing season.

The major energy sources consumed in the United States are petroleum (oil), natural gas, coal, nuclear, and renewable energy (EIA, 2014). The major users are residential and commercial buildings, industry, transportation, and electric power generators. The pattern of fuel use varies widely by sector. For example, oil provides 92% of the energy used for transportation, but only about 1% of the energy used to generate electric power. Understanding the relationships between the different energy sources and their uses provides insights into many important energy issues (EIA, 2014).

A comparison of different fuels shows that primary energy includes petroleum, natural gas, coal, nuclear fuel, and renewable energy. Electricity is a secondary energy source that is generated from these primary forms of energy. The United States uses British thermal units (Btus), which measure fuel use by the energy content of each fuel source.

Total U.S. energy use in 2013 was about 97.5 quadrillion Btus. One quadrillion equals 10^{15}, or one thousand trillion. One quadrillion Btus, often referred to as a *quad*, therefore represents about 1% of total U.S. energy use (EIA, 2014). In physical energy terms, one quad represents 172 million barrels of oil (about nine days of U.S. petroleum use), 51 million tons of coal (about 5.5% of total U.S. coal consumption in 2013), or 1 trillion cubic feet of dry natural gas (about 1.4% of total U.S. natural gas use in 2013). The number of quads used in 2013 from each primary energy source is shown in the figure 2.10. Petroleum accounts for the largest share of U.S. primary energy consumption, followed by natural gas, coal, renewable energy (including hydropower, wind, biomass, geothermal, and solar), and nuclear electric power (EIA, 2014).

Primary energy is used in residential and commercial buildings, in transportation, and by industry. Primary energy is also used to generate electricity. Amount of primary energy used in each of these sectors is shown in figure 2.11. Electric power generation is the largest user of primary energy, followed by transportation (EIA, 2014).

The electric power sector uses primary energy to generate electricity, which makes electricity a secondary, rather than a primary, energy source. Most electricity is used in buildings and by industry (EIA, 2014). This means that the total amounts of energy used by residential and commercial buildings, industry, and transportation are actually higher than the amounts shown on the graphics when electricity is included (EIA, 2014).

The lines in figure 2.12, below, connecting the primary energy sources (on the left) with the demand sectors (on the right) summarize the links between energy sources and different sectors in the United States. For example, because all nuclear energy is used in the electric power sector to generate electricity, and nuclear represents 22% of the primary energy used by that sector, the line between nuclear energy and the electric power sector shows 100% on the nuclear (supply source) side and 22% on the electric power (demand sector) side (EIA, 2014). Sources of energy used in the US, from both renewable and nonrenewable sources, is given in table 2.2

Figure 2.10

U.S. primary energy use by source, 2013. Source: (EIA, 2014)

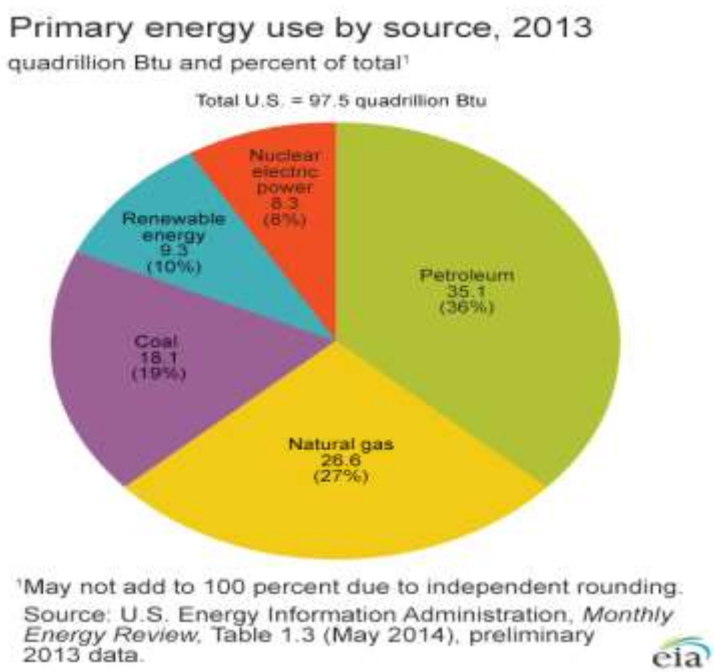


Figure 2.11

U.S. primary energy use by sector, 2013. Source: (EIA, 2014)

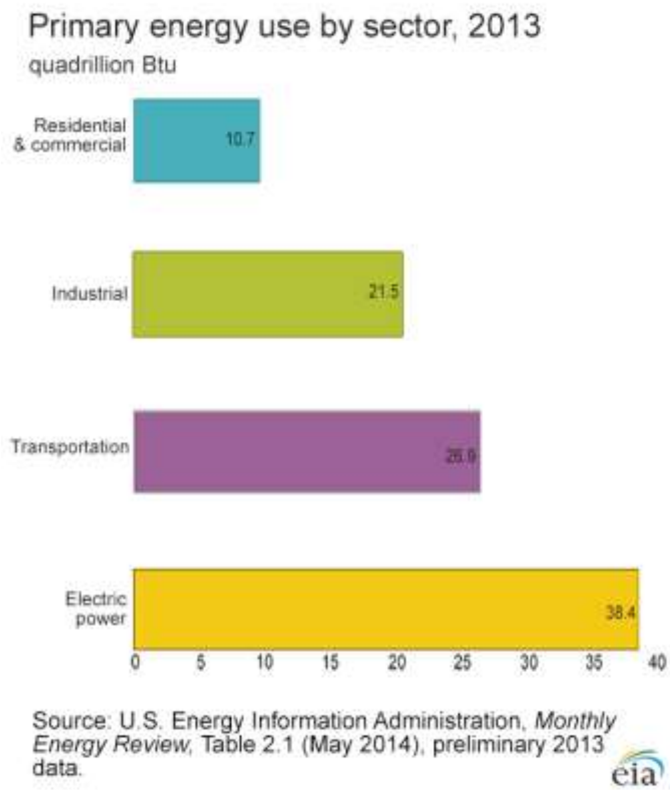


Figure 2.12

U.S. primary energy consumption by source and sector, 2013. Source: (EIA, 2014)

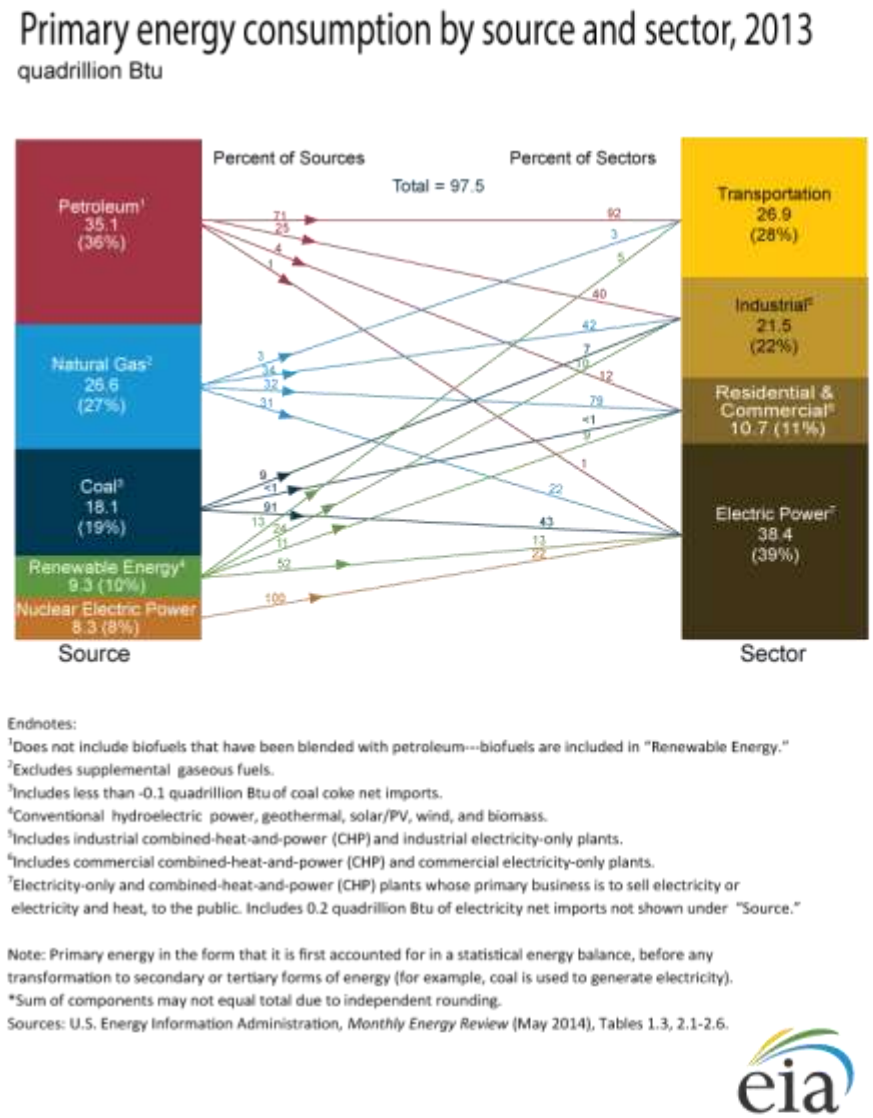


Table 2.2
Sources of Energy used in the U.S. Source: (EIA, 2008)

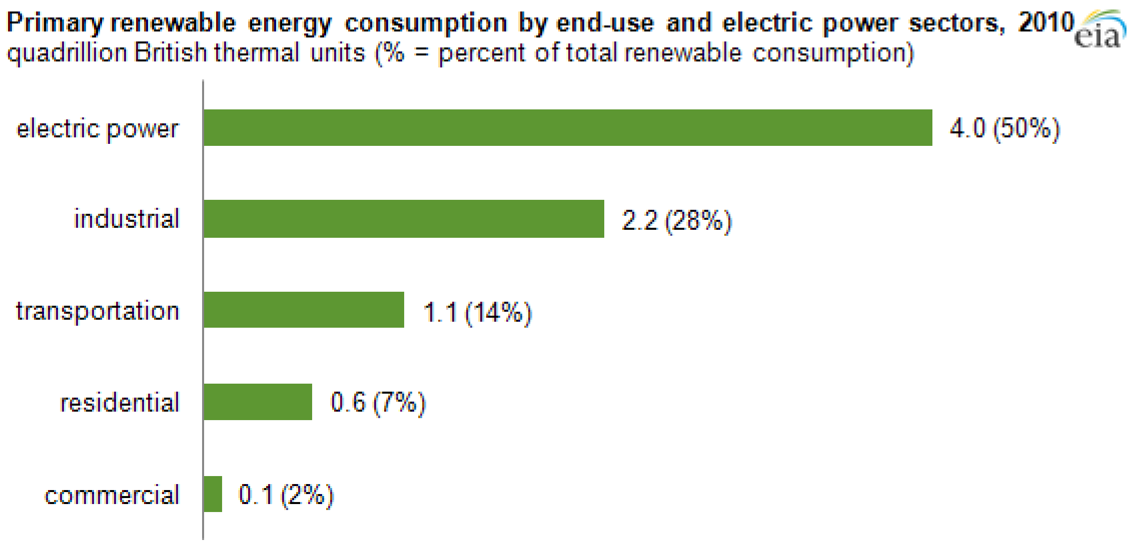
Oil	Hydropower
Natural Gas	Solar
Coal	Wind
Nuclear	Hydrogen
Bioenergy	Coal-based fuel
Geothermal	Wood

Source: Energy Information Administration. "Official Energy Statistics from the U.S. Government." U.S. Department of Energy. http://www.eia.doe.gov/ (accessed May 21, 2008).

U.S. consumption of primary renewable energy by end use and electric power sector in 2010 is given in figure 2.13. The total consumption was about 8 quadrillion British thermal units. This amount is equal to 8% of all energy used nationally. Renewable energy - including hydroelectric, wood, biofuels, wind, organic waste, geothermal, and solar - was used in all sectors of the U.S. economy (EIA, 2010). There are five sectors that generate renewable energy in the U.S.:

1. Electric power sector: This sector generates electricity, primarily from hydroelectric, followed by wind.
2. Industrial sector: This sector is used for manufacturing applications. Over half of this sector was in the form of wood and wood waste (bark, sawdust, wood chips, wood scrap, and paper mill residues). Many manufacturing plants in the wood and paper products industry use wood waste to produce their own steam and electricity.
3. Transportation sector: this sector uses biofuels, which is, mainly, ethanol blended into motor gasoline.
4. Residential sector: This sector is mainly wood burned for heating and cooking.
5. Commercial sector: mainly wood and wood waste for heating, cooking, and combined heat and power applications.

Figure 2.13
U.S. consumption of primary renewable energy by end use and electric power sector in 2010. Source: (EIA, 2010)



Source: U.S. Energy Information Administration, Annual Energy Review.
Note: 2010 data are preliminary.

2.7 Renewable Energy in Texas

The development of renewable energy in markets with competition at wholesale and retail levels poses challenges caused by the intermittent nature of some renewable energy resources, which impact reliability, operations, and market prices. This, in turn, affects all market participants. These challenges may be successfully overcome by setting and imposing goals, establishing trading mechanisms, and implementing operational changes in competitive markets (Zarnikau, 2011). Coordination among many market players and stakeholders is needed to meet renewable energy goals (Zarnikau, 2011).

Texas has adopted a strategy which has contributed to its leadership among U.S. states in non-hydro renewable energy production. Texas has been largely successful creating about 9,000 MW of wind power electricity generating capacity. There are numerous problems associated with this extensive reliance upon wind power. Such problems stem from the need to procure higher levels of operating reserves. Market prices often go negative in the proximity of wind farms. This is coupled with inaccurate wind forecasts. All of these factors have led to reliability problems (Zarnikau, 2011).

Texas is not traditionally considered or commonly thought of as a “green” state. It is known for being the home to most of America's major oil companies and the leading state in both electricity consumption and production. Despite this fact, Texas is the nation's leader in non-hydroelectric renewable energy production. The policies which enabled the state to hold such a leading role were not enacted out of concern over climate change. Many of the state's policymakers deny any link between global warming and human activities (Zarnikau, 2011; Price, 2009; Attorney General of Texas, 2010; Caputo, 2007).

A combination of factors such as the declining oil production, Texas being the largest non-hydroelectric renewable energy resource potential in the US, an entrepreneurial business climate, and an interest in diversifying its energy mix, have contributed in making wind generation attractive. Texas has one of the world's most competitive electricity markets. Yet, the growth of renewable energy has had little to do with the pure operation of market forces. Policy goals and programs were superimposed on the market, though market mechanisms have been relied upon to meet the policy goals (Zarnikau, 2011).

Texas took several policy initiatives, including renewable energy goals, renewable energy credit trading program, and the designation of Competitive Renewable Energy Zones. It also reviewed the impacts of renewables (primarily, wind energy) upon the state's primary electricity market. These initiatives resulted in Texas succeeding in promoting renewable energy development within a competitive electricity market framework Zarnikau, 2011). This is despite the negative effect of the rapid wind generation expansion on the state's electricity reliability and cost.

Texas energy production and consumption in trillion Btu (1970–2008) is given in figure 2.14. It also shows that only recently did the state of Texas begin to tap its vast renewable energy potential. It is clear that in the period between 1970 and 2006, production continued to fall while consumption continued to rise. This is one of the factors which led policy makers to enact new renewable energy legislations. These legislations introduced customer choice into the service areas of the state's investor-owned utility services areas in the Electric Reliability Council of Texas (ERCOT) market. These legislations also fostered competition at the wholesale level and established programs to foster the development of renewable energy. Steady growth of ERCOT Installed wind generating capacity in MW is given in figure2.15. Production for the 1999 to 2010 steadily rose from near zero MW, in 1999, to over 9000 MW, in 2010. Map of Texas detailing (county-wise) megawatt production from wind generation projects completed, wind generation projects under construction, and wind generation projects announced is given in figure 2.16.

Figure 2.14
Texas energy production and consumption in trillion Btu (1970–2008)
Source: (US DOE EIA - undated)

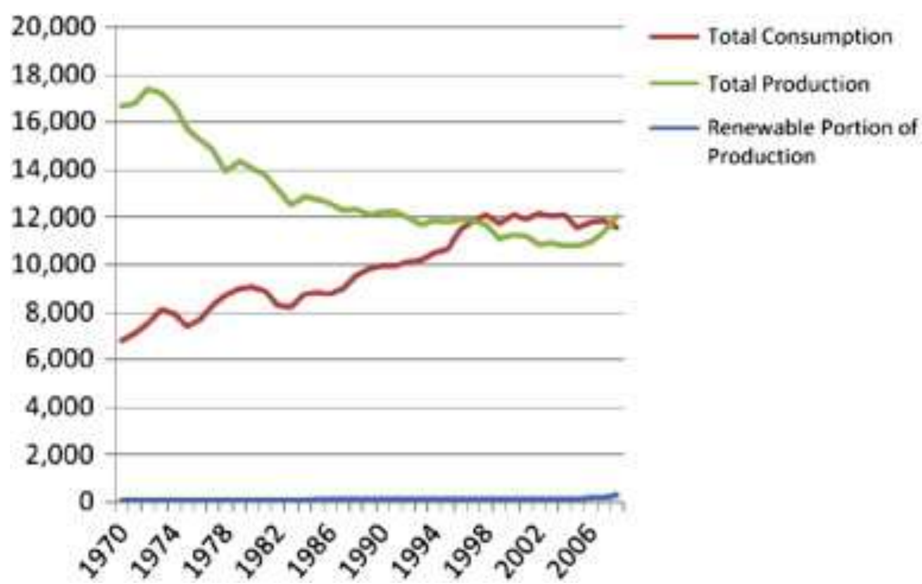


Figure 2.15

Texas growth of ERCOT installed wind generating capacity in MW, 2010. ERCOT-Installed wind generating capacity in MW (end of year). Source: (Recreated from ERCOT, 2010).

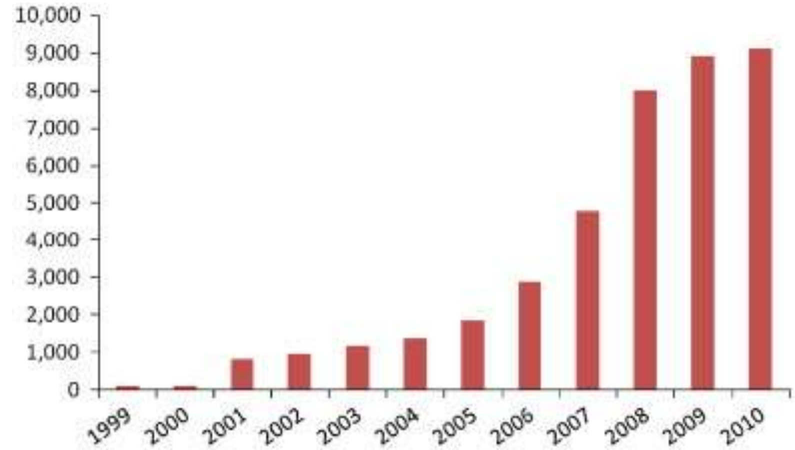
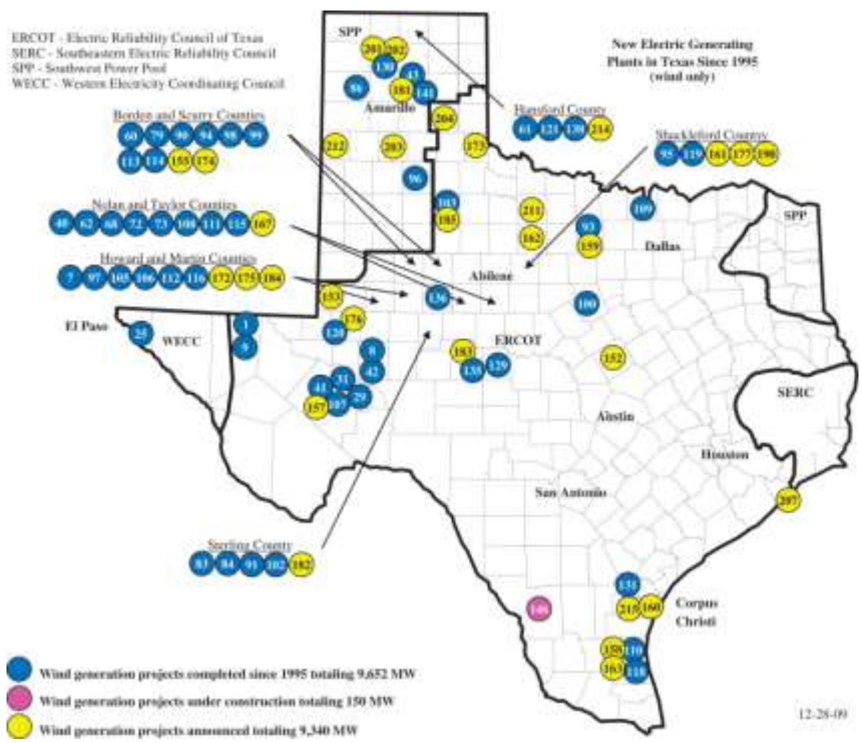


Figure 2.16

Wind generation projects in Texas. Source: (ERCOT, 2010).

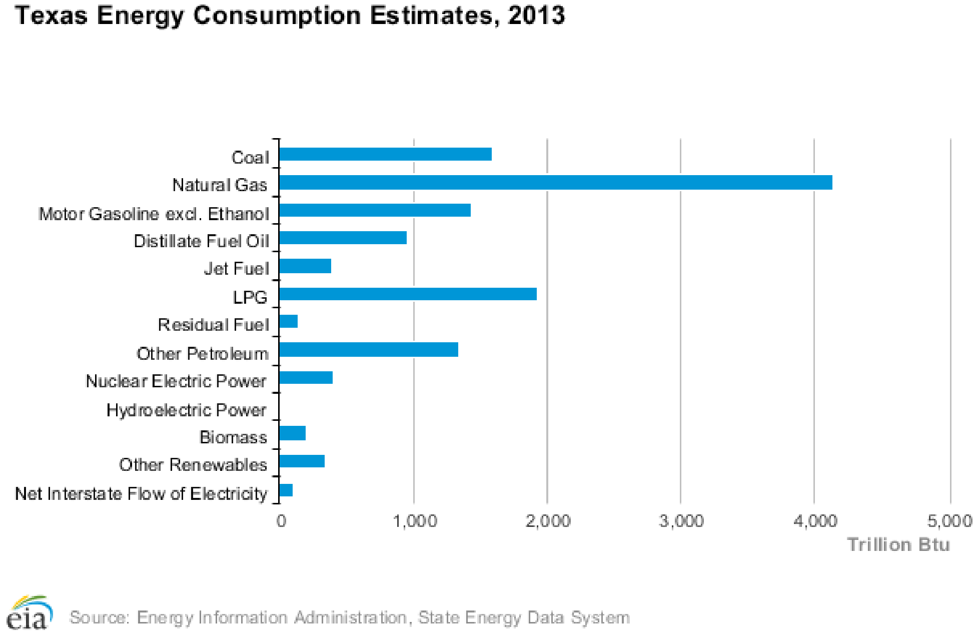


Texas currently has the largest wind energy capacity, with 8797 total megawatts and an additional 660 MW under construction (Swofford & Slattery, 2010). Swofford and Slattery (2010) explores three research strands: 1) describing the environmental attitudes of a population in close proximity to a wind farm development, 2) determining the influence that proximity has on wind energy attitudes, and 3) determining if Nimby phenomenon is appropriate for explaining human perceptions of wind energy. Swofford & Slattery (2010) results on general wind energy attitudes signify overall public support for wind energy. However, NIMBY is clear in the findings. Those living closest to the wind farm indicate the lowest levels of support, while those living farthest away indicate much stronger support. Alternative factors such as planning implications, public participation and education might be considered for further explanations (Swofford & Slattery, 2010).

2013 estimates for Texas energy consumption, production, and consumption by end use sector is given in figures 2.17, 2.18, and 2.19. Texas net electricity generation by source for May 2015 and recent price differences from U.S averages is given in figures 2.20 and 2.21. Fossil based energy represents the bulk of both energy consumption and production in Texas. In 2013, Texas energy consumption by end-use sector was 51% industrial, 21% transportation, 13% residential and 12% commercial. While there is a steady growth in generation of electricity from renewable sources, fossil based energy generation remains the dominant source. However, the recent fall in oil prices may have a negative effect on growth in electricity generated from renewable sources.

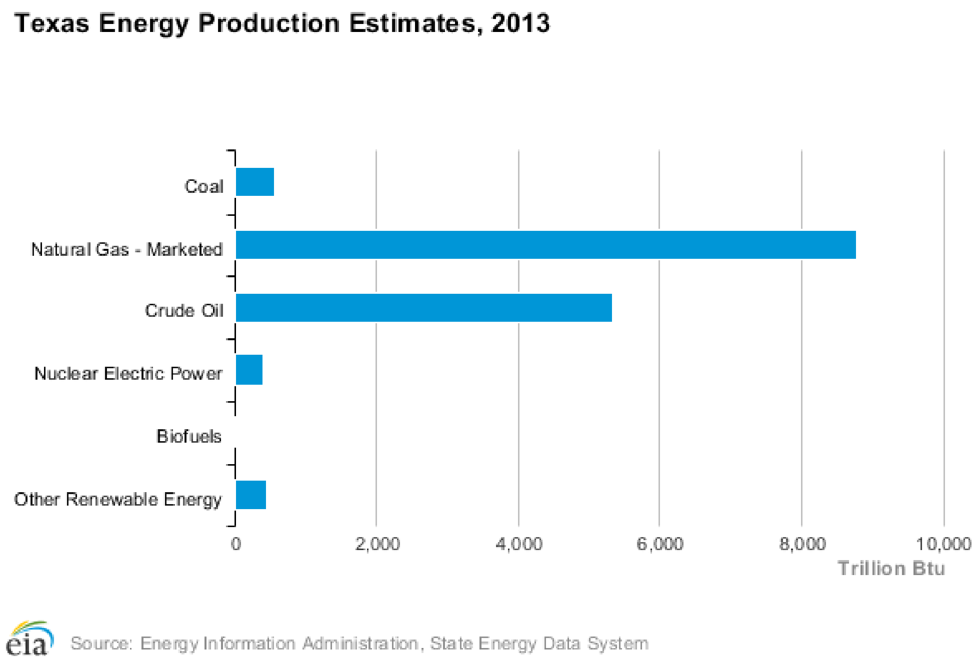
Figures 2.17

2013 estimates for Texas energy consumption. Source: (EIA, 2013)



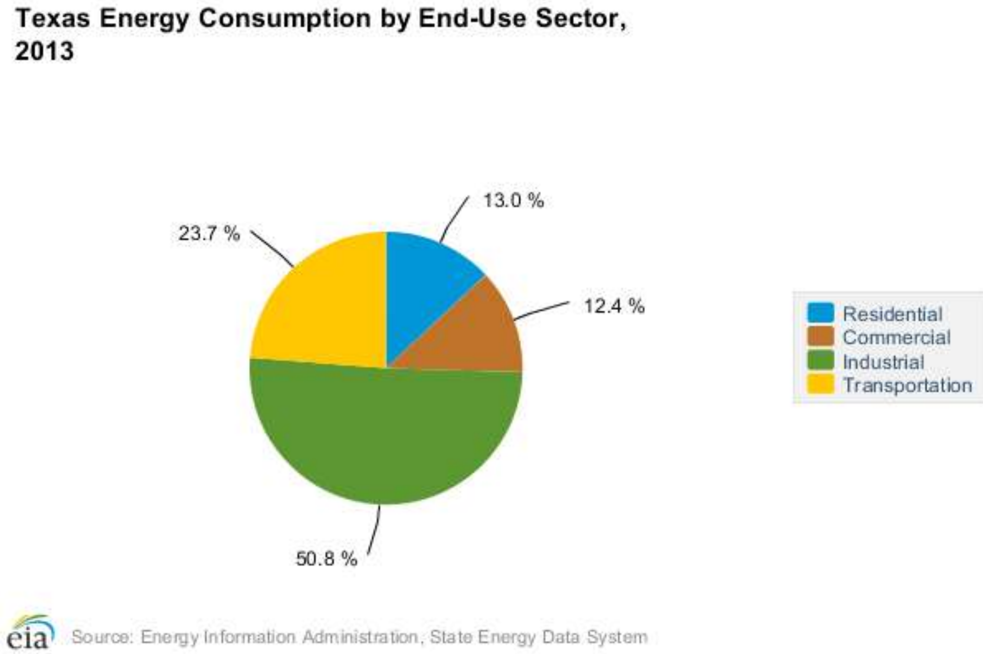
Figures 2.18

2013 estimates for Texas energy production. Source: (EIA, 2013)



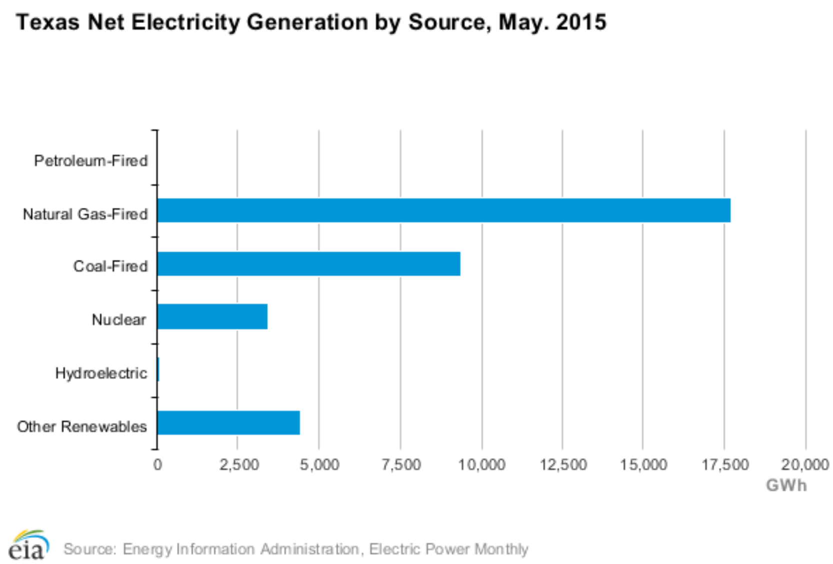
Figures 2.19

2013 estimates for Texas energy consumption by end-use sector. Source: (EIA, 2013)



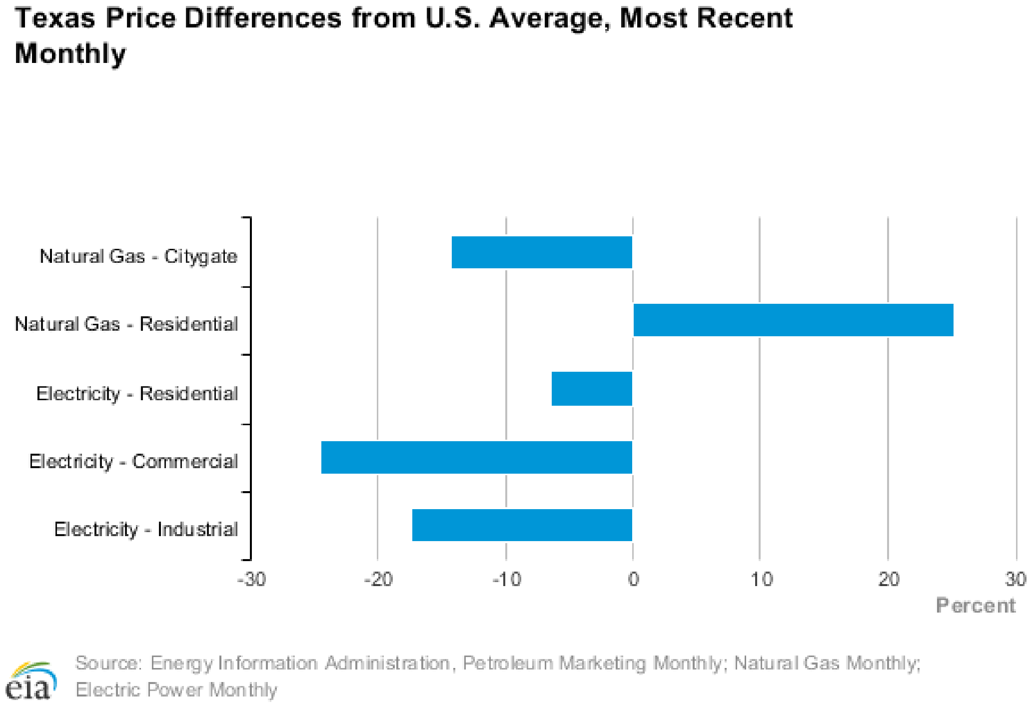
Figures 2.20

Texas net electricity generation by source for May 2015. Source: (EIA, 2015)



Figures 2.21

Texas price differences from U.S averages. Source: (EIA, 2015)



3. CONCEPTUAL MODEL AND FRAMEWORK

3.1 Overview

Based on literature review, the conceptual model and framework is developed to help understand the interdependent relationships of variables affecting the adoption of green practices (figure 3.1). The model provides basis for a quantitative analysis, which uses statistical test to evaluate relationships among the variables. The model's relationships are examined to ascertain the level of green practices adopted by municipalities under study. Special attention is given to factors influencing municipalities' decisions to adopt green practices in operations pertaining to production, transmission, and distribution of energy. This section also provides a conceptual understating of the major variables included in the framework, the expected relationships among these variables, and the expected outcomes.

The model relies on the previous literature for providing a framework for organizing the manner in which groups of variables can affect the outcome of adopting green practices. Scholars have developed a body of theory to aid in understanding the relationship between clusters of variables. This is drawn from four theories/models that explain the way these clusters interact. The first theoretical foundation for the model is drawn from Stein (2013) which shows stakeholders impacting or impacted by energy production technology decisions. The model groups the factors which impact energy production decisions under four clusters; financial, technical, environmental, and socio/economic/political.

Stein (2013) provides an ordering of the three main components of the model: 1) decision makers; composed of utilities, elected officials, investors, and technology suppliers; 2) influencers; composed of environmental groups, industry groups, and government agencies; and 3) groups impacted; composed of local communities, consumers, and businesses.

The second foundation for the model is based on Brody, et al. (2008), which looks into the question of households' willingness to install solar thermal technologies for heating purposes. The authors also divided variables under three categories/clusters; environmental, economic, and sociopolitical.

The third foundation is based on Afgan et al. (1999), which state that corporations operating within the utility industry need to have some criteria for system sustainability assessment. It also states the need to identify a range of variables which can affect the adoption of green strategies in the sector. According to Afgan et al. (1999), such criterion has to include four aspects: resource, environment, social, and economic.

The fourth foundation draws from Geis & Kutzmark's (1998) view that the criterion for selecting variables must be based on six parameters:

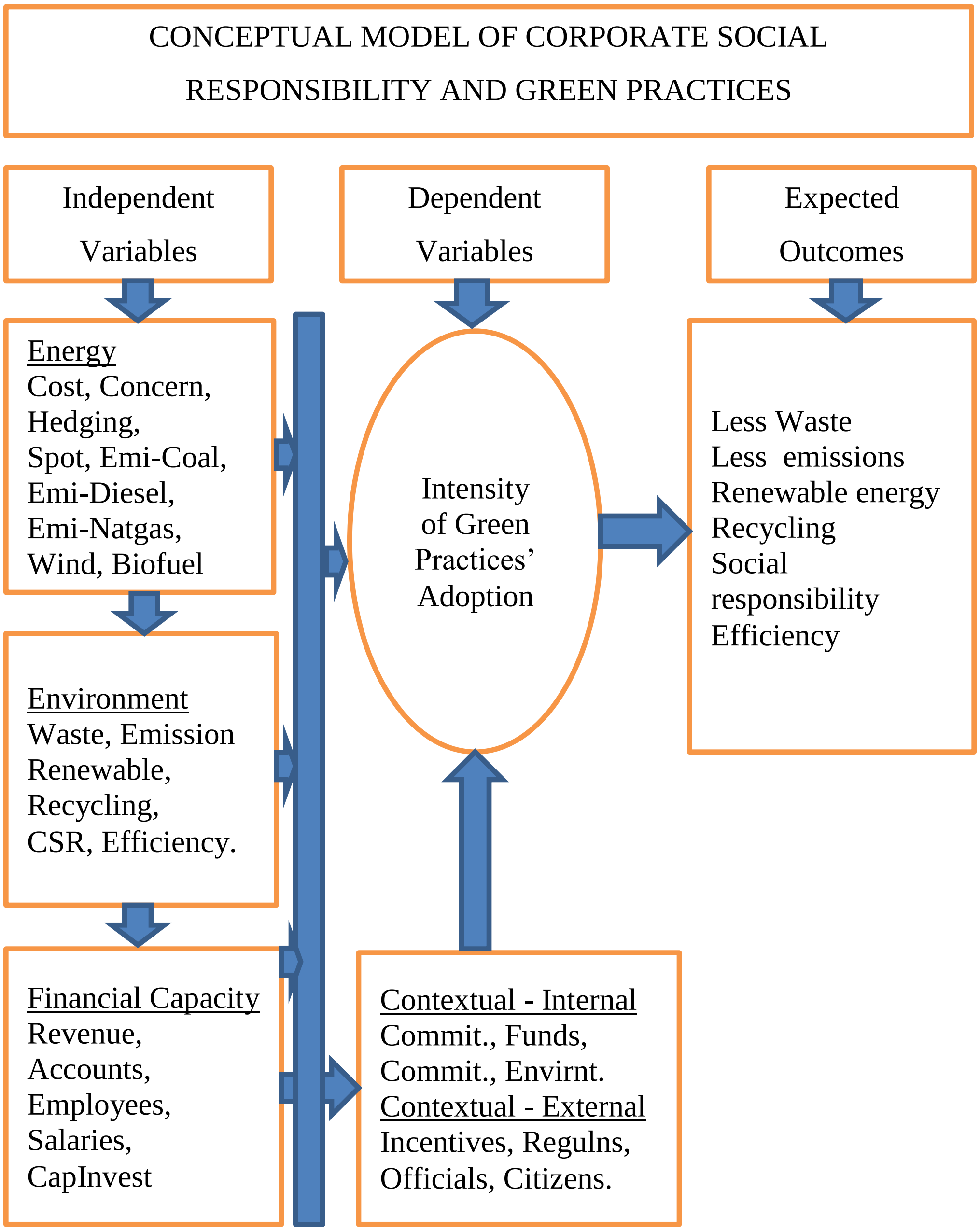
1. Reflect sustainability concept.
2. Reflect measurable indicators.
3. Based on timely information.
4. Based on reliable information.
5. Reflect the strategic view of the organization's sustainability goals.
6. Give possibility to optimize the system energy cost, material use, government regulations, financial resources, protection of the environment, coupled with safety and reliability of the system.

Based on the above parameters, Geis & Kutzmark (1998) developed a model to reflect four indicators: resource indicator, environmental indicator, social indicator, and efficiency indicator.

The conceptual model core components reflect the importance of creating groups, clusters, and variables which aid in explaining the adoption of green practices by municipal utility organizations. There are six components in the model, four of which are under the clusters of energy, environment, financial capacity and contextual (figure 3.1). Energy cost, for example, can be a factor in changing management's behavior toward the consumption of fossil based energy or using renewable sources of energy. On the other hand, concern for the environment can lead to the adoption of environmentally friendly practices such as producing less waste and emission, using renewable energy, recycling, involving in social and community projects, and running energy efficient operations. Commitment and efforts put by managers who favor adoption of green practices or the development of community projects may be aided by the financial capacity of the city and how much revenue it generates. Decisions made by managers can also be impacted by regulations imposed by the federal government, the state or the local government.

Figure 3.1

Conceptual Model and Framework.



3.2 Dependent Variable: Intensity of Green Practices' Adoption

The research is limited to public municipal utility organizations created to serve communities and that profit is not their goal. "Municipalities" is the studies unit of analysis. The dependent variable of the conceptual model is "intensity of green practices' adoption". The goal is to determine out why some municipal utility organizations adopt green practices while others do not and, if so, to what degree. What are the factors driving the adoption of these practices; is it wealth, is it commitment by management or elected officials, or is it federal, state, or local government laws and regulations imposed on them?

The dependent variable is measured as an index. If there are a number of practices adopted by municipal utilities at varying degrees, the degree of adoption can be measured by dividing the number of actual practices adopted by the total number of practices. Different weights can be given to each practice, depending on its significance and contribution to the overall intensity of green practices adopted. Accordingly, scores are assigned to each practice and express the sum of actual score as a percentage of total score. An ordinal scale is used to help examine the degree of adoption in a continuum line from zero to hundred percent; hence avoiding confining the result to mere two groups, those who adopted and those who did not.

The adoption of technology and innovation, for example, can impact the level of green practices adopted by any given municipality. The use of technologies can come in the form of smart meters, emails, payment systems (percentages of mail vs. online), etc. to serve the consumer. It also includes the adoption of improved community services - money spent on more energy efficient street lights and rebates. The dependent variable can also be shaped by the extent of implementing practices such as waste reduction, less emissions, use of renewable energy, recycling, efficiency, and more socially responsible practices. The goal is to find out the threshold that utility organizations find it worthwhile to adopt green practices.

It is predicted that utility organizations which delay in adopting green practices or are forced by legislation into adopting them are less likely to embed these practices long term into their. The assumption is that green practices, coupled with social and environmental responsibility, do impact the overall sustainability of organizations. However, as indicated above, the predicted outcome (intensity of green practices' adoption), not only depends on predictor variables but also on many contextual variables, which also influence the outcome, each at a varying degree.

Even though many organizations would like to portray the image that reflects social and environmental responsibility, the reality is that they fair differently in this subject depending on many factors. Internal structure, belief system, organization's culture, and leadership style do influence the outcomes and set organizations apart. Temporal dimension is another factor that can influence outcomes. Examining historic data can give an idea about the time green practices were introduced to the organization. This also helps in finding out if policies were translated, over time, into action. These actions can come in the form of implementing contextual control variables such as management commitment, local or State and Federal laws, wealth, and time of introduction and implementation of green practices into the organization.

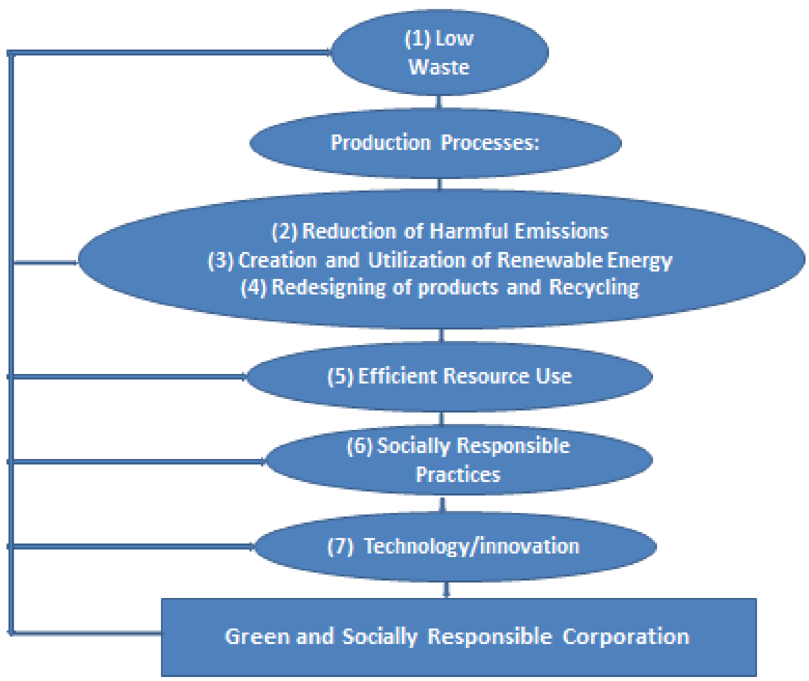
Even if there are different municipalities adopting exactly the same green practices, there will be differences in intensity of adoption. Through conducting interviews with officials and city managers, impact of different variables are assessed and most importantly, management styles of those officials may shed light into their personal commitment to the idea of green organization.

Municipalities are ideal for this study because they are publicly owned and that profitability is not their primary goal for adopting green practices. Those who show corporate responsibility are expected to be self-motivated and true believers in an environmentally friendly organization. Temporal data pertaining to the selected municipalities are examined to determine the duration of adopting corporate social responsibility and green practices and if it has an impact on a municipality's environmental records.

Seven components of corporate social responsibility and green practices; low waste, reduction in harmful emissions, creation and utilization of renewable energy, efficient use of resources, socially responsible practices, and use of technology and innovation are shown in figure 3.2.

Figure 3.2

Diagram Showing Components of Corporate Social Responsibility and Green Practices.



3.3 Independent Variables

The independent variables are too many to fit in one model, considering the limited number of sample observations which is discussed in the population section. To remedy this situation, the variables are divided into four blocks/categories; Energy, Environment, Socioeconomic, and Contextual variables.

Corporate social responsibility and green practices are defined in the following terms, which form the basis for the survey/questionnaire.

- Energy Indicators
    - Energy resource indicator, defined as percentages of energy produced/purchased from coal, natural gas, nuclear, and wind, in tons divided by the energy produced in one year (Kilogram per Kilowatt Hours) (KG/KWH).
    - Efficiency indicator, defined as the percentages of fuel consumed (coal, oil, natural gas, nuclear, and wind) divided by the energy produced in one year (KG/KWH).
- Environmental Indicators
    - Emission and carbon dioxide indicator, defined as the amount of carbon dioxide, in tons, produced by the plant divided by the energy produced in one year (KG/KWH)
    - Waste environment indicator, defined as the amount of waste, in tons, produced by the plant divided by energy produced in one year (KG/KWH).
    - Renewable Energy, defined as the percentage of renewables to fossil based energy produced per year.
- Socioeconomic Indicators
    - Job indicator, defined by the number of paid hours per KWH produced in one year (Hours/KWH).
    - Diversity and vitality indicator, defined as the number of diverse entities divided by energy produced in one year (diversity/KWH).
    - Philanthropy indicator, defined as the Dollar amount donated to support community projects per KWH produced in one year (USD/KWH).
    - Volunteering indicator, defined as the number of hours volunteered by employees to support community projects in one year (Hours/KWH).
    - Efficiency economic indicator, defined as the revenue generated minus cost divided by total energy produced in one year (Revenue – cost/KWH).

- Capital investment indicator, defined as amount of USD invested in assets divided by the energy production in one year (USD/KWH).

3.4 Contextual Variables

Contextual Variables are the third type of variables which may help explain why an independent variable (variable A) is correlated to the independent variable (variable B). The contextual variable alters the nature of the relationship between variables A and B. For example, variables A and B might be correlated when a mediating variable is high but not when it is low, or vice versa (Leedy et al., 2010).

According to the model above, intensity of green practices' adoption is impacted by predictor variables grouped under Energy, Environment, and Financial Capacity variables. However, the impact of these variables could be altered by the Contextual variables.

- Management Commitment: The role played by senior management in committing to and adopting corporate social responsibility and green practices. For example, mission statement may include a statement on restructuring internal processes to make operations more efficient.
- Wealth: Municipality's wealth can be related to the size of community it is serving as well as the medium prices of homes, being a source of property tax revenue. Municipalities which have more financial resources may be in a better position to implement corporate social responsibility and green practices, if compared with smaller ones. Median home value is one of the variables used to measures wealth of a municipality.
- Early Adoption of green practices: Adoption of green practices may stem from internal commitment or from government regulations. Organizations may embrace these principles and adopt them early on. On the other hand, according to Porter and Linde (1995), some corporations spend too many of their environmental dollars on fighting regulations and not enough on finding

real solutions. As such, it is likely that there are early adopters and late or non-adopters of green practices.

- Local or State and Federal laws and regulations: Municipalities may be required to adhere to certain laws put in place by local authorities or by the state or federal government. The presence or absence of such laws may make a difference in the levels of green practices adopted by different municipalities.
- Region: Proximity of a municipality to an urban setting, measured in distance to a big city.
- Education: The average years of education attained in the region.

4. THE HYPOTHESES

The research hypothesis is a prerequisite for any sound and well-developed research study. It contributes to the solution of the research problem (Toledo et al., 2011).

4.1 Overview

The research hypotheses are drawn to reflect the five dimensions previously mentioned - structural, spatial, temporal, legal, and operational. It is understandable that each of these dimensions, if taken individually, presents a unique aspect of corporate social responsibility and green practices. However, they need to be taken collectively. For example internal structure and systems of operation within an organization have a role to play. However, it may not be clear if geographical locations augment or hamper the organization's systems. Time may be a factor which can play a role in outcomes since variations in times of adopting corporate social responsibility and green practices may lead to different results.

The relationships created in the conceptual model above, are tested to see if the independent and contextual variables did play a role in impacting the dependent variable. The goal is to create hypotheses to test and see if factors such as energy cost, concern for the environment, wealth, regulations, and styles of management could have led to intensity in green practices' adoption.

4.2 Main Hypotheses

$H_0 1$: regulation is not a driver behind adopting green practices. It is rather the voluntary and non-profit nature of municipalities which lead to that.

$H_a 1$: regulation is a driver behind adopting green practices.

Federal, state, or local regulations may force municipalities to adopt green practices. Therefore, the decision to implement green practices may depend on the presence or absence of such regulations.

H_0 2: The non-profit nature of municipalities works as an impediment for management embracing green practices due to lack of motivation.

H_a2: The non-profit nature of municipalities does not work as an impediment for management embracing green practices due to lack of motivation.

Municipal utilities are non-for-profit organizations. As such, they may not be interested in profit maximization. They may be interested in raising enough revenue to support their operations and infrastructure. They may or may not be motivated to adopt green practices.

H_0 3: wealth of a city has little to do with adoption of green practices.

H_a 3: wealthier cities show higher levels of adoption of green practices compared with their less wealthy counterparts.

Resources attainable to municipalities may play a role in the programs and services they render to their citizens.

H_0 4: a community's party affiliation has little to do with adopting green practices by the municipality serving that community and that there is little variation between communities of different party affiliations in the way they adopt these practices.

H_a4: Municipalities operating in communities with liberal party affiliations are more likely to adopt green practices when compared to conservative communities.

This is to find if party affiliation of a population of a city or a municipality may be a factor in decisions to support adoption of green practices. The influence can be through citizens' involvement or pressure groups that are in favor or against adoption of green practices.

$H_0$5: duration of adopting corporate social responsibility and green practices has limited impact on a municipality's environmental records.

H_a5: duration of adopting corporate social responsibility and green practices has an impact on a municipality's environmental records. With time they will develop expertise which helps them improve their environmental records.

The assumption here is that municipalities which have spent longer time implementing green practices would have acquired expertise, if compared with municipalities which are new to the filed.

$H_0$6: concern for emission of carbon dioxide and its impact on global warming is not a motivating factor leading to the adoption of green practices.

H_a6: concern for emission of carbon dioxide and its impact on global warming is a motivating factor which leads to the adoption of green practices.

The extent to which municipalities and their citizens are concerned about global warming and also believe that carbon dioxide emission may influence the environment, may be a factor in decisions taken to adopt green practices.

5. RESEARCH DESIGN AND METHODOLOGY

Steps taken to complete this study involved data collection, testing, evaluation, and analysis/interpretation, to reach some conclusions about adoption of green practices by municipalities. The project aims at finding out if there are differences between municipalities under study in the way they adopt corporate social responsibility and green practices.

5.1 Study Population (Municipal Utilities)

In straightforward cases such as examining material from a production line, it is feasible to identify and measure every single item in the population and to include any one of them in the sample. This process is known as direct element sampling. On the other hand, to satisfy the randomness nature of the research as well as to reduce elements of biasedness, the sample is to cover a wider range of the population. For practical reasons this may not be possible all the time either because it is cost-prohibitive, in cases such as reaching every citizen of a country, or impossible, in other cases such as reaching all humans alive. For these reasons, the research was limited to a small area in Texas (South Eastern Texas).

Texas Municipal League (TML) is divided into 16 regions throughout Texas. South East Texas has four regions (regions 10, 11, 14, and 16), which have a total of 60 municipalities. Officials in all of the 60 municipalities were contacted via email and/or phone. Meetings for interviews were arranged. The goal was to get a minimum of 30 completed surveys.

List of South East Texas municipalities (based on the four regions):

Region 10

San Saba, Mason, Uland, Lampasas, Burnet, Wilkinson, Trams, Has, Mlam, Bastrop, Caldwell, Burleson, Lee, Brazos, Washington, and Fayette. (16 Counties).

Region 11

Lavaca, Dewitt, Jackson, Victoria, Goliad, Calhoun, Refugio, Aransas, Bee, Live Oak, San Patrico, Jim Wells, Nueces, Kleberg (14 Counties).

Region 14

Houston, Trinity, Madison, Walker, San Jacinto, Grames, Montgomery, Waller, Harris, Chambers, Galveston, Brazoria, Fort Bend, Austin, Colorado, Wharton, Matagorda. (17 Counties).

Region 16

Shelby, Nacogdoches, Angelina, San Augustine, Sabine, Newton, Jasper, Tyler, Polk, Hardin, Orange, Liberty, Jefferson. (13 Counties).

5.2 Concepts Measurement

This section talks about measurement of specific variables collected. The research question aims at ascertaining the reasons why do some municipal utility organizations adopt corporate social responsibility and green practices while others do not. The assumption made here is that there are variations in the way different cities adopt these practices, depending on factors such as city size, wealth and political affiliations. For this reason, several variables were combined to create indexes for the dependent and independent variables.

5.3 Measurement of key variables

5.3.1 Dependent Variable

The dependent variable, "Intensity of Green Practices' Adoption" measures the extent to which green practices are adopted by differ municipalities, at varying degrees. It is measured in terms of number of actual practices adopted expressed as a percentage of total number of practices. Nine variables are combined, coded as binary (0,1), and the total positive responses for each city was expressed as a percentage of the total green practices available (9), reflecting each city's level of green intensity, ranging from zero to a hundred. The lists below show the nine practices, composed of five green processes and four green technologies.

Green processes

1. Change of policies to reflect green practices.
2. Training and awareness programs for employees.
3. Incorporation of green practices in mission statement.
4. Involvement of stakeholders and taking their views into consideration.
5. Commitment by senior management in driving the implementations of programs.

Green technologies

1) Smart meters.
2) Smart grid.
3) Emails.
4) Online payment system.

5.3.2 Independent Variables

The independent variables are too many to fit in one model, considering the limited number of sample observations. To remedy this situation, the variables were divided into four blocks/categories; energy, environment, financial capacity, and contextual variables. Each block was analyzed individually and the most significant variables, from each block, were chosen to conduct the final analysis.

5.3.2.1 Energy Block of Variables

Survey responses to questions on energy were considered for the Energy Block. Below is the list of variables:

- Cost (concern for current cost of energy);
- Concern (concern for future cost of energy);
- Hedging (entering into hedging contacts);
- Spot (entering into spot contracts);

- Emi_Coal (emission from coal);
- Emi_Diesel (emission from diesel);
- Emi_Natgas (emission from natural gas);
- Wind (wind energy generated); and
- Biofuel (biofuel energy generated).

5.3.2.2 Environment Block of Variables

The list below shows the variables in the Environmental Block:

- Waste (importance of less waste);
- Emission (importance of less emission);
- Renewable (importance of renewable energy);
- Recycling (importance of recycling);
- CSR (importance of corporate social responsibility); and
- Efficiency (importance of energy efficiency).

5.3.2.3 Financial Capacity Block of Variables

The variables for the Financial Capacity Block are as follows:

- Revenue (revenue generated);
- Accounts (number of customer accounts);
- Employees (number of employees);
- Salaries (employees' salaries and wages); and
- CapInvest (capital investment).

5.3.2.4 Contextual Block of Variables

The contextual Block of variables are composed of responses to question on internal and external motivating factors, which led to the adoption of green practices.

5.3.2.4.1 Internal Motivation Variables

- Committ (commitment by employees);
- Funds (availability of funds);
- Fuel (high fuel cost);
- Managmt (management’s involvement); and
- Envirnmt (concern for the environment).

5.3.2.4.2 External Motivation Variables

- Incentives (incentives such as energy credits);
- Regulns (government laws and regulations);
- Officials (pressure from elected officials); and
- Citizens (pressure from citizens).

variable types, concepts measured, how they are measured, scale used, and sources of data are shown in table 5.1

Table 5.1

Concept Measurement

Variable	**Concept Measurement**	**Type**	**Measurement**	**Scale**	**Source**
Intensity of green practices' adoption	The extent of adoption of green practices	Dependent	An Index: The number of actual practices adopted divided by the number of total practices.	Ordinal;0-1*10, changed into a scale of 0-100 (0 is no adoption and 100 is full adoption	Survey
Concern for Emission	Concern for carbon dioxide emission	Independent	Ratio of energy produced / purchased (coal, natural gas, nuclear, & wind), in tons TO energy produced in one year (KG/KWH).	Ratio	Survey/ EIA - Electricity Data Browser
Concern for energy cost	If concern for energy cost plays a role in adoption of CSR and green practices	Independent	Degree of concern.	Ordinal: 0-5. 0 - not concerned, 5 - very concerned.	Survey
Emission	The amount of carbon dioxide in tons produced by the plant in one year	Independent	Ratio of carbon dioxide in tons produced by the plant TO energy produced in one year.KG/KWH	Ratio	TCEQ Point Source Emissions Inventory
Waste	Waste produced in tons per year	Independent	Ratio of waste in tons produced by the plant TO energy produced in one year.KG/KWH	Ratio	Survey/TCEQ - Point Source Emissions Inventory
Renewables	Non-fossil based energy produced in one year	Independent	Ratio of renewable to fossil based energy produced per year.	Ratio	Survey
Political affiliation	If party affiliation plays a role in embracing green practices.	Independent	Indication of affiliation to democratic or republican parties.	Ordinal	Survey
Economic Efficiency		Independent	Ratio of revenue generated less cost TO total energy produced in one year	Ratio	Survey
Capital Investment		Independent	Ratio of ($) invested in assets TO energy production in one year	Ratio	Survey
Regulation (local, state and federal Laws)	If laws and regulations impact decisions to adopt green practices	Independent	Environmental laws and regulations imposed to force municipalities to adopt certain practices.	Ordinal; 0-5 0 (not a factor) and 5 (an absolute factor in the decisions)	Survey

Table 5.1 Continued

Variable	Concept Measurement	Type	Measurement	Scale	Source
Management Commitment	Management's commitment to implementing socially responsible and green practices	Independent	Commitment and efforts devoted to adopting green practices	Ordinal: 0-6. 0 -no commitment, 6 - high commitment	Survey
Technology & innovation	The use of technologies such as smart meters, smart grids, emails, online payment systems.	Independent	Extent of use of technology.	Ordinal: 0-5 0 (no technology adopted) and 5 (high use of technology).	Survey
Financial Capacity	Level of wealth in a TML region	Independent	Median home value, revenue generated, and salaries	Interval	2010 US Census and survey
Duration	Duration of green practices embraced by cities	Independent	Measure of duration of green initiatives were adopted	Interval	Survey
Urban to Rural	Proximity to urban settings	Independent	Measure of location and distance from major urban settings	Distance (miles)	2010 US Census
Education	The average years of education attained in each region	Independent	Average number of educational years	Years	2010 US Census

5.4 Data Collection

The development of survey and research methods, based on interviews with focus groups, was aimed at gathering information from the utilities and to obtain views on relevant information on green practices. Focus groups have long been utilized as a methodology for developing items for standardized questionnaires (Sudman, et al.,1996). Krueger & Casey (1994) described the steps in planning, implementing, and analyzing the qualitative findings of focus groups. Specifically, focus group interviews can help in discovering the vocabulary and the thinking patterns of the target group prior to the development of quantitative standardized items for survey questionnaires. Focus groups can also alert to issues such as important variables being excluded from the analysis. Initially, focus group interviews with municipality directors were held to form basis for the approach taken in compiling and analyzing the qualitative and quantitative data. An instrument/questionnaire was developed to seek answers to the three main research questions:

1. What types of corporate social responsibility and green practices have they adopted and to what extent?
2. Why do some municipality utility organizations adopt corporate social responsibility and green practices while others do not?
3. What are the impediments to adopting corporate social responsibility and green practices?

The questions were limited to corporate social responsibility and green practices adopted by the municipalities under study. The variables indicated in the conceptual model above formed boundaries for questions asked so that the answers would directly address the research's main objectives.

To collect data, appointments for face-to-face interviews with municipality officials (mayors, CEOs, city managers, city superintendents and city financial officers) were arranged. Copies of the questionnaire/survey were emailed in advance to give officials time to prepare. Literature pertaining to green practices in the energy sector was reviewed to obtain qualitative data and evidence of green practices adopted by municipalities. Peer-reviewed studies regarding policy and attitudes, discussed in literature reviewed above, were also considered. This is important for understanding what the literature says about green practices in general and if policies and attitudes are different in the research's study area of South East Texas. Findings from correlation of variables were compared and analyzed against collected data. The focus group was interviewed for the second time to seek help with interpreting and qualifying the quantitative results. This was also to look for additional variables to include in the analysis, or drop some variables, if necessary.

5.4.1 Criteria for Data Collection

As indicated in the research design and methodology, the steps taken to complete this research involved data collection, testing, evaluation, and interpretation. The geographical area was based on cities' data from Texas Municipal League (TML), South Eastern Regions 10, 11, 14, and 16. There is heavy concentration of municipal utility organizations in this area, which makes it easier to visit. TML Director of Member Services was contacted for help in gathering data pertaining to survey regions. A list containing mayors' names for 305 cities within TML regions was received, coupled with cities' addresses, counties, and population. Due to concern that surveys may be lost, if sent directly to the mayors' offices, TML was requested to furnish contacts of utility organizations serving those cites. It was felt, there is a better chance of receiving survey responses from city officials such as city managers, CEOs, officials associated with the electric utility side, and public relations or customer service managers, than from mayors. TML provided two lists of cities which run their own gas and electricity systems, as well as a report for utility directors in the study regions. A list of electric utilities in Texas was compiled from Public Utility Commission of Texas (PUC). This list included officials' contacts and emails. A total of four lists, city owned gas utilities, city owned electric utilities, list of utility directors, and PUC list were received. The lists covered the entire research regions and provided all the contacts needed.

The TML lists were sorted into two groups; one for regions, and one for regions and population. Accordingly, four lists were created; two lists for city owned gas utilities, based on regions and population, and two lists for city owned electric utilities, based on regions and population. By doing so, cities were grouped in an ascending and a descending order, based on regions and population, respectively. The sorting out of the four regions (10, 11, 14, and 16) resulted in a total of 39 electric and 37 gas city utilities. Cities' populations were restricted to a minimum of 1000. This is to have a reasonable city size with legitimate operations and enough resources to address issues that were raised in the survey. This reduced the list to a total of 66 city utilities. A plan was drafted to contact, by email, both groups (66 cities) and ask for a face to face interview. Because there was a good chance that some cities may not respond to emails, a plan included provisions to follow up and make phone calls to increase the chance of receiving a minimum of 30 completed surveys.

The actual data collection involved sending 66 emails in June 2014. Three weeks passed and no responses were received. A second email reminder was sent, for which one completed survey was received. Few cities also responded and declined to participate in the survey. Follow up phone calls were made. Initially, it was difficult to identify the right people to interview, but, eventually, the right city personnel were reached and they agreed to be interviewed. Appointments were made and one or two cities were visited at a time. A review of the initial interviews conducted revealed that many answers to survey questions were not readily available and in many cases needed to be compiled from different departments over time. This process involved additional work for the interviewee who may not have had the motivation to do so.

A further review of completed surveys showed that there was a higher success rate with city managers than with mayors, superintendents, utilities; departments, and public works. Accordingly, the contact list was modified, making city managers the primary targets for interviews.

A total of 31 surveys were completed. One of the problems faced was the difficulty in gathering information that was not readily available. Many interviewees asked for additional time to compile the data and they would email it in few days. Few of them did, but many never followed through on their promises. There was also the problem of lack of coordination between some city departments.

There was another problem relating to city size. It was more difficult to collect data from larger cities (large departments and population) than from small ones. Taking part in the survey was voluntary and city personnel did not have the motivation to participate. Many phone calls and messages asking for interviews went unanswered and it took numerous follow-up calls to get a yes answer. It is important to choose the right time to conduct such lengthy interviews, especially when it involves gathering of data from several departments. For example, budget time, even though convenient for some, in general, it is not suitable for this type of exercise.

Effort was made to get representation for each and every sector of the population within the four survey regions. The 31 out of 66 surveys completed represented a response rate of about 47%. The sample contained very few larger cities. The focus group was helpful during the initial stage of framing the survey questions, as well as, during interpreting the reasons for lack of response to some survey questions. Surveys completed during face-to-face interviews provided the data used for analyses. Many surveys completed and sent via emails contained missing information.

Reviews of surveys completed showed that response rate for questions relating to energy were very low. Few questions went completely unanswered. The reason was that such information can only be obtained from wholesale electricity providers. For example, Lower Colorado River Authority (LCRA) supplies power to 31 cities within the study area. It was not possible to obtain such information because of its confidentiality and proprietary nature.

Generally, the approach adopted for data collection was a valuable exercise. It sheds light on the reasons for the gap that exist between survey questions asked and responses received. This could be attributed to some of the assumptions made while developing the survey questions. It could also be due to the length of the survey.

5.5 Data Analysis

This stage of analysis seeks to explain the influences on green practices adopted by cities by conducting internal consistency tests, hypotheses tests, and t-test of means. As previously, analysis preceded in “blocks” of variables under energy, environment, financial capacity, and contextual control variables (Berke & Beatly, 1992; Brody, 2001). The analysis will help determine if municipalities differ in their characteristics which leads them to adopt corporate social responsibility and green practices in different ways. The manner in which the population was selected helped control for self-selection problem by sampling from municipalities serving South East Texas residents.

5.5.1 Stages in Data Analysis

The following approaches were adopted for the analysis:

1) Characteristics of Respondents;

2) Descriptive statistics;
3) Analysis of green practices adopted; and
4) Explanatory analysis.
    a. Cronbach's Alpha Correlation Analysis to measure internal consistency and reliability between items being used.
    b. t-test of means to compare two means from independent samples.

5.5.2 Analysis of Cities Surveyed

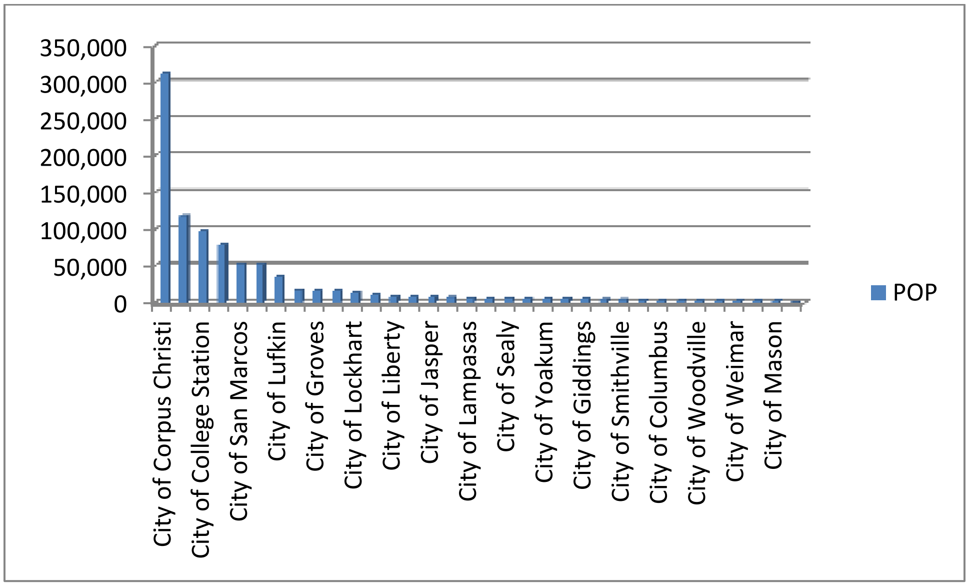
As mentioned above, all the cities surveyed are within Texas Municipal League (TML) regions 10, 11, 14, and 16, in South East of Texas. Because of time and financial constraints, the survey area was not expanded beyond these four regions.

The population of cities contacted for survey ranged between the lowest of 1,116 for the City of Garrison, and the highest of 842,592 in the city of Austin. However the population for the 31 cities who responded ranged between 1,198, for the City of Hemphill and 312,195 for the City of Corpus Christi (figure 5.1). There were only two cities surveyed with populations exceeding 100,000, Corpus Christi (312,195) and Beaumont (118,548). There were six cities considered as urban with population ranging between 50,000 and 312,000. All the remaining cities were considered to be rural. Median home values of cities surveyed ranged between a minimum of $55,000 and a maximum of $183,000. The average home value was $117000.

Figure 5.1

South East Texas Cities and Population

Data Source: Survey Questionnaire 2014



5.5.3 Analysis of Missing Responses

Some survey questions that went unanswered may provide information about the cities' full knowledge of their operations. Some conclusions can also be drawn from the percentages of responses received about some cities' confidence on data they have provided. Missing values may be treated as evidence of cities not knowing the answers to certain questions. This may have policy implications.

Analysis shows that the energy section of survey questionnaire completed has consistently very high missing responses. Some questions pertaining to energy section in the survey went 90% of the time unanswered because they were based on the wrong assumption that cities generate their own electricity; hence they are familiar with the breakdown of the sources of the power they produce. The survey contained questions about electricity produced and consumed from nuclear, fossil-based, as well as renewable sources of energy such as wind, solar, biofuel. Very few cities answered questions pertaining to sources of energy produced or consumed and sources of emissions.

Cities buy electricity off the grid so they are more concerned about the cost and the amount of kilowatt-hours (KWH) they need for their cities. Many interviewees thought that producers would have better answers because they have federal and state rules to follow. The cities are not under the same rules so it may make sense that they do not know much about electricity production. Further research should look into this issue and try to find out why cities did not respond. It helps to know why they did not know. It may not be important for them to know such type of information.

Questions which have limited responses were excluded from the analysis. Any question with more than nine missing responses was used for general analysis only. Because of limited number of observations, questions with 25% missing values were excluded from the analysis.

5.5.4 Descriptive Statistics Analysis

The 31 cities surveyed come from Texas Municipal League, South East, Regions 10, 11, 14, and 16. Twenty four cities which, provide services to rural communities; seven cities consider themselves urban. The farthest distance from an urban setting is 120 miles. The average mileage from urban settings is 45 miles.

The responses to production and consumption of energy from different sources indicate that all cities surveyed, except one, do not produce electricity. The questions ask for electricity produced and consumed during the last year from both fossil based sources, such as coal and natural gas, as well as renewable sources, such as wind solar and biofuel. Majority of cities did not respond to these questions. The missing values for questions on energy production and consumption range between 22 and 31, out of a total of 31 cities. This will have policy implications.

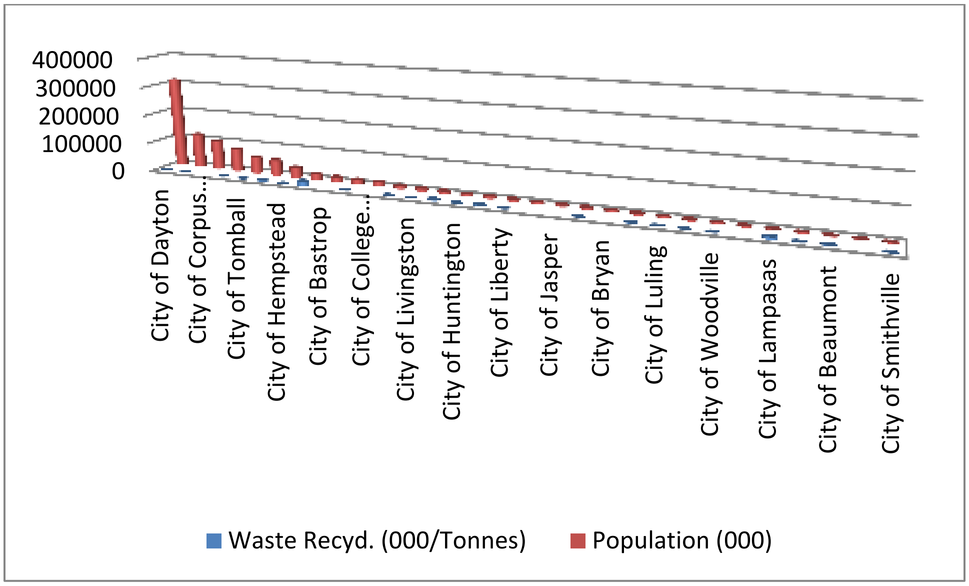
There is high response to questions about different cities' levels of adoption of corporate social responsibility and green practices. Half of the cities responded positively to the question about changes in policies to incorporate green practices in their operations. Eighteen cities conducted training for their employees. Many cities responded positively to whether they have mission statements or not but only three cities said they have incorporated statement about green practices in their mission statement. Twenty six responded that they have not. Thirteen and eighteen cities responded positively to the question about involvement of stakeholders and commitment by senior management. Most cities introduced green technology into their operations. Twenty three cities adopted smart meters, 26 cities adopted emails, and 23 cities adopted online payment systems. The cities' response to the question about adoption of smart grid technology showed that only three cities had adopted smart grids, whereas, 28 cities reported that they have not adopted.

There were eight cities which did not respond to the question about tonnage of waste recycled, whereas nine cites said they did not recycle anything last year. The remaining 14 cites reported amounts of tonnage recycled ranging from 5 tons to 16000 tons. The average tonnage recycled last year was 1576.

The relationship between cities' population and the amount of waste recycled last year is graphed in (figure 5.2). It does not seem that large municipalities are recycling more waste if compared with smaller ones.

Figure 5.2

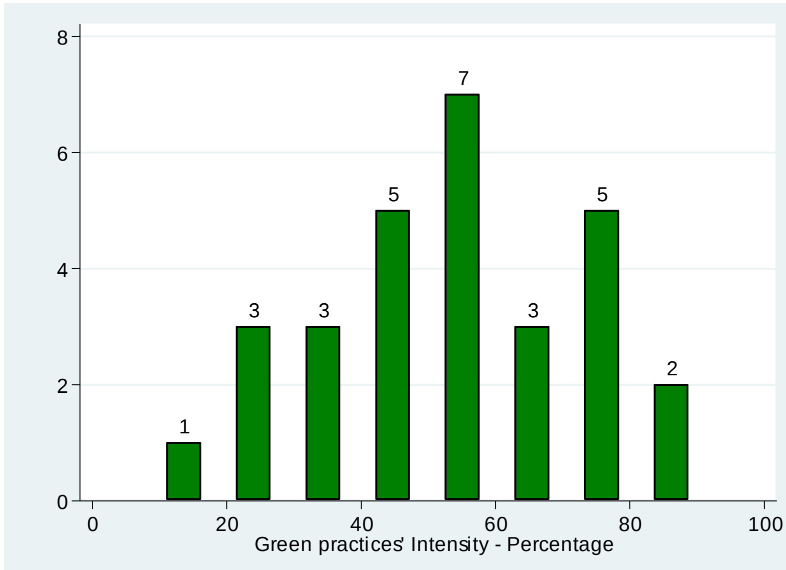
Cities (population/000) and Waste Recycled (Tonnage/000)



As indicated in the concepts measurement section above, the dependent variable, "Intensity of Green Practices' Adoption", measures the percentage of green practices adopted by differ municipalities. The results show that different cities adopt these practices at different degrees. Percentages range between 11% and 89%. The number of cities that have adopted a given percentage of green practices is shown in figure 5.3.

Figure 5.3

Histogram of intensity of green practices adopted (%)



The cities were asked to rank (table 5.2) environmental practices (less waste, less emission, use of renewable energy, recycling, socially responsible organization, and energy efficient operations) on a scale of 1 to 6 (1 for less important and 6 for most important). "Importance of energy efficient operations" is the one practice which was ranked the highest. Fourteen cities gave it the highest rank (6), and 11 cities gave it the rank of (5). On the other hand, 9 cities thought that "less waste" and "production/consumption of renewable energy", are the least important practice to adopt, ranking each practice (1). 13 cities (7+6) expressed a lack of concern for emission, 10 cities (5+5) were fairly concerned, and 7 cities (3+4) ranked less emission as very important. 9 cities ranked "recycling" (3) and 12 cities thought that corporate social responsibility as relatively important, giving it the rank of (4).

Table 5.2

Cities' ranking - importance of green practices

(1 less importance to 6 high importance)

		Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6
1	Less Waste	9	4	6	2	7	3
2	Less Emission	7	6	5	5	3	4
3	Renewable Energy	9	4	3	6	4	5
4	Recycling	2	7	9	2	8	3
5	CSR	3	8	5	12	1	2
6	Energy Efficiency	0	1	2	3	11	14

This descriptive analysis addresses the research questions and shows that there are variations in the number of adopted green practices. It also shows the types of corporate social responsibility and green practices being adopted. It forms the basis for the explanatory analysis to test the hypotheses and find answers to impediments to adopting corporate social responsibility and green practices.

5.5.5 Explanatory Analysis

5.5.5.1 Cronbach's Alpha Correlations

To capture commitment to green practices, it is important to measure, internal consistency and reliability between the items being used. In the absence of such measurement, it is going to be impossible to have validity associated with the score of the scale. The goal is to try to get multiple items to tap into a single construct. In this case, items were measured to get the extent to which cities adopt green practices. This is to find out if all the items in the scale are fitting together and if they are all measuring the same concept of green practices. This is also to remember that the items chosen to include in the scale are driven by theory shown by past research and also by empirical results to support the theory. The literature reviewed above was the basis for both theoretical and empirical considerations made here at this stage of analysis.

Even though the concept of internal consistency is not well defined, it is often referred to within the context of the degree to which all the items of a test or instrument measure the same attribute or dimension (Kottner & Steiner, 2010). Cronbach's Alpha (α) helps determine whether it is justifiable to interpret scores that are aggregated together. There are many different explanations of what Cronbach's α is. In the literature, however, most often, Cronbach's α is considered as a measure of the interrelatedness of item scores constituting one particular instrument or test (Kottner & Steiner, 2010). Four scales of independent variables; energy, environment, financial capacity, and contextual were used to measure internal consistency and reliability associated with the scores. The criteria for determining an acceptable level of reliability is, actually, something that is not being resolved thoroughly, but in the social sciences research, a Cronbach's Alpha > .70 is a good reliability benchmark and is considered adequate reliability.

The blocks of variables used in Cronbach's alpha analysis are shown in table 5.3. There are a number of items in each block as well as scale reliability coefficients. There are also alpha coefficient reliability values for all the items for each block and the last two items with the highest alpha values. For example, Cronbach's Alpha correlation of the energy block of variables is 0.45. By removing the variable concern, the alpha value rose to .57. By running the analysis several times, the alpha value rose to 0.79. For each analysis the variable with the highest value was removed. The following Cronbach's Alpha values were registered by removing corresponding variables; (Cost = 0.59, Wind = 0.60, Emission Diesel = 0.63, Emission Coal = 0.63, Emission Natural Gas = 0.69, Biofuel 0.79). The last two items (Hedging and Spot) gave the best alpha value (0.79).

The Cronbach's Alpha for the environmental block of 6 items in the scale is 0.46. By dropping the variable "Renewable" the alpha value increased to 0.57. The results show an alpha value of 0.71, after dropping Waste, alpha (0.62), Recycling, alpha (0.65), and CSR, alpha (0.71). The last two items with the best alpha result are Emission and Efficiency.

The Cronbach's alpha result for financial capacity block is 0.90. This is greater than 0.70 Alpha, which is considered a good reliability alpha value. The results of the motivating factors for both internal and external contextual block of variables show a moderate alpha of 0.62. By dropping variables, we got the following alpha values; Fuel (0.65), Funds (.066), Management (0.64), Incentives (0.62), Officials (0.62), Commitment (0.64), and Environment (0.70). The last two variables with the highest alpha value (0.70) are Regulations and Pressure from Citizens.

Table 5.3

Cronbach's Alpha - summary of scale reliability coefficients – best alpha results

Variables	Scale reliability coefficient
Energy block: 1. Cost 2. Hedging 3. Spot 4. Coal Emission 5. Diesel Emission 6. Natural Gas Emission 7. Wind 8. Biofuel	Alpha = 0.57(8 items) Alpha = 0.79 (2 items – Hedging and Spot)
Environment block: • Waste • Emission • Recycling • CSR • Efficiency	Alpha = 0.57 (5 items) Alpha = 0.71 (2 items – Emission & Efficiency
Financial capacity block: • Revenue • Accounts • Employees • Salaries • Capital Investment	Alpha = 0.90 (5 items)
Contextual block: Internal and external motivating factors • Commitment • Funds • Fuel • Management • Environment • Incentives • Regulations • Officials • Citizens	Alpha = 0.62 (9 items) Alpha = 0.70 (2 items – Regulations & Pressure from Citizens)

5.5.5.2 T-test of Means

T-test is one of the analytic strategies which allow inferring whether the differences observed between and among groups are attributed to chance or the variable (intervention) of interest (Adamson and Prion, 2014). Two-sample t-test can be used to examine whether two samples are different. This is commonly used when an experiment uses a small sample size and the variances of two normal distributions are unknown. The t-test, comparing the mean in the population between cities that have adopted green practices, is performed for the following nine criteria:

1) Management Involvement;
2) Financial Capacity;
    - Salaries (Full Time)
    - Total Revenue
3) Concern for Energy Cost;
4) Technology;
5) Urban and Rural.
6) Government Regulations;
7) Duration (Years) of green practices adopted;
8) Political Affiliation; and
9) Concern for carbon dioxide emission.

1) Management Involvement

To create two groups (Involved and Uninvolved) to reflect management's commitment to green practices, the six rankings for management involvement were collapsed into "Uninvolved", composed of rankings 1, 2, and 3, and "Involved", composed of rankings 4, 5, and 6. The null hypothesis states that the degree of involvement by management has no impact on the level of intensity in green practices adopted by a city.

Statistical test of significance can be used to conclude if an experimental result differs from chance expectations. However, effect-size measurements tell the relative magnitude of the experimental treatment (intervention) (Thalheimer & Cook, 2002). Cohen's ***d*** is a popular method used in effect-size measurements. It is the difference between two means (e.g., treatment minus control) divided by the average of the standard deviation of the two conditions. Effect-sizes of .20 are small, .50 are medium, and .80 are large (Thalheimer & Cook, 2002).

The tabulation result (appendix 23) shows four cities with uninvolved or uncommitted managers that have an average of 33.33% of intensity of green practices adoption, compared with 58.80% for 24 cities with involved or committed managers. Cities with more committed and involved managers have adopted, on average, 25.5% green practices more than cities with uncommitted or uninvolved managers. The 25.5% difference in means is roughly equal to 1.53 of standard deviation, if we average the standard deviations as a guide.

The negative t-value only means that the sample mean (33.33) of the first group of four cities with "uninvolved" managers was less than the sample mean (58.80) in the second group of twenty four cities with "involved" managers. The negative sign is unimportant. What's important is the p-value. Summary of t-test for management involvement is shown in table 5.4. The t-test value of $t = -2.93$ has a $p < 0.05$ ($p = 0.04$). The p-value is so small and the effect-size measurement is $= 1.53 > 0.50$, showing a strong effect. We reject the null hypothesis that the degree of involvement by management has no impact on the level of intensity in green practices adopted by a city and conclude the alternative hypothesis that management involvement has an impact is true.

Table 5.4. Summary of statistics and t-tests for the nine hypotheses

	Observations	Means	Standard deviations	t-test	p-value	Cohen's d
		Management Involvement				
Uninvolved	4	33.33	15.71			
Involved	24	58.80	18.09	-2.93	0.04	1.51
		Financial Capacity – Full time Salaries				
< 6 million	17	46.41	18.94			
> 6 million	6	72.22	18.26	-2.95	0.02	1.39
		Financial Capacity – Total Revenue				
< 25 million	18	48.77	20.22			
> 25 million	8	63.89	18.54	-1.87	0.08	0.78
		Concern for Energy Cost				
Reasonable	23	54.11	21.00			
Costly	6	51.85	22.95	0.22	0.83	0.10
		Use of Technology				
< 50%	4	22.22	9.07			
> 50%	25	58.67	17.72	-6.33	0.00	2.72
		Urban and Rural Settings				
Rural	22	51.52	21.56			
Urban	7	60.32	19.09	-1.03	0.33	0.43
		Government Regulations				
No	15	47.41	22.80			
Yes	14	60.32	17.28	-1.73	0.09	0.64
		Duration (Years)				
Short	14	53.14	17.53			
Long	14	57.14	22.16	-0.53	0.60	0.2
		Political Affiliations				
Democratic	7	57.14	23.51			
Republican	15	51.11	21.33	0.58	0.58	0.27
		Concern for Carbon Dioxide Emission				
Less Important	17	55.56	21.52			
Important	11	51.52	21.81	0.48	0.64	0.19

*Two-sample t-test with unequal variances.

* Two tailed test with the null diff = 0 and alternative not equal to zero.

2) Financial Capacity

- Salaries (Full Time)

The tabulation result (appendix 24) shows that there are 19 cities (61%) with annual payroll average of 6 million dollars or less. This group's intensity of adoption of green practices is 46%. There are six cities (19%) with annual pay roll average exceeding 6 million dollars. This group's intensity of adoption of green practices is 72%. The remaining percentage (19%) represents six cities with missing responses. Summary of t-test for financial capacity (Salaries) (shown in table 5.4) is: $t(9) = -2.95$ has a $p < 0.05$ ($p = 0.02$). The effect-size measurement is = 1.51 > 0.50, showing a strong effect.

- Total Revenue

The tabulation result (appendix 25) shows that there are 20 cities (65%) with annual revenue of 25 million dollars or less. These cities' intensity of adoption of green practices is 49%. There are eight cities (26%) with annual revenue exceeding 25 million dollars. These cities' intensity of adoption of green practices is 64%. The remaining percentage (10%) represents three cities with missing responses. Summary of t-test for financial capacity (Total Revenue) (shown in table 5.4) is: $t(15) = -1.87$, has a $p > 0.05$ ($p = 0.08$). The p-value of 0.08 is insignificant but it can be treated as an exception due to the limited number of observations. Also because the effect-size measurement is = 0.8 > 0.50, showing a strong effect.

The null hypothesis states that revenue of a city has little to do with adoption of green practices. The results (appendix 25) show that cities with more revenue have better capacity for adoption of green practices. We reject the null hypothesis and conclude that the alternative hypothesis that cities with more revenue have better capacity for adoption of green practices is true.

3) Concern for Energy Cost

The goal here is to find out if concern for energy cost plays a role in adoption of corporate social responsibility and green practices. The five responses (1, 2, 3, 4, and 5) were collapsed into 2 groups. Group 1 (costly/concerned) represented by the responses 1, 2, and 3, and group 2 (reasonable/unconcerned) represented by the responses 4 and 5. The tabulation result (appendix 26) shows that twenty five cities (81%) thought that the cost of energy is reasonable. This group's level of intensity of green practice's adoption is 54%. The second group, six cities (19%) thought that energy is costly. This group's level of intensity of green practice's adoption is 52%. The comparison between the two groups (concerned and unconcerned) shows little difference in the percentage of green practices adopted. Summary of t-test for concern for energy cost (shown in table 5.4) is: $t(7) = 0.22$, has a $p > 0.05$ ($p = 0.83$). The p-value is highly insignificant. The effect-size measurement is $= 0.1 < 0.2$, showing a weak effect. This shows that concern for energy cost was not a factor in cities' adoption of green practices.

4) Urban and Rural

The tabulation result (appendix 28) shows that there are 24 (77%) rural cities with a mean of 52% adoption of green practices. There are seven (23%) urban cities with a mean of 60% adoption of green practices. The results show that cities in urban settings are more likely to adopt green practices than rural cities. This could be attributed to factors such as city size and political affiliation. Summary of t-test for urban and rural setting (table 5.4) is: $t(11) = -1.03$ has a $p > 0.05$ ($p = 0.33$). The effect-size measurement is $= 0.43 > 0.2$, showing a moderate effect but the p-value is insignificant.

5) Technology

The tabulation result (appendix 27) shows that six cities (19%) used less than 50% of technology available, adopting 22% of green practices. Twenty five cities (81%) used more than 50% of technology available, adopting 59% of green practices. There is a strong positive correlation between technology used and green practices adopted. Summary of t-test for use of technology (shown in table 5.4) is: $t(7) = -6.33$ has $p < 0.05$

($p = 0.00$). This is a significant p-value and the effect-size measurement is = $2.72 > 0.5$, showing a strong effect.

6) Government Regulations

Cities were equally divided in their responses to the question on government regulations (appendix 29). Fifteen cites responded positively and fifteen cities responded negatively. However, the group that answered “no” adopted 47% of green practices, whereas the group with the “yes” answer adopted 60% of green practices. Summary of t-test for government regulations (table 5.4) is: $t(26) = -1.73$ has a $p > 0.05$ ($p = 0.09$). The null hypothesis states that regulation is not one of the drivers behind adopting green practices. It is rather the voluntary and non-profit nature of municipalities which lead to that. The results show that the cities were equally divided in their response to regulations but the cities which thought that regulations were factors in their decisions adopted 60% green practices, compared to 47% in the case of cities with a “no” answer. The p-value (0.09) is insignificant but it can be treated as an exception because cities which thought that regulation is a factor in adopting green practices have thirteen percentage points more than the group of cities with a “no” answer. Also the effect-size measurement is = $0.64 > 0.5$, showing an effect between moderate and strong. For these reasons, we reject the null hypothesis and conclude that the alternative hypothesis that regulation is one of the drivers behind adopting green practices is true.

7) Duration (Years) of green practices adopted

Prior expectation was that cities which have adopted green practices for a longer duration will have higher intensity of green practices’ adoption, if compared with other cities that are new to the concept of green practices. The cities’ responses were grouped into short and long durations; 0 to 5 years, for “short duration” and “more than 5 years”, for long duration. The results in table 5.4 show the output of the t-test comparing the means in population between cities with shorter and longer experience (duration) in green practices. The descriptive statistics, discussed in 5.5.4 above, show the number of observations (14) for each group. The means for short and long durations are 53% and 57%.

T-test for duration (table 5.4) is: $t(25) = -0.53$ has a $p > 0.05$ ($p = 0.60$). The effect-size measurement is = 0.2, showing a week effect. The null hypothesis states that duration of adopting corporate social responsibility and green practices has limited impact on a municipality's environmental records. The P-value of 0.60 is evidence to fail to reject the null hypothesis. We conclude that there is an insignificant difference between cities that are relatively new to the concept of green practices, compared to cities with longer experience.

8) Political Affiliation

There are 7 categories of responses to the question on political affiliation (appendix 33). They were collapsed into two groups, democrats (7) and republicans (15). The remaining five categories were left out of the analysis because there were a small number of observations, nine in total or less than two responses per category. There are seven (23%) cities with democratic affiliation. This group, in average, adopted 57% of green practices. There are fifteen (48%) cities with republican affiliation. This group, in average, adopted 51% of green practices. T-test for political affiliations (table 5.4) is: $t(11) = 0.58$ and has a $p > 0.05$ ($p = 0.58$). The effect-size measurement is = 0.27, showing a week effect. The null hypothesis states that party affiliation has little to do with adopting green practices and that there is little variation between communities of different party affiliations in the way they adopt these practices. The results suggest that there is not much difference in mean between cities of different party affiliation. We fail to reject the null hypothesis.

9) Concern for carbon dioxide emission

Eighteen cities (58%) expressed the view that they are not concerned about carbon dioxide emission. This group adopted 56% green practices. There are 12 cities (39%) in the second group, which expressed concern for carbon dioxide emission. They adopted 52% of green practices. T-test for concern for carbon dioxide emission (table 5.4) is: $t(21) = 0.48$ has a $p > 0.05$ ($p = 0.64$). The effect-size measurement is = 0.19, showing a week effect. The null hypothesis states that concern for emission of carbon dioxide and its impact on global warming is not a motivating factor leading to the adoption of green practices. The difference in mean between the two groups is four percentage points, which is negligible. We fail to reject the null hypothesis.

6. DISCUSSIONS AND POLICY RECOMMENDATIONS

This section is divided into two subsections. First, results from the preceding statistical analysis are summarized and expanded upon. Results from descriptive and explanatory analysis are collectively discussed within the overall research theme of corporate social responsibility and green practices. The second sub-section discusses the findings of attitudes toward energy and green practices and policy implication of these research findings relative to what others have found. The relevance of these findings to the debate on organizations' behavior towards green practices is also presented.

6.1 Discussion of Findings

Municipalities are ideal for this type of study because they are publicly owned organizations. They need to generate enough revenue to support their operations and infrastructure but profitability may not be their primary goal for adopting green practices. Some organizations adopted corporate responsibility and green practices because they were self-motivated and believed in these principles, while others adopted green practices because of regulations.

The expectation is that the extent of cities' adoption of green practices are shaped by their level of commitment to implementing practices such as waste reduction, reduction in emissions, use of renewable energy, recycling, and adopting socially responsible practices. Another expectation is that social and environmental responsibility impacts overall sustainability of organizations. However, as indicated in the literature review section, the predicted outcomes depend on many control variables which influence the results at varying degrees.

The general aim of the research is to evaluate the extent to which municipalities operating in Texas adopt corporate social responsibility and green practices. The research also aims at finding out if there are differences between municipalities in the way they process energy production, transmission, and distribution, and if such processes have environmental and climatic implications. It also aims at finding out if there are impediments to adopting corporate social responsibility and green practices. Below is a list of the different stages of analysis involved:

1) Characteristics of Respondents.
2) Descriptive statistics.
3) Analysis of green practices adopted.
4) Cronbach's Alpha to measure correlations, internal consistency, and reliability between items being used.
5) T-test of means to compare two means from independent samples.

Respondents answers of particular questions varied between questions which have 100% responses and others, which went 100% of the time unanswered. In any case, lack of response gives an idea about cities' knowledge or the lack of how they are operating. Some conclusions can be drawn from the percentages of responses received. Missing values can also be treated as evidence of cities not knowing the answers to certain questions, or not willing to answer them. This may have policy implications.

The total number of cities surveyed was 31. All the cities are within Texas Municipal League (TML) regions 10, 11, 14, and 16, in South East of Texas. Time and financial constraints were the reasons for limiting the survey area to these four regions, hence the sample is not representative of a wider range of cities. There are a total of 66 cities in the four TML regions.

The population of cities contacted for survey ranged between 1,116, for the City of Garrison and 842,592 for the City of Austin. However, the population for the cities surveyed ranged between 1,198, for the City of Hemphill and 312,195, for the city of Corpus Christi. There were only two cities surveyed with populations exceeding 100,000. There were six cities that are considered as urban, with population ranging between 50,000 and 312,000. 24 out of the 31 cities, which responded to the survey, considered themselves rural. The remaining 7 are considered as urban. The average distance between the rural cities and nearest urban settings is 45 miles.

The bulk of dollar amount spent by cities on green practices ranged between $0 and $775,000. One city, as an exception, spent $1,818,000. This is not reflective of money spent by majority of cities. On the other hand, money spent on community projects, such as supporting local fire stations or building a local library, ranged between $1,000 and $3,061,057. Majority of cities spent between $1,000 and $500,000. Cities, on average, spent less than 7% of their revenue on green practices and community projects.

Majority of cities (19) considered the cost of energy as reasonable. The cities' response to questions on energy production, transmission, and consumption went unanswered. This is due to the fact that a large majority of cities do not produce or transmit energy. Many cities expressed the view that they are committed to social and environmental responsibility. The reality is that cities fair differently depending on many factors.

Seven components of corporate social responsibility and green practices were examined; zero waste, reduction in harmful emissions, creation and utilization of renewable energy, efficient resource use, adopting socially responsible practices, and use of technology and innovation. Most cities responded positively to the question on training, stakeholder involvement, and introduction of green technology. Even though most of them said that they have mission statements, only three cities have incorporated statements about green practices in their mission statements.

One expectation is that larger cities have a better financial capacity to introduce waste recycling programs and will be recycling more waste than smaller cities. Contrary to this assumption, large municipalities do not seem to be recycling more waste (figure 5.2) above. There are eight cities which did not respond to the question about tonnage of waste recycled, whereas nine cites said they have not recycled anything last year. The remaining 14 cites reported amounts of tonnage recycled ranging from 5 tons to 16000 tons. The average tonnage per city recycled last year was 1576.

The cities were asked to rank the importance of environmental practices (less waste, less emission, use of renewable energy, recycling, socially responsible organization, and energy efficient operations) from 1 to 6 (1 for less important and 6 for most important). The importance of energy efficient operations is the one practice which was ranked high. Fourteen cities gave it the highest rank (6) and 11 cities gave it the rank of (5), together, a total of 25 cities thought that energy efficient operations is very important. On the other hand, nine cities thought that less waste and production/consumption of renewable energy are the least important practice to adopt, ranking each practice (1). Thirteen cities expressed lack of concern for emission, ten cities were fairly concerned, and seven cities ranked less emission as very important. Nine cities ranked the importance of "recycling" (3), (1, less important and 6, highly important). Twelve cities thought that corporate social responsibility as relatively important, giving it the rank of 4. Eighteen cities thought that "customers' lack of access to technology" as an impediment for adopting green technology.

Analysis shows that the energy section of the survey questionnaire consistently has a very high rate of missing responses. Some questions went 90% of the time unanswered. This is understandable because most of the cities surveyed did not generate their own electricity. As a result, very few cities answered questions pertaining to sources of energy produced or consumed. Most cities buy electricity off the grid so they are more concerned about the cost and the amount of kilowatt-hours (KWH) they need. They bought it from wholesale suppliers such as Lower Colorado River Authority (LCRA), so they did not have breakdown for the sources of energy (fossil, nuclear, wind, solar, and biofuel).

The cities expressed concern for emission of carbon dioxide and energy efficient operations but they did not have data to show if they have taken practical steps to curb emissions. The answers to the question about concern for emission of carbon dioxide ranged from 4, indicating greatly concerned, 3 concerned, 2 fairly concerned, and 1 not concerned at all. Respondents expressed the views ranging between "fairly concerned" and "not concerned". Very few cities responded that they are "greatly concerned". This result may mean that concern for carbon dioxide emission and its impact on air quality, hence global warming, is not a motivating factor leading to the adoption of green practices. This may be attributed to the fact that majority of the cities studied do not produce electricity. This finding is not supported by literature reviewed, which suggests that modern planning measures and green practices evolving in communities include creation, protection, preservation, restoration, and enhancement of man-made as well as natural environment. These measures are directed toward air quality, water quality, prudent use and reuse of land, and enhancement of citizens' quality of life (Kemp & Stephani, 2011).

The cities also expressed concern for the environment, in general, cost of fuel, and the need for producing less waste. They adopted green practices in the form of recycling and renewable sources of energy, even though at very low levels. They also adopted technology in the form of smart meters, smart grid, emails, and online payment systems.

Even though there are 31 observations, the coding of the survey questions resulted in a total of 174 variables. This is a significantly high number of variables, relative to the number of observations. Therefore, the analysis proceeded in "blocks" of variables under energy, environment, financial capacity, and contextual control variables, (Berke & Beatly 1992; Brody 2001).

The outcome variable comprised of two components. The first one is processes which included changes in policies, training, mission statement, stakeholder involvement, and commitment by senior management to drive the implementation of green programs. The second component is the adoption of technologies such as smart meters, smart grid, emails and online payment system. There are a total of nine green practices which formed the outcome variable. Each city's total positive response is expressed as a percentage of the total green practices available. This is to reflect levels of green intensity ranging from zero to a hundred. A scale of a hundred means that the particular city has embraced and adopted all the nine green practices. This reflects the city management's concern for the environment and its level of commitment for taking action. Similarly, a city which adopted 0% of green practices shows the low priority it may have for issues relating to the environment. The data shows that the cities' scale of green practices ranged between 11% and 89%. Seven cities adopted less than 40% of the green practices, twelve cities adopted between 40% and 60%, and ten cities adopted over 60% of the practices.

To capture commitment to green practices, Cronbach's Alpha correlation is used to measure internal consistency and reliability between different items. This measure is important for having validity associated with the score of the scale. This is also to know if all the items in the scale are fitting together and if they are all measuring the same concept of green practices. The items chosen to include into scale are driven by theory shown by past research, but also by considering empirical results to support the theory (Brody, et al., 2008). Four scales of independent variables (energy, environment, financial capacity, and contextual) were used to measure internal consistency and reliability associated with the scores (Geis & Kutzmark, 1998).

The criteria for determining an acceptable level of reliability is actually something that is not being resolved thoroughly but in the social sciences research, a Cronbach's Alpha > .70 is a good reliability benchmark. Cronbach's Alpha - Summary of scale reliability coefficients (best alpha results) is shown in table 5.3, above.

Summary of the blocks of variables used in Cronbach's alpha analysis shows the number of items in each block as well as scale reliability coefficients. There are alpha coefficient reliability values for all the items for each block, as well as, the last two items with the highest alpha values. For example, Cronbach's Alpha correlation of the energy block of variables is 0.45. The two items (Hedging and Spot) gave the best alpha value (0.79). The Cronbach's Alpha for the environmental block of six items is 0.46. The last two items with the best alpha result are Emission and Efficiency. The Cronbach's alpha result for financial capacity block is 0.91. This is greater than 0.70 Alpha, which is considered a good reliability alpha value. The results of the motivating factors for both internal and external contextual block of variables show a moderate alpha of 0.62. The last two variables with the highest alpha value (0.71) are "Regulations" and "Pressure from Citizens".

The results indicate that the items with the highest Cronbach's Alpha values are fitting together in measuring the same concept. For example, buying energy in the spot market or entering into a hedging contract is influenced by concern for energy cost and future energy prices. Similarly, concern for emission may play a role in seeking to run an efficient operation. On the other hand, size of an organization, reflected in number of employees and remunerations, may translate to financial capacity. Lastly, there is consistency in fitting the two items of regulations and pressure from citizens in one scale.

Empirical studies suggest that factors such as government regulations and organizations' wealth may play a role in the adoption of green practices. In response to the survey question about impact of government regulations on cities' decision to adopt green practices, fifteen cities responded "No", whereas fourteen cities responded with a "Yes" answer. The cities were equally divided in their views on regulations.

Two-sample t-test summary of means is used to infer whether the differences observed between and among groups are attributed to chance or to the variable (intervention) of interest (Adamson and Prion 2014). This tool of analysis is suitable in this type of experiment which uses a small sample size. The summary of t-test is shown in table 5.4.

The test result of management involvement is statistically significant (table 5.4). The null hypothesis states that the degree of involvement by management has no impact on the level of intensity in green practices adopted. Since the p-value is significant (0.03), we can reject the null hypothesis and conclude that the alternative hypothesis that management involvement has an impact on adoption of green practices is true.

The test on cities' financial capacity on salaries was significant but total revenue showed an insignificant t-test results. The test results were highly insignificant for political affiliation, duration of green practices adopted, urban and rural settings, and concern for energy cost on whether a city adopts green practices or not. On the other hand, as per the t-test results, the use of technology was significant and has a strong impact on cities' adoption of green practices.

Even though the t-test results show significance levels in excess of 5% for both government regulations (0.09) and total revenue (0.08), an exception can be made here and consider these results as significant, due to the limited number of observations. The test results also show that party affiliation of city population was statistically insignificant and there was no difference between groups affiliating to the two main parties (democrats and republicans) in cities' decision to adopt corporate social responsibility and green practices. Therefore, there is a lack of evidence to support the hypothesis that municipalities operating in communities with liberal party affiliations are more likely to adopt green practices, relative to conservative communities.

Earlier adoption of corporate social responsibility and green practices has limited impact on a municipality's environmental records. There is no evidence in the data to suggest that variation in time of adopting corporate social responsibility and green practices has impact on a municipality's environmental records that with time it will develop expertise, which helps in improving its environmental records. Cities did express concern for carbon dioxide emission and its impact on global warming. That concern was not translated into a motivating factor leading to the adoption of green practices.

In general, there is limited evidence to support the assumptions made about adoption of green practices. The geographical area of the survey and the limited number of cities covered may be contributing factors to this finding. There is evidence that giving importance to corporate social responsibility and green practices by management did result in an increase in the intensity of adoption of green practices. This concludes that management commitment plays a role in adoption of green practices.

The current situation with fossil based fuels and nuclear power has posed a great challenge to humanity. The literature states that there is less fossil-fuel production available than it is believed. The production at oil fields globally is declining at about 4–6% a year. It is believed that oil's tipping point has already passed. It is also believed that the economic pain of decline in supply will trump the environment as a reason to curb the use of fossil fuels (Murray & King, 2012). The general finding is that this warning and concern is not widely reflected in the behaviors of the cities studied. There is a complex task that lies ahead for policy makers. This puts pressure on energy producers to meet the increase in demand for energy and also to behave in an environmentally responsible manner by adopting climate-friendly practices, which will positively contribute to solving the climate problem. The challenge is that nobody has come up with a set of policies that can make renewable energy sources a viable near-term substitute for fossil fuels (Robbins, 2011). This may answer the question of the indifference of cities to the issue of emission. This could also be due to the fact that most cities do not produce their own electricity. However, in response to pressure, many corporations have taken steps to implement a variety of sustainability initiatives (Searcy et al., 2012). This may answer the question of variation in the way cities adopted green practices. They ranged between adoptions of 11% to 89%. Since cities were equally divided in their response to the question on regulation, it is more logical to conclude that some manager's voluntary commitment may give the best answer to the variation in levels of embracing and adopting green practices. It could also be due to the fact that corporations are coming under growing pressure from internal and external stakeholders to consider the environmental and social impacts of their operations.

Another finding is that many city managers did talk about the increasing share of renewable energy sources but they lack clarity about what they need to do to impact the environment. The literature suggests that the guiding question is: how do utilities shape their business model for renewable energies? (Richter, 2012). It is believed that utilities, on their own, cannot shape the future of the business models for renewable energies and those policy-makers should closely follow the development. This is particularly important since renewable energy business models are highly dependent on the regulatory framework. Because policy-makers have direct influence on their future development, they should set the framework for a truly sustainable energy future (Richter, 2012).

Utility organizations have numerous areas for improvement to enhance their internal policies, operational programs, and supporting infrastructure (Soyka & Bateman, 2011). The findings suggest that there is lack of programs specifically designed or tailored towards cities to help them adopt green practices, which impact the environment. There is a need for enhancing the coherence of systems put in place to deal with the environmental and other infrastructure, as well as providing better systems for effective long term sustainability and management of financial issues (Soyka & Bateman, 2011). The effective strategy to get municipal governments to mitigate global climate change is by not talking about global climate change. The best approach may be to 'think locally, act locally' (Betsill, 2001). There is a need for collaborative efforts. All levels of government and society must be actively involved in efforts to control GHG emissions "so that complementarity and mutually reinforcing measures are concurrently implemented" (DeAngelo & Harvey, 1998, p. 134).

There is a growing awareness with environmental issues but there still remains a need for attitudinal change to translate that awareness into action. Research suggests that there is a need for change in attitudes and behaviors towards the environment and the way resources are being used (Ockwell, Whitmarsh, & O'Neill, 2009). This is visible in some cases where the adoption level of green practices is as low as 11%. Programs and instruments to create added value for improving internal learning are missing (Manetti & Toccafondi, 2012). However, it is important to take the factors of costs and benefits into consideration because some cites may not have adequate resources to implement Programs and instruments to create added value.

Surveys indicate that about half of all Americans believe that the energy problem is real and serious, while less than one-fourth are unconvinced of the problem (Olsen, 1981). The actions taken by municipalities within this research area did not reflect this finding. It seems that the general attitudes toward the energy problem are not associated with reported conservation actions. People who anticipate experiencing direct personal consequences from the energy problem are likely to take action to save energy (Olsen, 1981). Factors linked to one's health and comfort are critical in predicting actual reductions in household energy consumption and that the two most commonly expressed reasons for conserving energy are to save money and to help solve the energy problem (Olsen,1981).

It is widely recognized that public acceptability often poses a barrier towards renewable energy development. Research conducted by Devine-Wright (2005), on public perceptions of wind energy, suggest that opposition is typically characterized by the NIMBY (not in my back yard) concept. Therefore, climate communication approaches require significant resources promoting attitudinal change, but research suggests that encouraging attitudinal change alone is unlikely to be effective (Ockwell, Whitmarsh, & O'Neill, 2009). One way to engender mitigative behaviors would be to introduce regulation that forces green behavior. This approach is usually not cost effective. It is also not favored by the government. It thinks that it leads to loss of precious political capital (Ockwell, Whitmarsh, & O'Neill, 2009). On the other hand, communication approaches that advocate individual voluntary action ignore the social and structural impediments to changes in behavior. The argument presented by Ockwell, Whitmarsh, & O'Neill (2009) calls for engaging the public through two crucial, but distinct, roles that communication could play in low carbon lifestyles: first, to facilitate and encourage public acceptance of regulation and second, to stimulate and involve grass-roots action through affective and rational engagement with climate change. This approach may present a middle ground towards a positive change in perception, attitudes, and behaviors towards embracing environmentally friendly practices. Future change in public's attitudes and perception may lead to change in the behavior of organizations, such as municipalities, and that may, in turn, lead to an impact on the environment.

6.2 Policy Recommendations

This research can be considered as a pilot or a platform for launching studies of similar nature, in future. It can represent guidelines or a road map to address similar scenarios and use it as a basis for the formulation of a robust and a more comprehensive research design.

Because of the limitation in the sample size, conclusions are not definitive. However, there is enough information for a comprehensive and robust research design and data analysis. Future research about municipal city utilities can be designed in a way to ensure that the questions are short, direct, and relevant. This is very important because there was a lack of response to many questions in this research, and there are several reasons for that. Some of the questions are lengthy. They also asked for information that the cities may not necessarily have ready answers to give. This may be attributed to the reason that the cities may or may not know the answers. It could also be because they did not want to give an answer. This is not suggesting that they should respond with an answer. More importantly, several questions were not relevant to the city's situation. This can be an area for further research.

Cities, for example, buy electricity off the grid. For this reason electricity price may be a driving force in their decision. Therefore, questions pertaining to CO_2 emission, sources of the electricity, and if it comes from fossil based or renewable sources are not relevant to most cities. Such questions are more relevant to producers. There are different rules governing production and distribution of electricity and this must be taken into consideration when designing research methods for similar types of studies in the future.

This expanded proposed study can be a stepping stone for a better understanding of the role of municipalities in dealing with issues of climate change and green practices. It is important to have a clear understanding of the complexities and the diverse nature of municipal city utilities as non-for-profit corporations. To elaborate on this, few direct scenarios (below) can be adopted under certain circumstances:

For example, based on the experience with this study, it is preferable for similar types of future studies to have observations in excess of 30, whenever possible. There are limited tools available for analyzing the data for 30 observations or less. For example, it will not be possible to take full advantage of expanded analysis such as regression and, confidently, support the results, especially if there are high missing values.

If the future research is based on cities as units of analysis, face-to-face interview is the best option. Even though information pertaining to cities is a public property, it was not easy to obtain information from city officials through emails. They may not have the motivation to do so because of costs and benefits considerations.

If the research is seeking data on aspects such as CO_2 emission, then it is important to avoid attempting to collect it from consumer cities, being secondary sources of data. It is better to directly approach energy producers, the primary sources. On the other hand, approaching producers may not guarantee receiving the required data or information. A request, for example, sent to Lower Colorado River Authority (LCRA) for information was declined. The argument given was that divulging information of such nature would amount to a breach of confidentiality and would compromise the company's position with regard to competition. Also compiling the required information can be a lengthy process which may make it necessary for additional time and financial resources to be taken into consideration.

Structuring the survey questionnaire to be concise and limited to pertinent questions only is paramount. To enhance the chances of positive responses, the survey must not ask for information that can be obtained from sources other than the interviewee. This will minimize the time needed and make it more convenient for the interviewee to agree to meet and answer the questions with ease.

Again, cities are the units of analysis for a similar future research, there should be a proper categorization of cities according to criteria such as population size and proximity to urban settings. The justification here is that majority of cities are small in size. Combining them with big cities in one study may distort the findings. This must be dealt with statistically, but it is better to avoid it at the initial stage of research design.

7. CONCLUSIONS

7.1 Summary and Conclusions

The terms sustainability, corporate social responsibility, and green practices are collectively used to mean practices which impact individuals, communities, and the environment. Sustainability, for example, is increasingly viewed as a desired goal of development and environmental management (Brown et al., 1987). On the other hand, the concept of corporate social responsibility, even though deeply rooted in history and has evolved over time, its application in the context of environmentally friendly practice has not been developed. Environmental concern is also a concept which has emerged in importance because of the current awareness about climatic change.

Climatic events have called for special attention and a closer look by policy makers, corporations, environmentalists, and other stake holders. There is a need for re-examining the way daily business is conducted, with the view to changing behaviors to become friendlier towards the environment.

As far as this study area of municipal city utilities is concerned, the debate on sustainability and embracing of corporate social responsibility and green practices are present in every city surveyed. Cities have taken steps to translate their concerns for the environment into tangible actions, even though may be on a limited scale and at varying degrees. The two areas which have clearly impacted the level of adoption of green practices were the cities' financial capacity and commitment by management.

Citizens and stakeholder are not fully involved by cities in debates about green practices. Municipalities studied did not show a sense of urgency for adopting a comprehensive approach for collaboration with their respective communities. This is primarily left to management style in each city.

This research is meant to provide a foundational framework for future research. The goal is to enhance initiatives taken by organizations, cities, and community based organizations to improve on the adoption of corporate social responsibility and green practices, with the view to, ultimately, influencing the outcome on the debate on climate change.

In conclusion, this study is a pilot project that can contribute to the sustainability debate. Finding out the response to green practices in municipalities may help policy makers make informed decisions about energy policies. The increasing share of renewable energy sources is expected to have an impact on the energy sector. This poses a challenge to the transformation of the power sector to a more sustainable energy production. The entire structure of the industry is likely to change (Richter, 2012). The guiding question is: how do utilities shape their business model for renewable energies? (Richter, 2012). Ascertaining the amount of carbon dioxide emission produced by electricity producing cities in Texas may show the state's position in relation to other states or countries. Emissions and climatic changes are problems of global nature. However, the best approach may be to think locally and act locally. The goal is to find out how much the State of Texas is contributing to making a real difference in the fight to curb global carbon dioxide emissions.

7.2 Validity and Reliability Issues

7.2.1 Threats to Validity

Research designs, however powerful they may be constructed, contain several validity threats that should not be overlooked. According to Cook and Campbell (1979), there is much debate in the research design literature over which types of validity threats belong in which categories. Four validity issues relating to this research may arise; statistical conclusion validity, internal validity, and external validity.

7.2.2 Statistical Conclusion Validity

The primary validity threat is associated with the sample size of the study. A sample of 31 East Central Texas Municipalities resulted in a low statistical power which made it impossible to perform meaningful regression modeling. Determining the influence of variables such as CO_2 emission reduction will be particularly difficult in a small sample, particularly taking into account the variations in sizes of municipalities under study. There is also the issue of the number of proposed independent variables included in the model, which may not be appropriate given the small sample size. For this reason, independent variables were analyzed by blocks or categories (Berke & Beatly, 1992). With adequate sample size, series of regressions analysis can be performed to test the significance of multiple variables individually.

7.2.3 Internal Validity

Internal validity threats may arise from the difficulties associated with controlling for all the factors influencing adoption of green practices. It is a complex process involving socioeconomic and environmental aspects, which makes it difficult to identify, measure, and control for potential spurious relationships between different variables.

According to Corral (2010), researchers, irrespective of their area of specialization, desire to generalize their findings beyond the specific samples in their studies. Such generalization makes it necessary to look for diverse samples that are representative of the diverse population being researched, and hence, researchers seek to include numerous status groups. A diverse sample, however, raises questions about the internal validity of the study, namely, the extent to which the samples of various groups are equivalent, and the extent to which the methodology and measures used, as well as the relationships among the measures, are equivalent across those groups (Corral, 2010; Sue, 1999).

For example, municipalities in different geographical locations all over the country are subject to different environmental, political, and legal conditions, requiring a different set of planning tools. It follows that municipalities in California are subject to modes of operation which are different than the ones applied in Texas. Choosing municipalities only from one area (South East Texas) will increase the internal validity since; they all adhere to the same set of rules and laws.

7.2.4 External Validity

External validity is an issue arises when researchers try to extend the results of their study to areas beyond the original area of study, and in this instance States beyond Texas. Even though methodologies adopted can easily be applied elsewhere, caution must be exercised when making generalizations about the statistical conclusions of the study. Similarly, comparing diverse groups of samples also raise issues of external validity. The concern here is to what extent each group of sample is representative of its population (Corral, 2010; Sue, 1999).

The limited number of samples in this research diminishes the external validity of the study and makes it difficult to generalize elsewhere.

7.2.5 Construct Validity

Construct validity encompasses all forms of validity, which refers to the extent to which a measure adequately assesses the construct it purports to assess (Westen et al., 2003). In case the construct has several aspects or components, it will be difficult for any one measure to encompass all of these aspects. As a result the different approaches to measuring the construct will produce different results because each one gets at a different aspect, or because each one comes from a different perspective.

In this study, construct validity may come into play when examining adopting green practices. To measure the extent to which cities adopt these practice, several indicators had to be considered. As such, it was difficult to determine if what is being measured really represents adoption of green practices.

7.3 Limitations and Future Research

The study is a first step towards understanding the role of municipalities in addressing the issue of green practices and its impact on environmental and climatic changes. As such, further research is necessary to deal with these issues. The complexities and the diverse nature of corporations, coupled with the non-profit nature of municipalities, may have implications on motivation for embracing green practices.

Different states develop different policies, which are in turn, different from federal government regulations. There are instances when federal government laws prevail, but it may be better to have a comprehensive policy agreeable to both the federal government and states. It is also difficult to analyze green practices of individual cities to ascertain their impact on a subject of a global nature.

It is problematic to collect data from large cities because the process involves collecting data from different departments, which may involve too much work. Departments may not always have the motivation to do that. There could also be some interdepartmental conflicts which can obstruct cooperation. This could result in repeating the request for data or interview every time a new department or a new official is approached. This process could be time consuming. Another limitation is the sample size, as indicated above, which may prove to be a problem with conducting a comprehensive analysis such as regressions. There will, naturally, be a validity issue if the findings are to be applied to a wider area.

Another limitation is the lack of guidelines or a unified approach taken by cities to address the issue of green practices. Decisions were taken by city managers in isolation from employees', as well as communities' involvement. This makes it difficult to achieve full potentials of desired results.

Another limitation stems from the complexities of the subject of environmental awareness which is influenced by many factors. There are demographic factors, external factors (e.g. institutional, economic, social and cultural) and internal factors (e.g. motivation, pro-environmental knowledge, awareness, values, attitudes, perceptions, emotion, locus of control, responsibilities and priorities) (Kollmuss, & Agyeman, 2002). Combining all of these factors in one study may lead to distorted findings. It will be ideal for future research to study green practices while focusing on a limited number of influencing factors.

Another limitation is that the study did not properly evaluate the role of citizens in impacting decisions pertaining to adoption of green practices. The influence of stakeholder pressure on the adoption of environmental practices has been established in the literature. There are numerous theoretical frameworks which have been developed for the purpose of explaining this gap (Kollmuss, & Agyeman, 2002). Citizens are becoming aware and more involved in issues of environmental nature. There, however, exists a gap between the possession of environmental knowledge and environmental awareness. As such, the question of what shapes pro-environmental behavior is a complex one that it cannot be visualized through one single framework or diagram.

Majority of the cities included in this study did not produce energy. They secure their energy needs by relying on producers such as Lower Colorado River Authority. For this reason, most of the survey questions pertaining to energy production (from both fossil and renewables' sources) went unanswered.

Future research in this field needs to look at the subject of training, specifically environmental training in non-for-profit organizations such as municipalities, which can mediate the relationship between stakeholder pressures and various environmental practices (Sarkis, Gonzalez-Torre, & Adenso-Diaz, (2010). Thus, development of the necessary intangible knowledge capacities is required in order to achieve effective response to pressures, but, most importantly, to follow a more scientific approach in embracing and adopting environmentally friendly practices.

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APPENDIX I

TEXAS MUNICIPALITIES – REGIONAL MAP (COURTESY OF TEXAS MUNICPAL LEAGUE WEBSITE, WWW.TML.ORG)

Region 2 Amarillo Area

Region 3 Caprock—Lubbock Area

Region 4 Permian Basin Region—Odessa Area

Region 5 Red River Valley—Wichita Falls Area

Region 6 Hub of Texas—Abilene Area

Region 7 Alamo Region—San Antonio Area

Region 8 Where the West Begins—Fort Worth Area

Region 9 Heart of Texas Region—Waco Area

Region 10 Highland Lakes Region—Austin Area

Region 11 Coastal Bend Region—Corpus Christi Area

Region 12 Lower Rio Grande Valley—Rio Grande Valley Area

Region 13 North Central Texas Region—Dallas Area

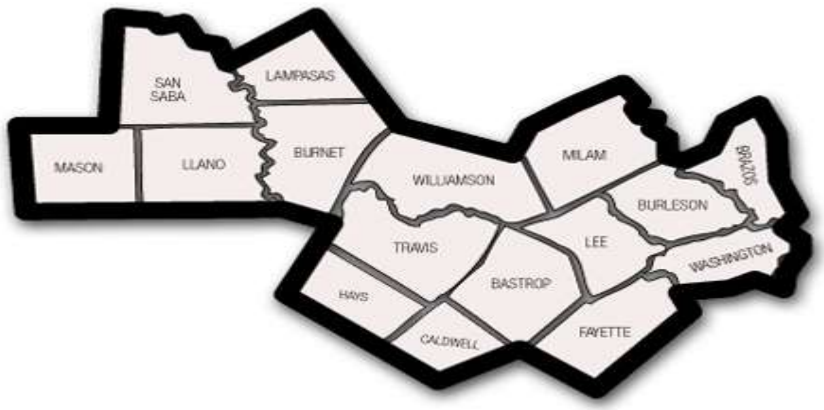
Region 14 San Jacinto Region—Houston Area

Region 15 Tyler—Longview Area

Region 16 Golden Pine & Oil Region—Beaumont—Lufkin Area

APPENDIX II

REGION 10 – HIGHLAND LAKES REGION – AUSTIN AREA

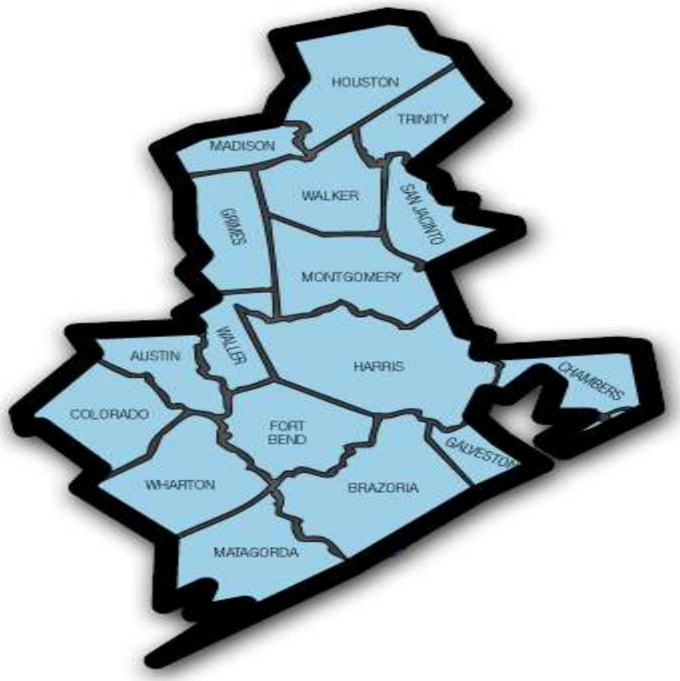


APPENDIX III

REGION 11 – COASTAL BEND REGION – CORPUS CHRISTI AREA

APPENDIX IV

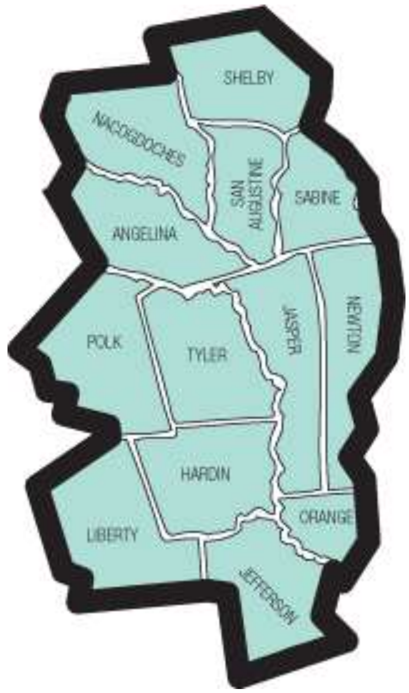
REGION 14 – SAN JACINTO REGION – HOUSTON AREA



APPENDIX V

REGION 16 – GOLDEN PINE & OIL REGION – BEAUMONT – LIFKIN

AREA



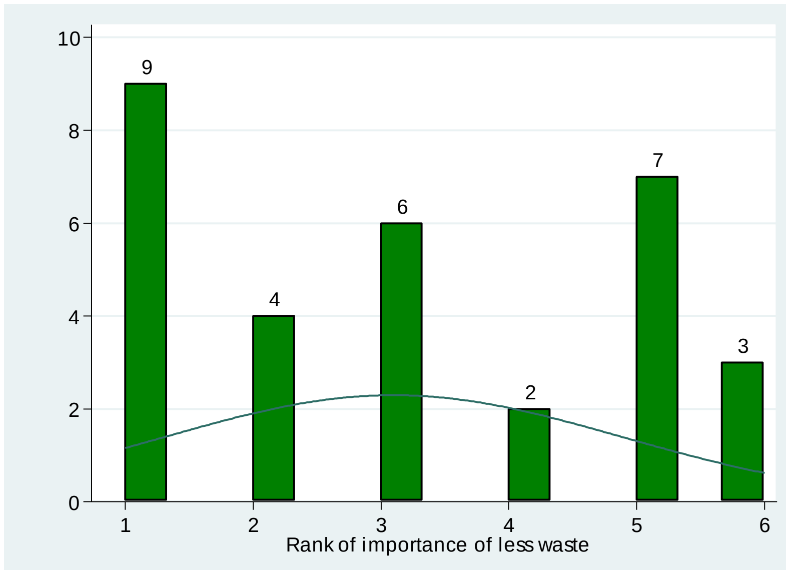
APPENDIX VI

FINAL LIST OF CITIES SURVEYED (FACE TO FACE INTERVIEWS)

	CITY	**TML REGION**	**POP**	STATUS
1	City of Corpus Christi	11	312,195	COMPLETE
2	City of Beaumont	16	118,548	COMPLETE
3	City of College Station	10	97,801	COMPLETE
4	City of Bryan	10	78,061	COMPLETE
5	City of Georgetown	10	52,303	COMPLETE
6	City of Lufkin	16	36,009	COMPLETE
7	City of Bay City	14	17,663	COMPLETE
8	City of Groves	16	16,181	COMPLETE
9	City of Brenham	10	16,147	COMPLETE
10	City of Lockhart	10	14,237	COMPLETE
11	City of Tomball	14	10,964	COMPLETE
12	City of Liberty	16	8,743	COMPLETE
13	City of Bastrop	10	8,438	COMPLETE
14	City of Jasper	16	7,714	COMPLETE
15	City of Dayton	16	7,307	COMPLETE
16	City of Lampasas	10	6,854	COMPLETE
17	City of Livingston	16	6,430	COMPLETE
18	City of Sealy	14	6,373	COMPLETE
18	City of Hempstead	14	6,091	COMPLETE
20	City of Luling	10	5,502	COMPLETE
21	City of Giddings	10	4,881	COMPLETE
22	City of La Grange	10	4,675	COMPLETE
23	City of Smithville	10	4,539	COMPLETE
24	City of Caldwell	10	4,104	COMPLETE
25	City of Columbus	14	3,655	COMPLETE
26	City of Schulenburg	10	2,872	COMPLETE
27	City of Woodville	16	2,586	COMPLETE
28	City of Hallettsville	11	2,571	COMPLETE
29	City of Huntington	16	2,136	COMPLETE
30	City of Mason	10	2,114	COMPLETE
31	City of Hemphill	16	1,198	COMPLETE

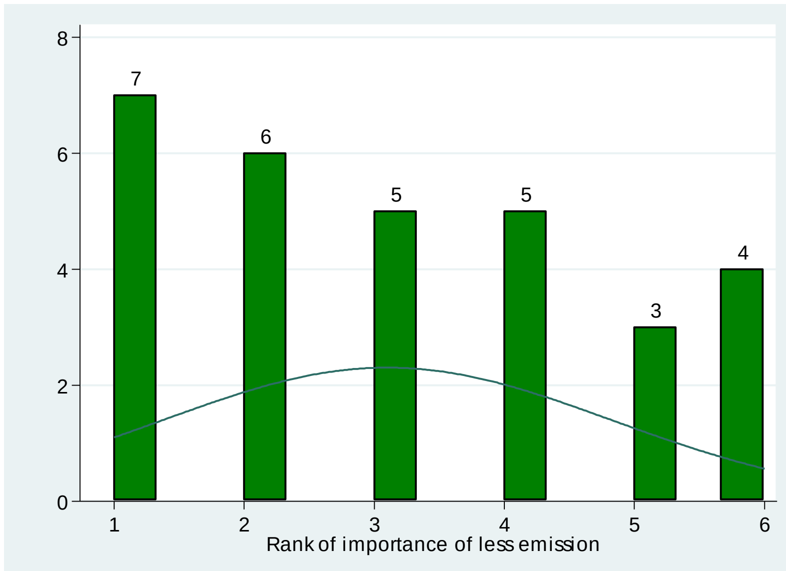
APPENDIX VII

IMPORTANCE OF LESS WASTE



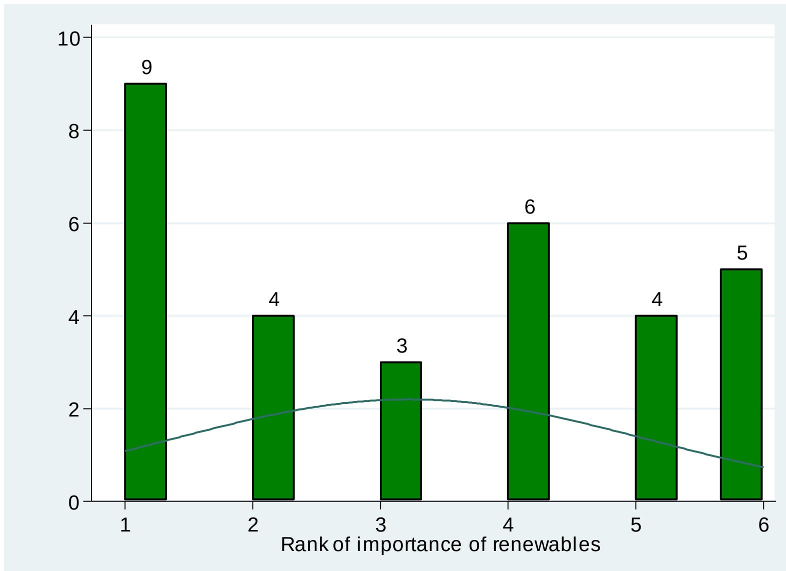
APPENDIX VIII

IMPORTANCE OF LESS EMISSION



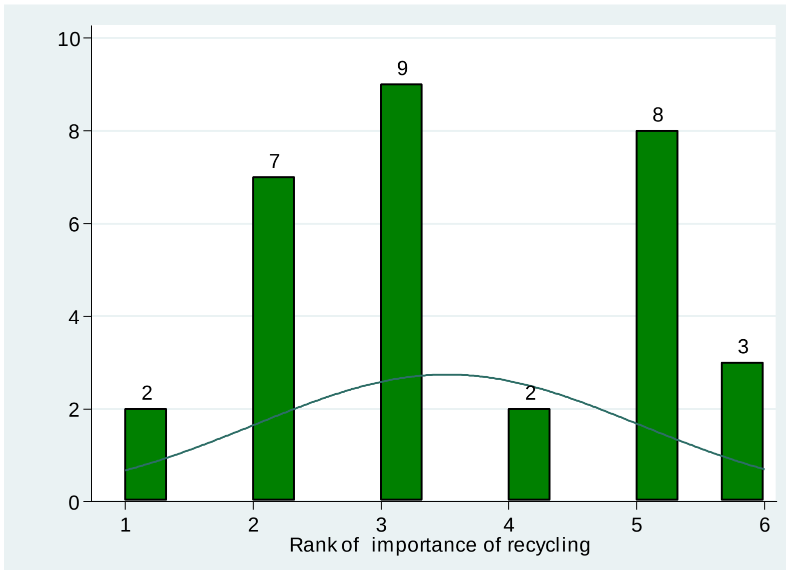
APPENDIX IX

IMPORTANCE OF RENEWABLE ENERGY



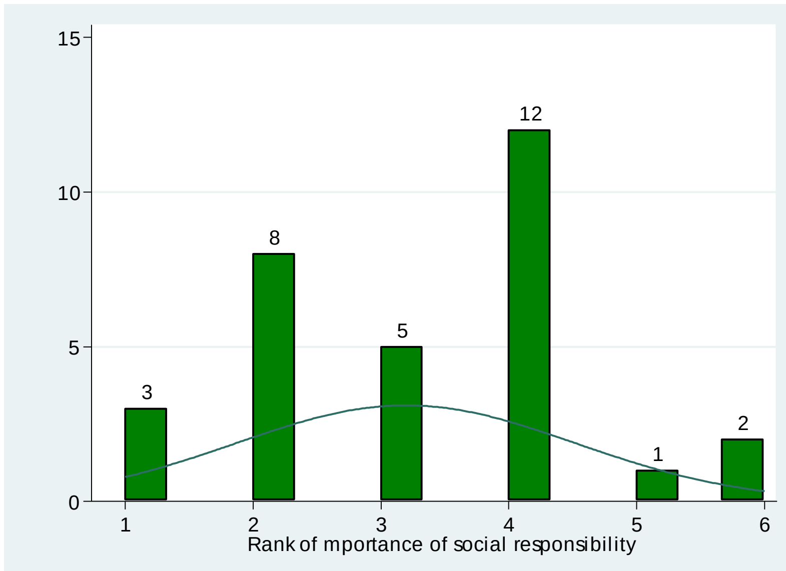
APPENDIX X

IMPORTANCE OF RECYCLING



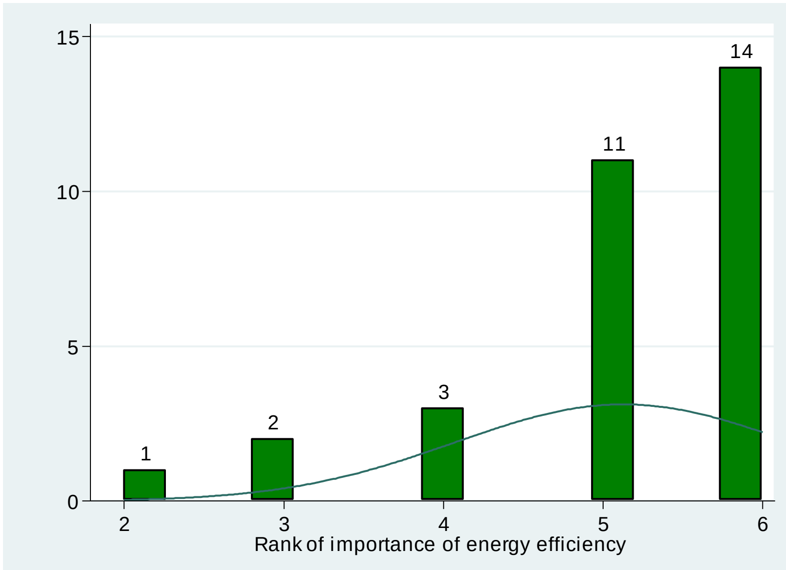
APPENDIX XI

IMPORTANCE OF SOCIALLY RESPONSIBLE ORGANIZATION



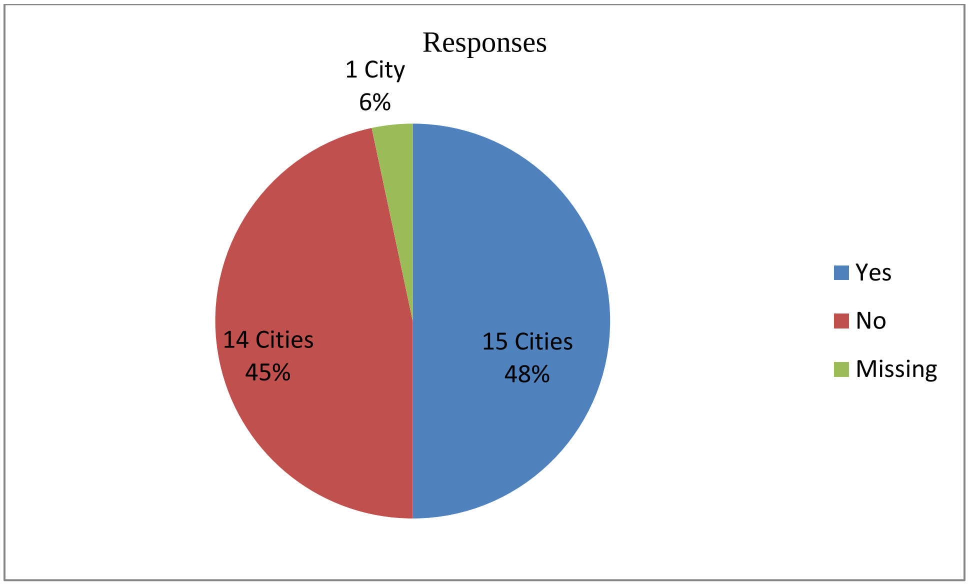
APPENDIX XII

IMPORTANCE OF ENERGY EFFICIENT OPERATIONS



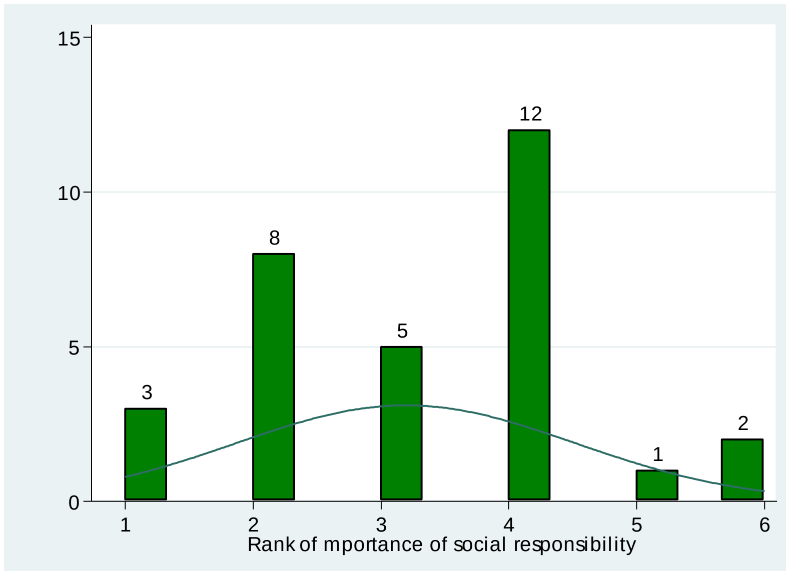
APPENDIX XIII

PIE CHART OF IMPACT OF GOVERNMENT REGULATIONS



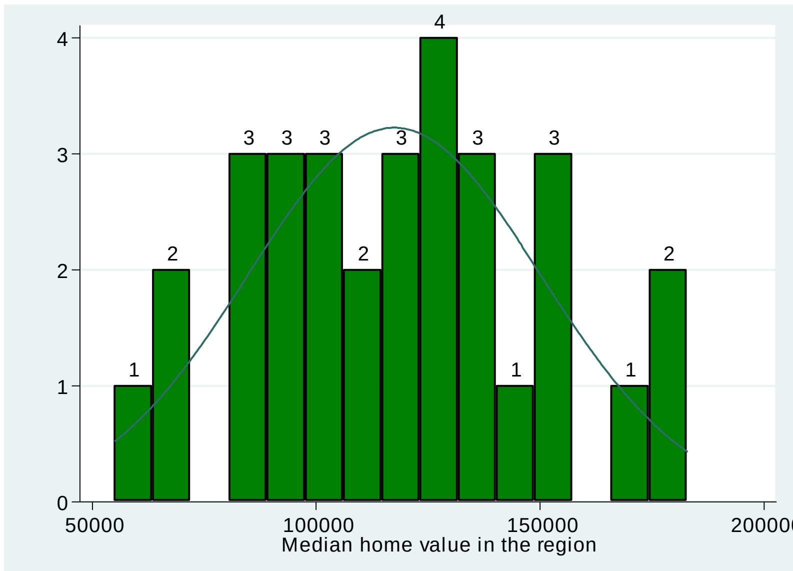
APPENDIX XIV

RANKING OF SOCIAL RESPONSIBILITY



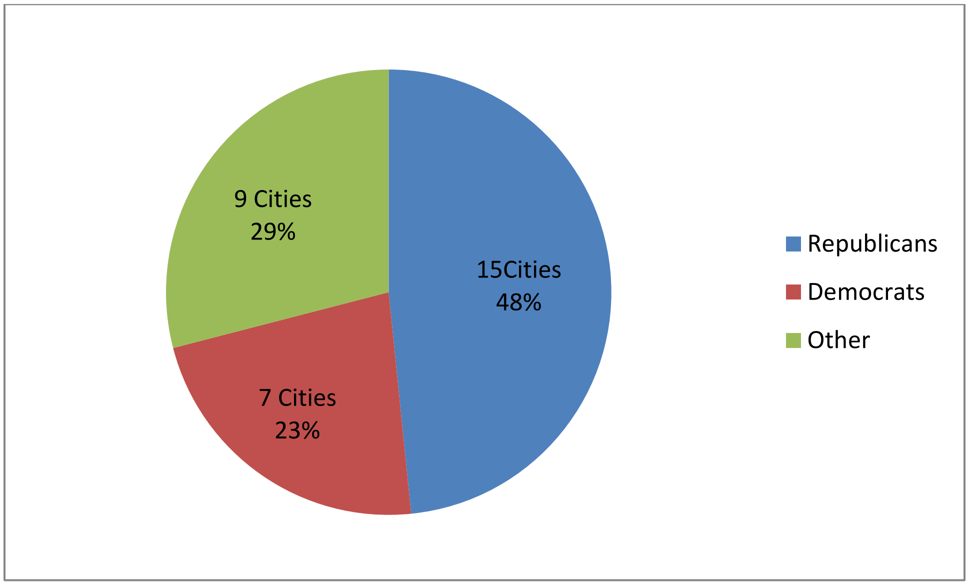
APPENDIX XV

MEDIAN HOME VALUE (SOURCE: CITIES' WEBSITE 2014)



APPENDIX XVI

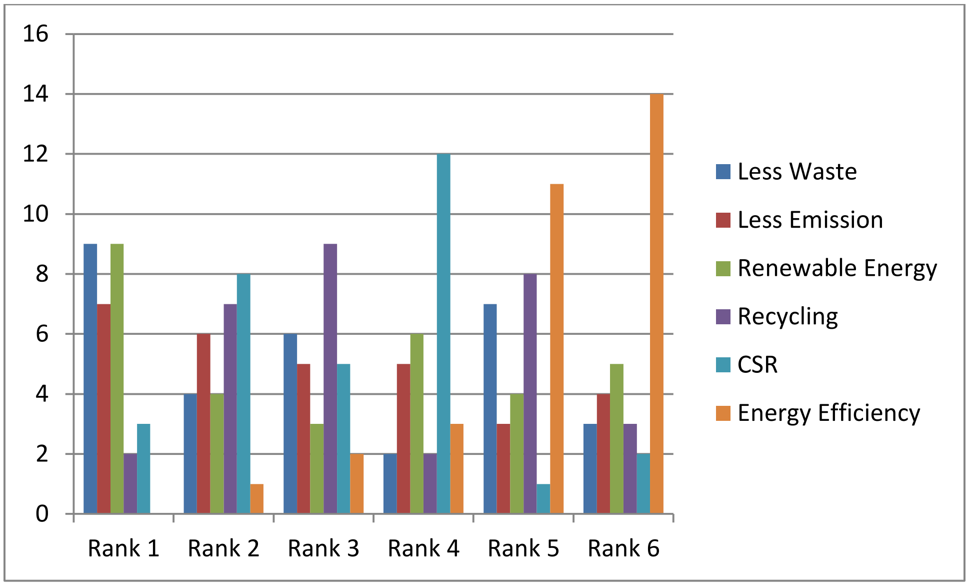
PIE CHART OF CITIES' POLITICAL AFFILIATIONS



APPENDIX XVII

CITIES' RANKING – IMPORTANCE OF GREEN PRACTICES

(1, LESS IMPORTANT TO 6, HIGH IMPORTANCE)



APPENDIX XVIII

SUMMARY OF RANKING OF ENVIRONMENTAL PRACTICES (LESS WASTE, LESS EMISSION, USE OF RENEWABLE ENERGY, RECYCLING, SOCIALLY RESPONSIBLE ORGANIZATION, AND ENERGY EFFICIENT OPEERATIONS) IN ORDERS OF 1 TO 6 (1 FOR LESS IMPORTANT AND 6 FOR MOST IMPORTANT)

```
.summarize Waste Emission Renewable Recycling CSR Efficiency

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
       Waste |        31    3.096774    1.795454          1          6
    Emission |        30         3.1    1.729062          1          6
   Renewable |        31    3.225806    1.874561          1          6
   Recycling |        31    3.516129    1.502686          1          6
         CSR |        31    3.193548    1.327136          1          6
-------------+---------------------------------------------------------
  Efficiency |        31    5.129032     1.05647          2          6
```

APPENDIX XIX

CRONBACH'S ALPHA CORRELATION OF ENERGY BLOCK OF VARIABLES

```
. alpha Cost Concern Hedging Spot Emi_Coal Emi_Diesel Emi_Natgas Wind Biofuel, item
min(1) std

Test scale = mean(standardized items)
```

Item	Obs	Sign	item-test correlation	item-rest correlation	average interitem correlation	alpha
Cost	31	+	0.3497	0.0105	0.0975	0.4637
Concern	31	+	0.0803	-0.2757	0.1442	0.5742
Hedging	30	-	0.4267	0.1160	0.0854	0.4276
Spot	30	+	0.4847	0.1944	0.0741	0.3903
Emi_Coal	27	+	0.5878	0.3801	0.0620	0.3459
Emi_Diesel	27	-	0.4279	0.1806	0.0827	0.4189
Emi_Natgas	27	-	0.6080	0.3912	0.0542	0.3142
Wind	25	+	0.5149	0.2461	0.0705	0.3775
Biofuel	22	-	0.4965	0.2524	0.0759	0.3965
Test scale					0.0827	0.4478

APPENDIX XX

CRONBACH'S ALPHA CORRELATION OF ENVIRONMENTAL BLOCK OF VARIABLES

```
. alpha Waste Emission Renewable Recycling CSR Efficiency, item min(1) std
Test scale = mean(standardized items)
```

Item	Obs	Sign	item-test correlation	item-rest correlation	average interitem correlation	alpha
Waste	31	-	0.2432	-0.0858	0.2087	0.5687
Emission	30	-	0.8131	0.6473	0.0294	0.1315
Renewable	31	-	0.2323	-0.0959	0.2122	0.5739
Recycling	31	+	0.6280	0.3621	0.0894	0.3293
CSR	31	+	0.5597	0.2610	0.1083	0.3778
Efficiency	31	+	0.6302	0.3673	0.0889	0.3279
Test scale					0.1226	0.4561

APPENDIX XXI

CRONBACH'S ALPHA CORRELATION OF FINANCIAL BLOCK OF VARIABLES

```
. alpha Revenue Accounts Employees Salaries CapInvest, item min(1) std

Test scale = mean(standardized items)
                                                             average
                                item-test     item-rest     interitem
Item         |  Obs  Sign   correlation   correlation    correlation     alpha
-------------+-----------------------------------------------------------------
Revenue      |   29    +       0.9790        0.9661         0.5557      0.8334
Accounts     |   29    +       0.9178        0.8661         0.6031      0.8587
Employees    |   28    +       0.9588        0.9334         0.5475      0.8287
Salaries     |   25    +       0.6574        0.1401         0.9341      0.9827
CapInvest    |   27    +       0.9707        0.9537         0.5819      0.8477
-------------+-----------------------------------------------------------------
Test scale   |                                              0.6474      0.9018
-------------------------------------------------------------------------------
```

APPENDIX XXII

CRONBACH'S ALPHA CORRELATION OF CONTEXTUAL BLOCK OF VARIABLES

```
. alpha Committ Funds Fuel Managmt Envirnmt Incentives Reguln s Officials Citizens, item
min(1) std
Test scale = mean(standardized items)
```

Item	Obs	Sign	item-test correlation	item-rest correlation	average interitem correlation	alpha
Committ	29	+	0.5231	0.3107	0.1487	0.5830
Funds	29	-	0.3548	0.1208	0.1772	0.6328
Fuel	29	-	0.3079	0.0878	0.1853	0.6454
Managmt	29	-	0.4627	0.2509	0.1628	0.6087
Envirnmt	29	+	0.6723	0.5160	0.1208	0.5236
Incentives	25	-	0.5910	0.4125	0.1367	0.5589
Reguln s	26	-	0.5222	0.3231	0.1489	0.5832
Officials	26	+	0.5228	0.3242	0.1486	0.5827
Citizens	26	+	0.6421	0.4726	0.1300	0.5444
Test scale					0.1509	0.6153

APPENDIX XXIII

STATISTICS AND T-TEST – MANAGEMENT INVOLVEMENT

```
. tabulate MngtInv

 Management |
Involvement |      Freq.     Percent        Cum.
------------+-----------------------------------
 Uninvolved |          4       13.79       13.79
   Involved |         25       86.21      100.00
------------+-----------------------------------
      Total |         29      100.00

. ttest GrnPractices, by(MngtInv) unequal

Two-sample t test with unequal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
Uninvolv |       4    33.33333    7.856743    15.71349    8.329672    58.33699
Involved |      24     58.7963    3.692364    18.08881    51.15806    66.43453
---------+--------------------------------------------------------------------
combined |      28    55.15873    3.724902    19.71033    47.51586     62.8016
---------+--------------------------------------------------------------------
    diff |           -25.46296    8.681126               -48.64635   -2.279578
------------------------------------------------------------------------------
    diff = mean(Uninvolv) - mean(Involved)                        t =  -2.9331
Ho: diff = 0                     Satterthwaite's degrees of freedom =  4.44325

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0188         Pr(|T| > |t|) = 0.0375          Pr(T > t) = 0.9812
```

APPENDIX XXIV

STATISTICS AND T-TEST – FINANCIAL CAPACITY (FULL TIME SALARIES)

```
. tabulate FTSalaries , missing

 Full Time Salaries |      Freq.     Percent        Cum.
--------------------+-----------------------------------
   Less than 6milln |         19       61.29       61.29
Greater than 6milln |          6       19.35       80.65
                  . |          6       19.35      100.00
--------------------+-----------------------------------
              Total |         31      100.00

. ttest GrnPractices, by(FTSalaries) unequal

Two-sample t test with unequal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
Less tha |      17    46.40523    4.592637    18.93593    36.66927    56.14118
 Greater |       6    72.22222     7.45356    18.25742    53.06224    91.38221
---------+--------------------------------------------------------------------
combined |      23     53.1401    4.524775    21.70006    43.75629     62.5239
---------+--------------------------------------------------------------------
    diff |           -25.81699    8.754877               -45.58645   -6.047534
------------------------------------------------------------------------------
    diff = mean(Less tha) - mean(Greater)                         t =  -2.9489
Ho: diff = 0                     Satterthwaite's degrees of freedom =  9.10711

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0080         Pr(|T| > |t|) = 0.0160          Pr(T > t) = 0.9920
```

APPENDIX XXV

STATISTICS AND T-TEST – FINANCIAL CAPACITY (TOTAL REVENUE)

```
. tabulate Trevenue , missing

      Total |
    Revenue |      Freq.     Percent        Cum.
------------+-----------------------------------
<25Millions |         20       64.52       64.52
>25Millions |          8       25.81       90.32
          . |          3        9.68      100.00
------------+-----------------------------------
      Total |         31      100.00

. ttest GrnPractices, by(TRevenue) unequal

Two-sample t test with unequal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
<25Milli |      18    48.76543    4.765026    20.21629    38.71211    58.81876
>25Milli |       8    63.88889    6.556631    18.54495    48.38492    79.39286
---------+--------------------------------------------------------------------
combined |      26     53.4188    4.042473    20.61265    45.09317    61.74443
---------+--------------------------------------------------------------------
    diff |           -15.12346    8.105238               -32.43403    2.187121
------------------------------------------------------------------------------
    diff = mean(<25Milli) - mean(>25Milli)                        t =  -1.8659
Ho: diff = 0                     Satterthwaite's degrees of freedom =  14.6628

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0411         Pr(|T| > |t|) = 0.0822          Pr(T > t) = 0.9589
```

APPENDIX XXVI

STATISTICS AND T-TEST – CONCERN FOR ENERGY COST

```
. tabulate CostConcern

Energy Cost |
    Concern |      Freq.     Percent        Cum.


------------+-----------------------------------
 Reasonable |         25       80.65       80.65
     Costly |          6       19.35      100.00
------------+-----------------------------------
      Total |         31      100.00

. ttest GrnPractices, by(CostConcern) unequal

Two-sample t test with unequal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
Reasonab |      23    54.10628    4.379429    21.00301     45.0239    63.18866
  Costly |       6    51.85185    9.369712    22.95101    27.76624    75.93746
---------+--------------------------------------------------------------------
combined |      29    53.63985    3.901924     21.0125    45.64712    61.63257
---------+--------------------------------------------------------------------
    diff |            2.254428    10.34267               -21.97202    26.48088
------------------------------------------------------------------------------
    diff = mean(Reasonab) - mean(Costly)                          t =   0.2180
Ho: diff = 0                     Satterthwaite's degrees of freedom =  7.34363

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.5833         Pr(|T| > |t|) = 0.8334          Pr(T > t) = 0.4167
```

APPENDIX XXVII

STATISTICS AND T-TEST – THE USE OF TECHNOLOGY

```
. tabulate TechPercent , missing

Adoption of |
      Green |
 Technology |      Freq.     Percent        Cum.
------------+-----------------------------------
       <50% |          6       19.35       19.35
       >50% |         25       80.65      100.00
------------+-----------------------------------
      Total |         31      100.00

. ttest GrnPractices, by(TechPercent) unequal

Two-sample t test with unequal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
    <50% |       4    22.22222    4.536092    9.072184    7.786352    36.65809
    >50% |      25    58.66667    3.543963    17.71981    51.35229    65.98105
---------+--------------------------------------------------------------------
combined |      29    53.63985    3.901924     21.0125    45.64712    61.63257
---------+--------------------------------------------------------------------
    diff |           -36.44444     5.75637               -49.89667   -22.99222
------------------------------------------------------------------------------
    diff = mean(<50%) - mean(>50%)                                t =  -6.3312
Ho: diff = 0                     Satterthwaite's degrees of freedom =  7.43394

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0002         Pr(|T| > |t|) = 0.0003          Pr(T > t) = 0.9998
```

APPENDIX XXVIII

STATISTICS AND T-TEST – URBAN AND RURAL SETTINGS

```
. tabulate UrbnRurl , missing

     Region |
   served - |
   urban or |
       rual |      Freq.     Percent        Cum.
------------+-----------------------------------
      Rural |         24       77.42       77.42
      Urban |          7       22.58      100.00
------------+-----------------------------------
      Total |         31      100.00

. ttest GrnPractices, by(UrbnRurl) unequal

Two-sample t test with unequal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
   Rural |      22    51.51515    4.597268     21.5631    41.95461    61.07569
   Urban |       7    60.31746    7.215969    19.09166    42.66062     77.9743
---------+--------------------------------------------------------------------
combined |      29    53.63985    3.901924     21.0125    45.64712    61.63257
---------+--------------------------------------------------------------------
    diff |           -8.802309    8.555997                 -27.568     9.96338
------------------------------------------------------------------------------
    diff = mean(Rural) - mean(Urban)                              t =  -1.0288
Ho: diff = 0                     Satterthwaite's degrees of freedom =  11.3261

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.1625         Pr(|T| > |t|) = 0.3250          Pr(T > t) = 0.8375
```

APPENDIX XXIX

STATISTICS AND T-TEST – GOVERNMENT REGULATIONS

```
tabulate GovRegln , missing

    If gov. |
     reglns |
  influence |
      green |
  practices |      Freq.     Percent        Cum.
------------+-----------------------------------
         No |         15       48.39       48.39
        Yes |         15       48.39       96.77
          . |          1        3.23      100.00
------------+-----------------------------------
      Total |         31      100.00

. ttest GrnPractices, by(GovRegln) unequal

Two-sample t test with unequal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
      No |      15    47.40741     5.88611     22.7968    34.78296    60.03186
     Yes |      14    60.31746    4.617258     17.2762    50.34248    70.29244
---------+--------------------------------------------------------------------
combined |      29    53.63985    3.901924     21.0125    45.64712    61.63257
---------+--------------------------------------------------------------------
    diff |           -12.91005       7.481               -28.28893    2.468828
------------------------------------------------------------------------------
    diff = mean(No) - mean(Yes)                                   t =  -1.7257
Ho: diff = 0                     Satterthwaite's degrees of freedom =  25.9492

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0481         Pr(|T| > |t|) = 0.0963          Pr(T > t) = 0.9519
```

APPENDIX XXX

STATISTICS AND T-TEST – YEARS OF GREEN PRACTICE (DURATION)

```
tabulate DuraYrs, missing

Duration of |
      Green |
  Practices |      Freq.     Percent        Cum.
------------+-----------------------------------
      Short |         14       45.16       45.16
       Long |         14       45.16       90.32
          . |          3        9.68      100.00
------------+-----------------------------------
      Total |         31      100.00

. ttest GrnPractices, by(DuraYrs) unequal

Two-sample t test with unequal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
   Short |      14     53.1746    4.684971    17.52956    43.05334    63.29587
    Long |      14    57.14286      5.9228    22.16109    44.34743    69.93829
---------+--------------------------------------------------------------------
combined |      28    55.15873    3.724902    19.71033    47.51586     62.8016
---------+--------------------------------------------------------------------
    diff |           -3.968253    7.551722               -19.53119    11.59468
------------------------------------------------------------------------------
    diff = mean(Short) - mean(Long)                               t =  -0.5255
Ho: diff = 0                     Satterthwaite's degrees of freedom =   24.691

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.3020         Pr(|T| > |t|) = 0.6039          Pr(T > t) = 0.6980
```

APPENDIX XXXI

STATISTICS AND T-TEST – POLITICAL AFFILIATIONS

```
. tabulate Political , missing
  Political |
Affiliation |      Freq.     Percent        Cum.
------------+-----------------------------------
 Democratic |          7       22.58       22.58
 Republican |         15       48.39       70.97
          . |          9       29.03      100.00
------------+-----------------------------------
      Total |         31      100.00

. ttest GrnPractices, by(Political) unequal

Two-sample t test with unequal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
Democrat |       7    57.14286    8.885109    23.50779    35.40178    78.88393
Republic |      15    51.11111    5.507731    21.33135     39.2982    62.92402
---------+--------------------------------------------------------------------
combined |      22     53.0303    4.619671    21.66818    43.42317    62.63743
---------+--------------------------------------------------------------------
    diff |            6.031746    10.45372               -17.02544    29.08893
------------------------------------------------------------------------------
    diff = mean(Democrat) - mean(Republic)                        t =   0.5770
Ho: diff = 0                     Satterthwaite's degrees of freedom =  10.8128

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.7121         Pr(|T| > |t|) = 0.5758          Pr(T > t) = 0.2879
```

APPENDIX XXXII

STATISTICS AND T-TEST – CONCERN FOR CARBON DIOXIDE EMISSION

```
. tabulate LssImssn , missing

 Importance |
    of Less |
  Immission |      Freq.     Percent        Cum.
------------+-----------------------------------
Lss Imprtnt |         18       58.06       58.06
    Imprtnt |         12       38.71       96.77
          . |          1        3.23      100.00
------------+-----------------------------------
      Total |         31      100.00

. ttest GrnPractices, by(LssImssn) unequal

Two-sample t test with unequal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
Lss Impr |      17    55.55556    5.218536    21.51657    44.49275    66.61836
 Imprtnt |      11    51.51515    6.577301    21.81444    36.86001    66.17029
---------+--------------------------------------------------------------------
combined |      28    53.96825     4.02951    21.32216    45.70038    62.23612
---------+--------------------------------------------------------------------
    diff |            4.040404    8.396071               -13.40611    21.48691
------------------------------------------------------------------------------
    diff = mean(Lss Impr) - mean(Imprtnt)                         t =   0.4812
Ho: diff = 0                     Satterthwaite's degrees of freedom =   21.282

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.6824         Pr(|T| > |t|) = 0.6353          Pr(T > t) = 0.3176
```

APPENDIX XXXIII

SURVEY/QUESTIONNAIRE

TEXAS MUNICIPAL LEAGUE – REGIONS 10, 12, 14, AND 16

Energy:

1) From your organization's point of view, what do you think of the current cost of energy compared to five years ago?
   - Very costly
   - Somewhat costly
   - Reasonable
   - Inexpensive
   - Very inexpensive
2) From your organization's point of view, are you concerned about future fuel prices?

   Yes, No,
3) Do you secure your fuel by entering into long term contracts (hedging), or do you buy from the spot market?
   - Entering into long term contracts (hedging).
   - Buy from the spot market.
4) How much electricity have you produced and consumed last year from the following sources?

PRODUCED	QUANTITY	%	Consumed	QUANTITY	%
Natural Gas			Natural Gas		
Coal			Coal		
Nuclear			Nuclear		
Other			Other		
Total			Total		

5) What are the sources of emission for electricity produced?

- Coal.
- Gasoline/Diesel.
- Natural gas
- Other; (specify). -------------------------------------.

6) What are the sources of emission for electricity consumed?

- Coal.
- Gasoline/Diesel.
- Natural gas.
- Other; (specify). --------------------------------------

Environmental and Social Initiatives:

7) How concerned are you about the amount of carbon dioxide your organization emits?

- Greatly concerned.
- Concerned.
- Fairly concerned.
- Not concerned.

8) How much carbon dioxide (in tons) emitted last year from total plant operations?

   ------------------Tons.

9) Please rank the following in order of importance to your organization's long term plans? (1, most important, and 6 less important).

ITEM	RANK
Less waste	
Less emission	
Production/consumption of renewable energy	
Recycling	
Socially responsible organization	
Energy efficient operations	

10) How much emission did you produce in comparison to dollar amount spent on energy produced last year?

-----------Emission (Tons).   -------------$ (Spent).

11) How much waste (in tons) did you produce last year from plant operations?

--------------Tons.

12) How much waste (tons) have you recycled last years?

--------------Tons.

13) How much electricity have you produced and consumed last year (KWH) from the following sources?

PRODUCED	QUANTITY	%	Consumed	QUANTITY	%
Wind			**Wind**		
Solar			**Solar**		
Biofuel			**Biofuel**		
Other			**Other**		
Total			**Total**		

14) Did you buy any electricity last year that is wind generated?

Yes,   No,

15) If your answer to question 14, above, is yes, how much wind generated electricity did you buy last year?

-----------------KWH.

16) Why did you buy wind generated electricity? Please check all that apply.

- The Government (Federal and State of Texas) said we have to.
- It is cheaper.
- It is a good thing to do.
- To help with local employment.

17) If your answer to question 14, above, is no, what was your reasoning? Please check all that apply.

- We didn't have to do so.
- We cannot get wind-generated electricity transported from West Texas to East Texas.
- It is not readily available
- Other reasons; specify.---

18) Did you buy any biofuel-generated electricity last year?

Yes, No,

19) If your answer to question 18, above, is yes, how much biofuel generated electricity did you buy last year?

-----------------KWH.

20) Why did you buy biofuel generated electricity? Please check all that apply.

- The Government (Federal and State of Texas) said we have to.
- It is readily available.
- It is a good thing to do.
- To help with local employment
- Some of our fleet runs on biofuel.

21) If your answer to question 18, above, is no, why you did not? Please check all that apply.

- Because we didn't have to do so.
- It is not cost effective.
- It is not readily available.
- Other reasons; specify. --.

22) When did you start adopting green practices in your organization?

- Within the last year.
- Within the last five years.
- Within the last fifteen years.
- Within the last twenty years.
- More than twenty years.

23) In a scale of one to five, how do you rate internal restructuring especially introduced to help with adopting corporate social responsibility and green practices?

- Excellent……………….. 1
- Good……………………2
- Fair………………………3
- Minimal…………………4
- Hardly any………......... 5

24) What are the internal motivating factors which have led your organization to **voluntarily** adopt corporate social responsibility and green practices? Please rank the points in order of importance, (1, for the most important factor, and 6 for the least important one)?

FACTORS	RANK
Internal convictions by employees.	
Availability of internal funds which helped accommodate for these projects.	
High fuel cost.	
Management's involvement in steering the organization in this direction.	
Concern for the environment.	
Other; (specify). --	

25) What are the external factors that have led you to adopt corporate social responsibility and green practices? Please rank the points in order of importance, (1, for the most important factor, and 6 for the least important one)?

FACTORS	RANK
Incentives such as energy credits.	
Government laws and regulations.	
Pressure from elected officials.	
Pressure from citizens such as environmentalists.	
Other; (specify). --	

26) What processes have you adopted to implement green practices? Please check all that apply.

- Changed our policies to reflect green practices.
- Conducted training and awareness programs to our employees.
- Incorporated green practices in our mission statement.
- Involved stakeholders and took their views into consideration.
- Commitment by senior management to drive the implementations of programs.
- Other; (specify). --

27) How much money you spent to promote green practices?

----------------$

28) When did you start adopting green practices? Please give the year.

----

29) Was the decision to adopt green practices attributed to your organization's internal policy?

Yes, No,

30) If the answer to question 29, above, is yes, in a scale of one to five, how do you rate your organization's internal commitment?

- Full commitment……………………………...1
- Relatively good commitment……………. 2
- Fair commitment……....………………… 3
- Less commitment………..………………..4
- Little commitment…………………………..5

31) Was government regulation a factor in embracing green practices?

Yes, No,

32) If the answer to question 31, above, is yes, in a scale of one to five, to what extent do you think that the adoption of green practices was attributed to government regulations?

- Absolutely…………..…………………….. 1
- To a great extent………………………… 2
- To some extent…………………………….3
- To a fair extent…………………….…... 4
- Not at all……….....………..……………… 5

33) Does the law require that you do any of the following? Mark all that apply.

- Cut on emission.
- Cut on waste.
- Recycle.
- Use renewable energy.
- Other; specify…………………………...…

Organization- specific characteristics:

34) What is the total number of employees on your records last year (full time and part time)?

------------------Full Time. -------------------Part Time.

35) What is the total dollar amount paid to employees in salaries and wages last year (full time and part time)?

------------------$ (Full Time) -------------------$ (Part Time).

36) How diverse is your organization?

RACE	**No.**	**%**
White		
Black or African American		
Hispanic, Latino, or Spanish origin		
American Indian or Alaska Native		
Asian and Native Hawaiian		
Pacific Islander		
Some other race (print race).		
GENDER:		
Male		
Female		
Disabled Persons		

37) How much did your organization spend last year in supporting community projects?

----------------$.

38) How much time (hours) did your employees volunteer in community service last year?

----------------Hours.

39) How much did your organization spend on capital investment last year?

----------------$.

40) How much revenue did your organization generate last year?

-----------------$.

41) How much operational cost did your organization incur last year?

-----------------$.

42) Does your organization have a mission statement?

Yes, No,

43) If your answer to question 42, above, is yes, does your mission statement make any reference to social responsibility and environmentally friendly operations or practices?

Yes, No,

44) In a scale of one to five, how do you rate management's commitment towards adopting corporate social responsibility and green practices?

- Excellent……………….. 1
- Good……………………2
- Fair……………………….3
- Minimal…………………..4
- Hardly any………......... 5

45) Which of the following technologies have you adopted to better serve your customers? Please check all that apply.

- Smart meters.
- Smart grid
- Emails.
- Street lights.
- Mail payment system.
- Online payment system.
- Other; (specify). --

46) Which of the following are you relying on for payments?

- Mail payment: ------------%, (if you know).
- Online payment ------------%, (if you know).

47) Are there any impediments to adopting any of the items in question 45, above?

Yes, No,

48) If your answer to question 47, above, is yes, please specify which one(s) you failed to adopt?

- Smart meters.
- Emails.
- Street lights.
- Mail payment system.
- Online payment system.
- Other; (specify). --

49) What impediments, beyond cost, that have prevented you from adopting any of the items in question 45, above?

- We did not know that we are required to do so.
- Many of our customers still don't have the means of using the technology.
- The law says we cannot use such technology(s) to serve our customers.
- People are living in areas which lack the connection to the service.
- Customers do not like costs such as printing emails passed on to them.
- We did not want to incur additional personnel cost needed to adopt new technologies and systems.
- We didn't feel there is an urgency to do so due to the non-for profit nature of our organization.
- Other; (specify). ---

50) What was the total revenue generated by your organization last year?

-----------------$.

51) What is the total number of customer accounts you serve?

----------------Accounts

52) If you are serving a rural community, how far are you from the closest major urban center?

……………..Miles.

53) Which of the following would best describe the community(s) you serve? Please check all that apply.

- Democratic.
- Republican
- Independent.

<u>I will provide answers to the following questions, unless you have answers readily available:</u>

54) What is the median value of homes in your region?

----------------$

55) The region you are serving is considered to be?

- Rural.
- Urban.

56) What are the percentages of the levels of education for each of the following groups in your region?

Group	**%**
Below high school	
High school	
College/University	
Master’s	
PhD	