An Ideal Sustainable Energy Model for Local Utilities: An Assessment of the City of San Marcos, Texas

by

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Abstract

The purpose of this research is to develop an ideal sustainable energy policy for the San Marcos Electric Utility. The utility of the 21st century should focus on doing more with less, rather than always producing more, which was the 20th century model. The San Marcos Electric Utility is uniquely positioned to become an energy utility for the 21st century by focusing on the five key components of the practical ideal model, known as the Sustainable Energy Utility. The five key elements are:

- Central Coordination
- Comprehensive Programs
- Flexible Incentives
- Financial Self-Sufficiency
- Setting a Standard

Key literature is reviewed on effective green policies for electric utilities, and applies them to policies in San Marcos, Texas. The research examines the historical context of renewable energy policies in the United States, and the lack of a comprehensive and consistent federal plan going back to the 1973 Arab oil embargo. By exploring how local governments acted in the absence of federal action, the research shows how local action is key to driving change.

A case study of the San Marcos Electric Utility occurred, using document analysis, direct observation, and structured interviews to gauge certain policies in San Marcos to determine how close the policies of the San Marcos Electric Utility reflect the ideal policies established by the Sustainable Energy Utility. For the most part, San Marcos mostly meets the standards of the Sustainable Energy Utility. The research helped develop 23 recommendations to improve the policies of the San Marcos Electric Utility.

About the Author

James Sharp Harkins, Jr. was born and raised in Houston, TX. The son of James "Jim" Harkins, III and Joy Lynn Harkins, brother to James Brandon Harkins, he grew up in the Cypress Fairbanks Independent School District, and thanks to the fine education he received in those schools, along with the drive and interaction to seek knowledge from his parents, he built a foundation for understanding that brought him to Texas State University – San Marcos.

James graduated from Texas State University with a bachelor's degree in Communications, with an emphasis on Public Relations and a Minor in Business Administration, in 2005. He is pursuing a Master's Degree in Public Administration at Texas State.

James has worked for the Texas General Land Office since May of 2005, where he started as an intern in the Office of Communications. He has worked in the Texas General Land Office Archives and Records since the Spring of 2007 as an Information Specialist and Outreach Manager. He is responsible for representing the Texas General Land Office, giving presentations on Texas history and the role of the Texas General Land Office in forming and administering a government over the last 174 years through land policy. Land policy is intimately tied to renewable energy, one of the main topics of this research.

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Chapter One: Introduction

"Public administrators often use research findings to make recommendations to improve programs. In other words, they are asked to gauge the effectiveness of program processes. One way to gauge efficacy of program processes is to develop criteria for this judgment and collect empirical evidence to contrast the reality of the program against the criteria" (Shields & Tajalli 2006, 324). One purpose of this research is to gauge the effectiveness of the energy policies used by the city of San Marcos, Texas. Unlike the "What?" research question associated with description, gauging research asks, "What should?" or, "How close is process x to the ideal or standard?" For practical ideal type research, the research purpose is to gauge "what should" be done to improve an administrative process (Shields & Tajalli 2006, 324), which is what this research does.

Research Purpose Statement

The purpose of this research is threefold. The first purpose is to establish a practical ideal model[1] for green policies for a local utility. Second is to gauge how closely the energy policies used by the San Marcos Electric Utility meet the standards presented in the practical ideal type. The final purpose is to provide recommendations for improving sustainable energy policies in the city of San Marcos.

Sustainability as the American Dream

When it comes to renewable energy and sustainable energy policy, one might think of the energy-climate challenge of what John Gardner, the founder of Common Cause, once described as "a series of great opportunities disguised as insoluble problems" (Gardner as quoted by Friedman, 2008, 171). Indeed, the problems associated with

[1] For examples of other Practical Ideal Type research papers from the Texas State Public Administration program, please see: Campbell, 2009; Lindsey, 2010; O'Neill, 2008; Vaden, 2007.

energy provide a great opportunity for someone to solve several problems with a “green bullet.”

The green bullet hits several targets simultaneously. A green bullet is a term for sustainable energy and energy efficiency policies that address where energy comes from, how it is produced, who produces it, along with how that energy can be produced cleanly, cheaply, locally and efficiently. While not everyone believes in global climate change, a hotly politicized issue, sustainable energy and energy efficiency policies address many concerns, including the environment, national defense, job creation, decreasing imports and increasing exports. There are multiple reasons why sustainability, energy efficiency and energy policy are inter-related.

“Sustainability” has come to be used interchangeably with “renewable energy” and “green.” Differences exist among all of these terms. For instance, renewable energy is a resource, which can be created or harnessed and continually replenished. Examples of renewable energy are wind, solar, geothermal and bio-fuel. The term “green” often times refers to the environment, and has been a fantastic marketing tool for the environmental movement to assign a simple color to a complex set of ideas.

Sustainability, on the other hand, is a singular term that refers to the way societies grow, build, design, manufacture, develop, and most importantly, live. In 1987, sustainable development was defined as, “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Howe, 1997, 597). The definition of “sustainability” was later extended by Robert Solow (1992, 15) who described it as, “to bequeath to posterity not any particular thing – with rare exceptions such as Yosemite, for example – but rather to endow them with whatever it takes to achieve a standard of living at least as good as our own and to look after their

next generation similarly." In essence, sustainability and sustainable living are the very definition of the *American Dream*. The American Dream has been defined in many different ways, but most often, it refers to some form of success, or, "achieving the American dream implies reaching some threshold of well-being, higher than where one began" (Hochschild, 1995, 16) and a desire among parents for their children to lead happy lives. By enacting renewable energy and energy efficient policies, Americans can move in the right direction of ensuring that future generations are better off than the current generation.

The actions taken today in San Marcos allows future generations the peace of mind to not worry about energy resources, because energy will be generated at home, rather than coming from a foreign source. The policies regarding energy efficiency and renewable energy being debated today in San Marcos will make future generations more secure.

The Environment

One of the most heated debates in American political life over the previous three decades has been the environment and global warming/global climate change, which in this research is referred to as climate change. Not everyone believes that climate change is real or hastened by man. With this said, it is not pragmatic to argue against helping the environment or trying to live cleanly. Sustainable energy practices, for instance, allow cleaner sources of energy to be used, like the sun or wind, as opposed to oil, coal and gas. Very few people want to pollute, yet it happens because it is the way things have always been done. An example of this might be the use of a petrochemical plant. It would be reasonable to assume, when driving by a petrochemical plant, that it may not be ideal for people to live nearby. According to numerous studies, those assumptions are confirmed,

as living close to these plants can have ill effects on health (Bhopal, et al., 1998, 812; Yang, et al., 1997, 145); ill effects on air pollution, water pollution, land use issues, and the environment as a whole (Byrne, et al., 2009, 81; Howe, 1997, 598; Droege, 2006, 141).

Whether or not climate change is real, an issue to be discussed outside of the realm of this paper, it is clear that petrochemical production, specifically oil, gas, and coal, is having an effect on the environment.

In the City of San Marcos, the environment has increasingly been the most prominent political topic for at least the last four years (Narvaiz, 2006). In San Marcos, protection of the environment is made evident by the multiple community events focused on the San Marcos River and protecting the natural environment.

Stable & Local Source of Energy

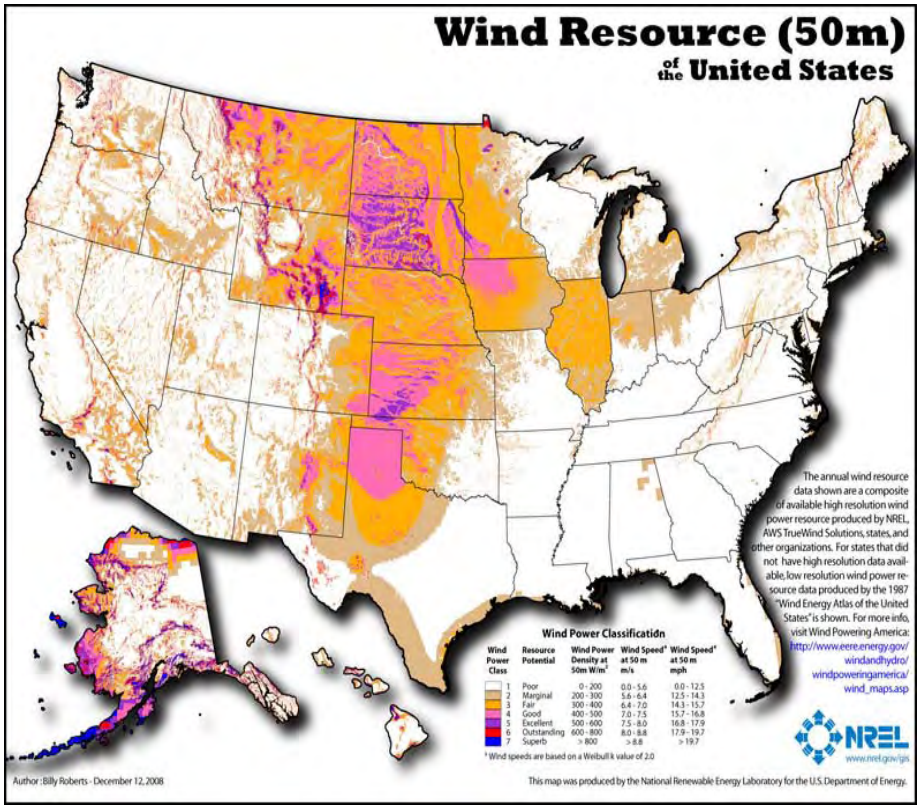

Figure 1.1: Wind Resource map of the United States. Courtesy of National Renewable Energy Laboratory. (http://www.nrel.gov/gis/wind.html).

Sustainable energy policies, as mentioned above, are pragmatic in every sense of the word because of the potential to create good. Americans can create renewable energy and efficient energy products and technologies. And, thus, have the potential to create jobs and

improve the economy. Using solar, wind, and other renewable energy technologies is increasingly attractive because they are produced in America's backyard.

The United States has ample renewable energy resources, as indicated in Figures 1.1 & 1.2. As indicated by Figure 1.1, the Great Plains of the United States is capable of producing so much wind energy that T. Boone Pickens has called it the *Saudi Arabia of Wind* (Patalon, 2009, quoting Pickens, 2009). According to Pickens, wind power could eventually fulfill as much as 20% of the United States' energy needs. This is an amazing number when considering the amount of energy produced from sources outside the United States. Pickens points out that the U.S. imported 4.35 billion barrels of oil in 2009, representing $265 billion that is being spent overseas. This represents over $500,000 spent per minute on foreign oil. The outward flow of revenue is projected to be approximately $10 trillion over the next ten years (Pickens, 2009). Clearly, this is a lot of money that could be spent on American projects rather than diverted to unstable parts of the world. Additionally, the Southwest United States has amazing potential to produce solar energy, as seen in Figure 1.2.

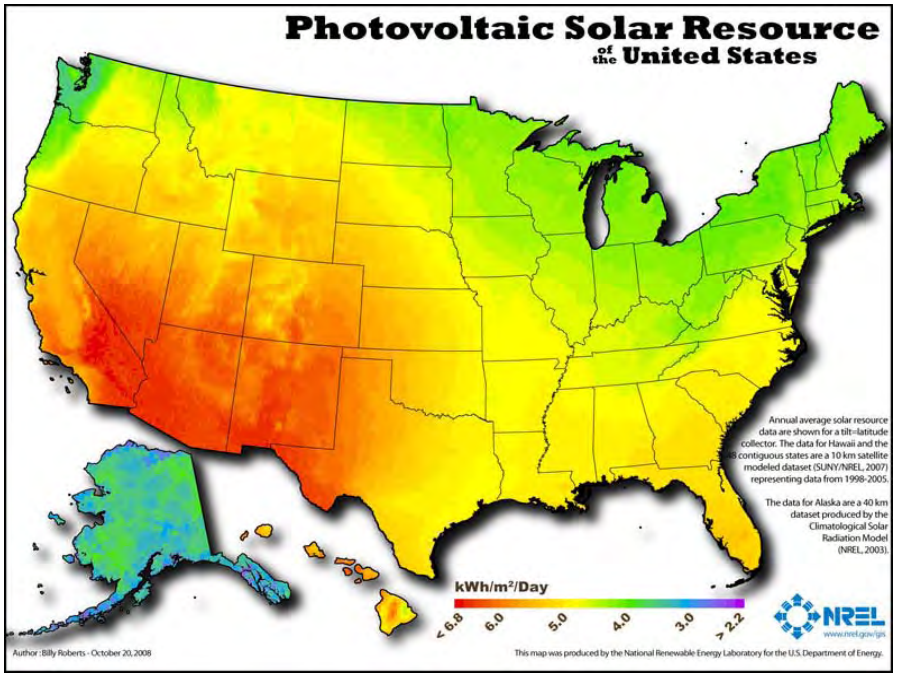

Figure 1.2: Photovoltaic Solar Resources of the United States. Courtesy of National Renewable Energy Laboratory. (http://www.nrel.gov/gis/solar.html).

Adding to the concerns about the affordability of energy has been increasing

unease, within the US, regarding domestic reliance on foreign energy sources and the loss of local energy dollars to outside regions and markets. “Increasing dependence upon foreign oil has subjected the nation to the whims of an oil cartel and the vagaries of supply commitments in an unstable world” and funding programs that are aimed at weakening America (Barkenbus, 1982, 411). The economic impact of this outward flow of local revenue to other countries translates to a lost opportunity for reinvestment in community-based programs and infrastructure. Americans should be investing in America and not in countries that are sometimes our adversaries (Hughes, 2009, 108-109; Roseland, 2005).

According to the U.S. Energy Information Administration, seven of the top fifteen countries that export crude oil to the United States are historically not friendly to the U.S. Countries on this list include Iraq, Saudi Arabia, Nigeria, Angola, Venezuela, Russia, and more (EIA, 2009). Several of these countries have had contentious issues with America over the previous three decades, and many of these issues are intimately tied to natural resources, like oil.

Focusing on the local level

The federal response to renewable energy policies has been inconsistent, at best, which is why the emerging movement for green power in the U.S. increasingly takes root at the community level. Hence, sustainability cannot be understood, or succeed, only as an international, national, or regional effort (Hughes 2009, 11). Since 1994, proponents argue that harnessing renewable and alternative energy and sustainable policies by local governments will require active citizen engagement at the local level. This shift in attitudes towards active citizen participation has been characterized as a rejection of the top-down approach to policymaking.

Sustainable development cannot be imposed from above. It will not take root unless people across the country are actively engaged (Barr, 2003, 227). To this end, local governments are demonstrating their ability and political will to set targets that often exceed those of national governments (Hughes, 2009, 14). Hughes (2009) argues,

> "With regard to energy specifically, once local stakeholders take part in forums of processes related to change in energy, they tend to demonstrate growing interest in and familiarity with energy matters. The result is that participants outlooks on alternative policies grow more positive, particularly when new energy proposals emerge from actors with strong links to local government or local agencies, rather than distant bodies" (Hughes, 2009, 40).

Cities have a huge influence on sustainability in energy use trends, because increasingly, global populations are moving towards urban environments instead of rural communities. As global centers of employment, communications, and transport, urban areas consume more than 75 percent of the earth's natural resources and some 75 percent of the global production of fossil fuels (Hughes 2009, 11). City and local governments should play a key role in encouraging renewable energy in a region because they play multiple roles. Cities act as decision-makers, planning authorities, managers of municipal infrastructure, and role models for citizens and businesses. It is their political mandate that makes local governments ideal drivers of change.

Cities drive change by providing guidance to their communities, providing services, and managing municipal assets. Also, local governments have legislative and purchasing power that can be used to implement changes in their own operations and in the wider community (Martinot 2009, 4). With such capacity, local governments become beacons for change in their region or country, demonstrating the effectiveness of policies and local action. Local governments should also play a key role as facilitators of change, particularly in terms of raising awareness and facilitating

community and business actions by a range of stakeholders. Often the participation of many different local, regional, and even national stakeholders is important to achieving planned outcomes (Martinot 2009, 4).

Many cities are in the early stages of including renewable energy and energy efficiency in urban planning. There are still relatively few explicit local renewable energy policies in place. Renewable energy, rather, is often addressed indirectly, within other themes such as sustainability, climate change, clean transportation, and "green" or "eco" programs. Often, energy savings and energy efficiency are the main priorities, which makes sense due to the enormous opportunities for reducing demand. Reduced demand also enables renewable energy to meet a larger share of the remaining demand. It is also true, however, that the potential for renewable energy is often overlooked, shortchanged, or needlessly postponed (Hughes, 2009).

When thinking of renewable energy and efficient energy use there have been some lessons learned from model cities like Austin, San Francisco, Washington D.C. and other "leader" communities. First of all, community size determines the approach and possibilities. There are differences, clearly, between the policies enacted and implemented by smaller versus larger communities. Smaller communities have the ability to be much more ambitious with their goals because they obviously don't use as much electricity as large cities. Per dollar, will cost a city the size of San Marcos, Texas less than it would cost a city the size of Houston, Texas to enact specific policies for renewable energy and energy efficiency, but costs may be higher on a per person basis. Smaller communities also tend to be motivated and supported in a regional context and cooperate with other municipalities in their region. Smaller cities are able to become

"early adopters," which can be an advantage when marketing the city as clean and allow the city to explore potentially beneficial business options (Martinot, 2009, 6).

Chapter Summaries

Chapter One focuses on some of the issues associated with renewable energy and energy efficiency, and why America should break the addiction from oil that President George W. Bush pointed out in his 2006 State of the Union address (Executive Office of the President, 2006). This chapter focuses on the environment and health, as well as the source of our energy, as the major reasons that America should look towards renewable energy and energy efficiency throughout the 21st century. This chapter explains why the lack of federal coordination led to a movement from hundreds of city leaders across the United States to focus local efforts towards creating the energy utility for the 21st century and establishes why local action is necessary, and critical to driving change.

Chapter Two focuses on the historical context of renewable energy and energy efficiency in America since the Arab Oil Crisis in 1973, when this movement started. The inconsistent policies and actions of Presidents Jimmy Carter, Ronald Reagan, George H.W. Bush, Bill Clinton, George W. Bush, and Barack Obama in regards to renewable energy and energy efficiency are reviewed. Chapter Two also defines several renewable energy and energy efficiency terms and policies that have been used across the country to varying degrees of success.

Chapter Three explores the practical ideal type model of renewable energy and energy efficiency policy for local energy utilities. The model that has been developed is called the Sustainable Energy Utility. This chapter focuses on what the Sustainable Energy Utility is, where it came from and how it should make a difference in the future. The five major areas of focus for the Sustainable Energy Utility are central coordination,

comprehensive programs, flexible incentives, financial self-sufficiency, and setting a standard.

Chapter Four describes the setting of the community that is examined in this research. The city of San Marcos, Texas was chosen as a case study and this chapter explores city demographics and gauges current policies.

The fifth chapter explains the methodology that was used in conducting this research. In this case study, city documents were analyzed, structured interviews were conducted, and there was direct observation of policy formation and outreach events.

The sixth chapter examines the results of policies of the San Marcos Electric Utility and how they measured up to the ideal policy framework, the Sustainable Energy Utility.

Chapter Seven makes specific recommendations to the San Marcos Electric Utility to improve renewable energy and energy efficient policies to better reflect those of the Sustainable Energy Utility.

Chapter Two: Historical Context and Definitions of Energy Policy in the 20th Century

Chapter Purpose

This chapter examines the lack of a consistent federal policy, which directly leads to state and local actors creating policy for renewable energy and energy efficiency. Also, federal, state, and local policies are discussed. These policies have been used to varying degrees of success over the last several decades.

Historical Context

A rapid growth in the production and consumption of commodities fueled the creation of wealth and economic opportunity for the last two hundred years (Byrne, et, al., 2006, 84). Energy was an irreplaceable ingredient of this economic and industrial progress (Alazraque-Cherni, 2008, 106). As Bakis (2008, 1) states, "The importance of energy in economic development is recognized universally and historical data verify that there is a strong relationship between the availability of energy and economic activity" (Bakis, 2008, 1).

Commodities, economic development, and economic activity created a foundation for the rapid growth of world economies and the "American way of life" for the last century. Unfortunately, the use of oil, gas, and coal is extremely short-lived as a historical phenomenon, (1% of the total urban history of 10,000 years-to-date). Yet, urban civilization is almost entirely based upon it (Droege, 2006, 141). These energy sources promote all initial economic activity. With few exceptions, the last century saw fossil fuels burned to produce energy and power the factories that created everyday products. The energy utility of the 20th century was invented to rapidly and continuously increase energy supply, and promoted economic growth at unparalleled rates in human history.

This utility, however, became the key contributor to the climate-change problem and increased dependence upon foreign oil (Byrne & Martinez, 2009, 27). Because of the dependence on fossil fuels as an energy resource, the world faces two major problems with its energy supply. The first problem relates to the security of fossil fuel resources and the second connects to the effects of the use of fossil fuels on the environment. These two problems have forced the energy sector, consumers, and central and local governments to recognize the need for sustainable and renewable alternatives to fossil fuels in mainstream power generation (Thorp & Curran, 2009, 159). The continued use of fossil fuels is not sustainable; eventually fossil fuels will be gone or too expensive to pursue. By depleting fossil fuels as a resource, future generations are denied the benefits as a manufacturing material as well as an energy source (Roeder, 2005, 166); or in other words, preventing future generations from being able to use resources that are rapidly being depleted today, and thus, not able to live as well off as current generations. Clearly, the current business-as-usual approach is nowhere near an ideal situation for current or future generations, as energy policy is one of the few issues that has the potential to ruin the American dream.

The Beginning of Sustainability in America

The previously mentioned problems were magnified in 1973 during the first Arab oil embargo. 1973 saw the official end of the Vietnam War. It was also the year of the first global oil shock the world experienced, involving the Palestinian question, which seems to be at the center of most problems in the Middle East (Lesch, 1982, 560). By exposing the fragility of advanced petroleum civilization, OPEC inflicted a significant psycho-cultural trauma on Western motorists and industries and threatened modernism, perhaps like nothing else could (Droege, 2006, 143).

Understandably, the increased oil prices caused a shock to the American economy. For the first time, Americans realized that increasing dependence upon foreign oil subjected the nation to an oil cartel and the inconsistencies of supply commitments in an unstable region (Barkenbus, 1982, 411). This reality caused politicians to consider alternatives to fossil fuels. The severe effects of the 1973-74 Arab oil embargo and the continuing global concern over dwindling fossil fuel sources prompted research on consumers' behavior in terms of personal energy consumption and response to energy conservation policies (Taschian et al., 1984, 134).

Figure 2.1 - Five of the six president's who have had an impact on the current energy situation in America. Photo taken January 7, 2009.

The Jimmy Carter Administration: Planting a Green Seed

During President Jimmy Carter's years in office, just as today, the energy predicament facing the U.S. represented a major crisis (Barkenbus, 1982, 411). To his credit, President Carter was as proactive as he could be. He implemented several policies that moved the United States towards a renewable energy future. For example, he introduced oil-reduction reforms and created the Cabinet-level Department of Energy. He began spending millions of research dollars on alternative sources for electrical power, including solar. He convinced utilities to cut their use of oil for electricity and ramp up their use of natural gas and coal. He insisted that U.S. automakers build more fuel-efficient cars, with a goal of 27.5 miles per gallon over the following decade – a

requirement passed under Gerald Ford but enforced by Carter. He offered incentives for getting oil from shale, creating a boom initially in the Rockies – and a bust when it failed to be cost-effective. He offered deductions for using solar water heaters in homes and commercial buildings, among several other policies (Koff, 2005).

Figure 2.2 - The official White House portrait of Jimmy Carter.

The oil embargo spurred sentiment for launching an effort reminiscent of the government's role in the Manhattan or Apollo projects (Barkenbus, 1982, 411). While Carter's policies towards alternative and renewable energy certainly were not to the scale of the Manhattan or Apollo projects, the United States took its first baby steps towards a sustainable energy policy (Brown, 1999, 678). Around that time, the Department of Energy announced an ambitious goal to produce 20% of the country's energy from renewable resources by the year 2000, beginning with a handful of well-publicized wind turbines. In addition, the government established what would become the National Renewable Energy Laboratory (NREL) in Golden, Colorado (Brown, 1999, 678). This was a good start. What was needed, however, was an unparalleled merging of public-private energies, talents, and finances to catalyze and mobilize energy technology contributions to reducing or eliminating foreign oil dependence (Barkenbus, 1982, 411).

Barden (1979, 26) argued that Carter took "baby steps" compared to what needed to happen, but many would disagree. Carter supported alternative energy both in policy and symbolically by installing solar panels on the roof of the White House. Congress

recognized the President's view that conservation was (and is) the cornerstone of a sound national energy policy and proceeded to enact a series of measures that were supposed to facilitate, induce and reward–and in some cases require–conservation efforts in the residential, commercial, and industrial sectors (Bardin, 1979, 26). One example of this was a tax rebate for homes that installed solar panels. Conservation was one of the most important concepts established during the Carter administration, and a key part of the ideal sustainable utility policies that can be enacted on national, state, and local levels.

The single most important factor in the development of a commercial renewable energy market was the passage of the Public Utility Regulatory Policies Act (PURPA) in 1978. According to Zucchet (1995, 1), "Among other things, PURPA encouraged the development of small-scale electric power plants, especially those fueled by renewable resources. The renewables industry responded to such incentives by growing rapidly, gaining experience, improving technologies and reliability, and lowering costs."

PURPA was designed to wean America off foreign oil by encouraging alternative fuels for generating electricity. PURPA requires utilities to buy power from independent power producers, mostly small generators or ones using renewable energy sources, at a price approved by regulators (Slocum, 2001, 473).

In April 1977, Carter unveiled his National Energy Plan (NEP). The NEP had numerous proposals and mechanisms designed to reshape basic energy supply and demand patterns (Barkenbus, 1982, 411). Carter asserted, "the energy problem can be effectively addressed only by a government that accepts responsibility for dealing with it comprehensively and by a public that understands its seriousness and is ready to make necessary sacrifices" (Barkenbus, 1982, 411; Executive Office of the President, 1977).

Unfortunately, subsequent presidential administrations have had drastically divergent views of the role of government on energy policy.

The Ronald Reagan Administration: The Retreat from Renewables

When Carter left office and Reagan ascended to the presidency in 1980, it was "morning in America," but as far as renewable energy policy was concerned, America should have been in mourning. Reagan represented a sharp paradigm shift from Carter on almost everything, including alternative and renewable energy. The free-market paradigm crossed the country, meaning there was no longer a significant place for government involvement in the energy sector. In a message to Congress transmitting the National Energy Policy Plan on July 17, 1981, Reagan said,

Figure 2.3 - Ronald Reagan prepares his 1983 State of the Union address in the Oval Office. Courtesy of the National Archives.

> "Our national energy plan should not be a rigid set of production and conservation goals dictated by government. Our primary objective is simply for our citizens to have enough energy, and it is up to them to decide how much energy that is, and in what form and manner it will reach them. When the free market is permitted to work the way it should, millions of individual choices and judgments will produce the proper balance of supply and demand our economy needs" (Executive Office of the President, 1981).

This shift in thought was based on the premise that government intervention does far more harm than good in resolving the nation's energy problem (Barkenbus, 1982, 413). The free market paradigm posits that government intervention–regardless of the best intentions–unwisely distorts or limits the choices for energy services that, in a free market system, are privately negotiated between buyers and sellers (Barkenbus, 1982, 413).

This shift had drastic consequences on the alternative and renewable energy industries and the way American's viewed these technologies. The final blow to the alternative energy industry and environmental movements came when Reagan repealed Carter's tax credits for those who purchased a solar power system for their home or business. Symbolically, Reagan removed the solar panels from the White House and removed any chance for solar and other forms of renewable energy from providing a meaningful portion of the nation's energy.

If the solar panel coming down off of the White House was a blow to the renewable energy industry and environmental movement, the repeal of the fuel economy standard to pre-Jimmy Carter levels was a poke in the eye to the alternative energy and environmental movements. Reagan was driven by the belief that government inefficiencies, complexity, and waste were major barriers to achieving energy autonomy (Barkenbus, 1982).

No longer was the federal government going to take an active role. If every CO_2 cloud has a silver lining, then the lack of a strong federal policy encouraged the development of more region- and state-specific energy policies. These were needed because energy conditions vary tremendously among the 50 states as a result of differences in climate, social history, economic activity and fossil fuel endowment (Sawyer, 1984, 205). Region- and state-specific energy policies opened up the door for grassroots movements, which are discussed later.

The George H.W. Bush Administration: The Grassroots Take Hold

The first President Bush was elected to office in 1988. He believed in the same free market principles as his predecessor, which should be no surprise, since Bush served as Vice President during Reagan's years in office.

In contrast to Reagan though, Bush campaigned as an "environmental president" (Tresner, 2009, 17; Sussman, 2004, 355)[23]. This was perhaps in response to new grassroots organizations formed as part of a burgeoning environmental movement. His actions as an environmental president took on new meaning on March 24, 1989, when the Exxon Valdez oil spill occurred off the coast of Alaska. Due to this environmental disaster, Americans were increasingly aware of man's role in the environment, and the potential to help or hurt the natural world around us. The Bush (41) administration passed substantial improvements in building standards and new appliance standards. It also introduced a production tax credit for renewable energy, and even elevated the Solar Energy Research Institute to the status of a national institution known as the National Renewable Energy Laboratory (Tresner, 2009, 17; Friedman, 2008). While he may have improved renewable and alternative energy policy, he was distracted by focusing his presidency on the end of the Cold War and the war in Iraq (Tresner, 2009, 18; Friedman, 2008; Sussman, 2004). At this time, he could have invested heavily in renewable energy to help avoid future conflicts but the political will and urgency was absent.

Figure 2.4 - The official portrait of George H.W. Bush.

President Bush was successful in passing the Clean Air Act Amendments in 1990 (Tresner, 2009, 17; Sussman, 2004). The overall political climate in the country made it

[2] For an additional look at the environmental movement in America, please see Erin Tresner's Texas State ARP. This paper can be viewed here, http://ecommons.txstate.edu/arp/293.
[3] For other examples of Texas State Applied Research projects that deal with environmental policy, renewable energy and energy efficiency policy, or local policy action, please Kosub, 2009; Reed, 2009; Sparks, 2007; Thompson, 1996. Wade, 1999.

difficult for President Bush to make more significant changes. While grassroots campaigns were in their infancy, the environment had not caught on as a major political issue. Awareness of global climate change had not found its way into the mainstream, the economy was weak, and there was a war in the Middle East. The environment would have to wait.

The Bill Clinton Administration and Deregulation

President Bill Clinton was elected to office in 1992. His running mate, Al Gore, was an avid environmental advocate. Together, Clinton and Gore stressed their commitment to the domestic and global environment (Tresner, 2009). The 1990s brought several changes to national energy policy and the environmental movement. The Energy Policy Act of 1992 (EPACT) began to chip away at utilities' monopolies by expanding the Federal Energy Regulatory Commission's (FERC's) authority. This act set the stage for deregulation by facilitating entry into power sales markets. Importantly, EPACT required utilities that owned transmission lines to provide non-discriminatory access to their grids for the purposes of selling wholesale electricity (Brennan, Palmer, and Martinez, 2002). The act thus opened the possibility that states could promote competition not only at the wholesale level but also at the retail level. EPACT also delegated to states the power to decide for themselves how to proceed. State regulatory commissions thus were the platform for most of the subsequent initiatives toward electric utility deregulation (Delmas, 2007, 9).

Figure 2.5 - The official portrait of Bill Clinton.

Between PURPA and EPACT, the first cracks in the utilities monopoly began to show (Slocum, 2001, 474). These two acts paved the way for alternative sources of energy to emerge. Utility monopolies hurt any realistic thought that green policies from an electric utility were possible. A common theme has been developed in the literature relating to utility deregulation. For instance, deregulation might mean changing industry boundaries, or it might mean shifting the scope of permissible activities for incumbents and entrants, or it could be changing incentives for behavior (Delmas, et al., 2007, 4). Deregulation permits new competitors to enter a field previously closed to them, as was the case with renewable energy, and it can remove restrictions on pricing. Prior to deregulation, utilities were granted a guaranteed rate of return on traditional activities but were subject to some risk if they were too innovative because regulators could rule costs associated with innovation if efforts failed. This is particularly true of energy utilities, which lacked the will to innovate with regard to green/renewable energy. Simply, there was no incentive to change an already profitable business model to pursue unproven wind or solar technology. Cho (2001) established that deregulation shifted managerial perspectives to a more entrepreneurial mindset. Russo (2001) found that new technological forms appeared in the utility industry following institutional change that facilitated entry.

The United Nations Framework Convention on Climate Change (UNFCCC or FCCC) established the Kyoto Protocol on December 11, 1997. President Clinton agreed to this treaty, which was aimed at combatting global warming. The treaty, however, was not ratified by the Republican-led Congress because of the perception that it would be detrimental to the U.S. economy (Friedman, 2008). Had the Kyoto Protocol passed

Congress, the United States would have joined 187 other states to help fight global warming. For Kyoto, the final decision would be made by the next president.

The George W. Bush Administration: An Addiction to Oil

In 2001, only months after taking office, President George W. Bush signaled opposition to the Kyoto protocol because it exempted 80% of the world, including major population centers such as China and India from compliance, and would cause serious harm to the U.S. economy (Sussman, 2004, 352; Executive Office of the President, 2001). This administration dealt with a multitude of major issues, many of which were the result of several decades of poor foreign policy in the Middle East. Ironically, many of these policies were rooted in energy and mineral exploitation (Friedman, 2008). Thomas L. Friedman (2008) explains that American reliance on foreign oil, and subsequent foreign policy, is *the* major reason our country was attacked on September 11, 2001. He argues that American foreign policy in the Middle East is the reason for the Arab oil embargo of the 1970s and numerous terrorist attacks on American interests around the world (Friedman, 2008).

Figure 2.6 - The official portrait of George W. Bush.

The Bush policies on environmental and renewable energy made a 180-degree turn from his first term to his second. Early on, Bush denied global warming only to change direction later on. He killed the Kyoto protocol in the United States, which mandated environmental action. Instead, he preferred voluntary action (Sussman, 2004, 363). In 2006, during his State of the Union speech, President Bush said, “Keeping America competitive requires affordable energy. And here we have a serious problem:

America is addicted to oil, which is often imported from unstable parts of the world. The best way to break this addiction is through technology" (Executive Office of the President, 2006). This announcement was among the most important steps for the American people to realize that there was a problem. Here, a Republican president with strong ties to the oil industry admitted that there was an addiction to oil, and an alternative needed to be found.

Bush announced a 22% increase in clean-energy research at the Department of Energy to push for breakthroughs in two vital areas. He pledged to power homes and offices differently and to invest more in zero-emission, coal-fired plants, revolutionary solar and wind technologies, and clean, safe nuclear energy (Executive Office of the President, 2006). Once again, the national government favored research on fossil fuels and nuclear power, in conjunction with experimental energy technologies and resources, while significant investments in existing and deployable sustainable energy solutions remained wanting (Byrne, et al., 2007, 4557). Simply, wind, solar and geothermal have been viable options that have not been supported in meaningful ways. For all the rhetoric the Bush administration gave alternative and renewable sources, it did not provide adequate funding for these technologies in comparison to other energy sources like fossil fuels, nuclear power and clean coal (Nogee, 2002, 106)

The Barack Obama Administration and a New Approach

It is still too early to determine how the Obama administration will treat alternative and renewable energy technologies. Early indications are that the President will attempt to "make green the new red, white, and blue" (Friedman, 2008) by having the government invest deeply in these technologies. The passage of the American Clean Energy and Security Act of 2009 on February 13, 2009 committed $190 billion in clean

energy and energy efficiency spending through 2025. This act is intended to create 1.7 million jobs related to clean energy, save 219 million barrels of oil annually, reduce pollution by more than 2 billion tons and much more (Center for American Progress, 2009). This bill has the potential to impact renewable energy markets (Bolinger et al., 2009). Later in 2009, Secretary of Energy Steven Chu announced, "This administration has set a goal of doubling renewable electricity generation over the next three years. To achieve that goal, we need to accelerate renewable project development by ensuring access to capital for advanced technology projects. We also need a grid that can move clean energy from the places it can be produced to the places where it can be used and that can integrate variable sources of power, like wind and solar" (DOE, July 29, 2009 Press Release). This announcement gave real teeth to environmental regulation.

Figure 2.7 - The official portrait of Barack Obama.

Definitions in Alternative and Renewable Energy Policies

Many policies and plans have come forward from federal, state and local governments. What has been absent, however, at the federal level, is a willingness to forge a genuine partnership with other levels of government to attack common problems or to implement policies (Barkenbus, 418, 1982). As a result, over the last 27 years, each state and municipality acts individually with very little guidance (Barkenbus, 1982; Friedman, 2008; Tresner, 2009).

State policies are important to the renewable energy and energy efficiency markets because state policies help drive markets by providing certainty in investments,

and incorporating the external benefits of the technologies into cost/benefit calculations (Doris et al., 2009). Local policies tend to be at the ground level and take advantage of grants from federal and state programs (Sparks, 2007).[4] In the absence of other constraints, high-quality renewable energy resources spur significant renewable energy development using relatively modest financial incentives. Likewise, states with poor renewable energy resources must use large incentives to meet and remain economically competitive. Thus, not all renewable resources are viable in all markets. In some places, wind energy is more feasible, whereas solar and geothermal may be more realistic than in others. When it comes to geography and types of energy, in many cases, the most important question to ponder is "What are the transmission constraints?" (Bird et al., 2003, 40). Thus, different jurisdictions have different policy priorities, which can be seen in the various types of policies they choose. Most of these policies are associated with green utilities and are reviewed here.[5]

Net metering is an electricity policy for consumers who own renewable energy facilities, such as wind, solar power or home fuel cells. "Net" refers to what remains after deductions—in this case, the deduction of any energy outflows from metered energy inflows. Under net metering, a system owner receives retail credit for at least a portion of the electricity they generate, thus reducing a monthly bill. New technology has made it possible for many electricity meters to accurately record in both directions, allowing a no/low-cost method of effectively banking excess electricity production for future credit.

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[4] Chance Sparks' ARP, entitled, "Greening Affordable Housing: An Assessment of Housing under the Community Development Block Grant and HOME Investment Partnership Programs, is a good example of how federal programs can be used at the local level to provide affordable green housing." This paper can be viewed here: http://ecommons.txstate.edu/arp/251.

[5] Daniel Reed's ARP, entitled, "Environmental and Renewable Energy Innovation Potential Among the States: State Rankings, is a good source for various incentives in different states." This paper can be viewed here: http://ecommons.txstate.edu/arp/291.

This policy encourages customer-sited distribution of electricity generation by crediting the excess output of onsite energy systems for financial compensation by the utility receiving the surplus, and it can be done at little-to-no extra cost. Net metering also uses digital technology to benefit both the electricity consumer and the electricity provider through gathering and outputting more information about electricity usage, peak usage hours and power outages. “Running today’s grid without smart grid technology is like trying to run the Internet off of an old switchboard” (Schaefer quoting Haney, 2010). With the new technology, customers are able to see immediately what turning up the thermostat two degrees does to the electricity bill, or unplugging the deep freeze in the garage. Net metering has the potential for communities to create a “smart grid,” where appliances are able to communicate when the best time for use is in order to save energy and money.

Voluntary green markets are policy options referring to premium green power products offered primarily by regulated utilities (Byrne, et al., 2007, 4562). These are put in place typically by utilities that issue surveys to customers. Overwhelmingly, studies indicate many customers willingness to pay more for green power. As a result, utilities began offering retail customers green power at a premium in the 1990s. The success of these programs sparked offerings across the country. As a result, the US hosts the world’s largest and most active customer-driven green power market (Byrne et al., 2007, 4562).

Public Benefit Funds (PBF) are policies that a utility puts forward to administer programs to meet an energy savings target. As of February 2007, there were 21 state PBFs in the US—15 having dedicated funds for renewable energy development (Byrne et al., 2007, 4562). Many states have supplemented their market-based renewable energy policies with direct incentives that include production credits and rebates. These

incentives are usually funded by a public benefit charge that is assessed on each kilowatt-hour (kWh) of electricity sold in the state. Revenues from these charges typically range between $0.001 and $0.003 per kWh, are deposited in public benefit funds (PBFs) (Byrne, et al., 2007, 4558).

A ***Feed-in Tariff (FIT)*** is an incentive structure to encourage the adoption of renewable energy through government legislation. The regional or national electricity utilities are obligated to buy from renewable sources, such as solar thermal power, wind power, biomass, hydropower and geothermal at above-market rates set by the government. The higher price helps overcome the cost disadvantages of renewable energy sources. The rate may differ among various forms of power generation. A FIT is normally phased out once the renewable energy reaches a significant market penetration, such as 20%, as it is not economically sustainable beyond that point (Byrne, et al., 2007, 4559).

One of the most popular policies in use is the ***Renewable Portfolio Standard (RPS)***, which, to date, has proven to be the most successful tool used to realize rapid development of renewable energy options. This market-based approach provides the greatest amount of renewable power for the lowest price. In addition, incentives are created to drive down costs of renewable energy supplies (Byrne, et al., 2007; Nogee, Clemmer, Paulos & Haddad, 1999). An RPS has been put in place in 34 states in the U.S. as of November, 2009. Generally, a state will determine a certain percentage of energy to be produced by renewable resources, or a certain megawatt amount, as is the case in Texas. This tool is not specifically called for in the Sustainable Energy Utility model, but would be a useful tool to encourage renewable and alternative energy sources by local utilities.

On the federal level, the most commonly used tool to encourage renewable energy production is the ***Production Tax Credit (PTC)***, which was authorized by the Energy Policy Act of 1992 and has been amended over time. The PTC can best be defined as "a per-kilowatt-hour (kWh) tax credit for electricity generated by qualified energy resources and sold by the taxpayer to an unrelated person during the taxable year" (Bolinger, 2009). The PTC offers a 1.9 cent credit per kWh generated from wind, closed-loop biomass and geothermal. This policy proved to be a significant factor in encouraging renewable energy in several states.

There have been some complaints about the PTC, because it may not do enough to promote renewable energy. Some believe the renewable energy that it promotes is often large in scale and not distributed. "Current supply-side energy policies in the U.S., such as the federal renewable energy production tax credit, have been criticized for supporting renewable energy development in a way that reinforces a commodity-focused energy system" (Houck & Rickerson, 2009, 96) rather than demand-side energy systems. These types of policies are supportive of limited, incremental, or conservative change, rather than fundamentally changing the energy structure that is required (Houck & Rickerson, 2009, 96).

Investment Tax Credits **(ITC)** are another type of policy put into the Internal Revenue Code, which provides an ITC for certain types of commercial energy projects, including solar, fuel cells, and small wind projects (all of which are eligible for a credit equal to 30% of the project's qualifying costs), as well as geothermal, micro turbines, and combined heat and power projects (all of which are eligible for a credit equal to 10% of the project's qualifying costs). The ITC is currently available to qualified projects that are placed in service prior to the end of 2016, though the geothermal credit has no expiration

date, and the solar credit will (unless otherwise extended) revert to 10%, rather than expiring altogether, at the end of 2016. The ITC is realized in the year in which the project begins commercial operations, but vests linearly over a 5-year period. The IRS recaptures the unvested portion of the credit if the project owner sells the project before the end of its fifth year of operations (Bolinger, 2009, 1).

Recently, a plan out of Berkeley, California, sometimes referred to as the Berkeley Model, has been called a "game-changer for a green economy" (Schnurman, 2010). The ***Property Assessed Clean Energy (PACE)*** policy refers to establishing a special taxing district that raises money, usually through bonds, and lends it to residents to buy solar panels, replace old windows and make other improvements in energy efficiency. The loan is then attached to the property, rather than the homeowner, and it is usually repaid along with property taxes or utility bills. This structure often eliminates upfront costs, the biggest hurdle for energy investments, and stretches payments for up to 20 years. When the house is sold, both the bills and benefits transfer to the new owner. (Schnurman, 2010).

All of these policies are used across the United States to varying degrees of success at the local level. While federal action has moved at glacier pace at times, enhanced state and local responsibility has encouraged each jurisdiction to direct legislation and resources to its most serious energy problems and most promising conservation and supply options. The decentralized approach has the potential to produce more cost-effective and productive programs that will be more widely supported (Sawyer, 1984, 205). When combined with other state efforts, the increasingly bold strategies to address climate change have been sizable and come with significant implications for the country and for international strategy (Byrne, et al., 2007, 4559).

While it seems the national government has yet to take a firm step as it relates to conservation in energy policy, state policies are having an impressive impact on America's energy future, and local governments are acting individually in an aggressive way to bring about change. When President Carter started enacting renewable energy policies in the 1970's, he most likely thought that the federal government would be the leading force. It appears, however, the opposite is true. Creative state and local policies are driving conservation in energy policy from the bottom-up.

Chapter Summary

This chapter discussed the history of the renewable energy and energy efficiency movement over the last three decades, since the Arab Oil Crisis of 1973, and explained how the federal policies paved the way for local action over the last several years. This chapter also discussed some of the most successful federal, state, and local policies that have been implemented to varying degrees of success. The Sustainable Energy Utility is a promising model that incorporates many of these policies into a comprehensive plan and it will be discussed next.

Chapter Three: The Modified Sustainable Energy Utility

Chapter Purpose

The purpose of this chapter is to examine the ideal model for an electric utility. The ideal model is a modified version of the Sustainable Energy Utility, which was recently developed in Delaware and implemented across the country in varying forms. Once developed, the San Marcos Electric Utility will have a framework for guidance.

Origins of the Sustainable Energy Utility

"The hunt is on for an entirely new paradigm, a new conceptual and practice framework spanning all aspects of the urban energy revolution" (Druege, 2006, 147). After reviewing the literature, the modified Sustainable Energy Utility is as close as a policy can be to an ideal or standard to encourage local green policies. From this point forward, the modified version of the SEU will simply be referred to as the Sustainable Energy Utility. Local utilities should help communities invest in using less conventional energy and more renewable energy. The Sustainable Energy Utility should aim to sell customers less, and should encourage increased efficiency, which is in sharp contrast to what utilities have done in the past. These are just two aspects of the Sustainable Energy Utility, the effects of which are far-reaching and broad, from saving consumers money, to reducing carbon emissions, creating jobs, and spurring local economic development (McDowell & Finnigan, 2009, 79; Yu, 2009, 133).

The Sustainable Energy Utility was developed in 2006, when the Delaware General Assembly created a bipartisan Sustainable Energy Task Force to research and recommend best-practice sustainable energy policies for the state. On the horizon were

significant energy price increases because of energy deregulation and rising fossil fuel prices (Byrne & Martinez, 2009, 27).

Energy leader Delaware began research into the SEU. Austin, Texas is a leader city. Austin became home of the “net zero” energy buildings standard and home to one of the most progressive energy building standards and urban renewable energy policies in the United States (McDowell & Finnigan, 2009, 80). Other SEU leaders include: Washington, D.C; Philadelphia, Pennsylvania; Seoul, South Korea; the Borough of Woking in the United Kingdom; and, Karnataka, India. Needless to say, these forward-thinking municipalities represent populations of various size and demographics all across the world, yet all have been successful in planning and implementing some form of the SEU.

The creators of this model recognized the importance of diversity and the need to exercise pragmatism in all matters as the basis for survival, adaptation, learning, and using common sense when developing an energy policy (Agbemabiese, 2009, 153). Pragmatically speaking, what could make more sense than for electricity to be treated as a service rather than a commodity? What makes more sense than reducing American reliance on an unstable part of the world (Barkenbus, 1982, 411), and powering communities with locally generated power, and adopting technologies that provide high-quality jobs in the communities where the energy is produced? Put simply, the SEU is a comprehensive model for tackling the energy and environmental challenges facing the world by letting individual communities take the lead (Hughes 2009, 109).

The Sustainable Energy Utility[6]

This research uses a practical ideal type model conceptual framework to develop the Sustainable Energy Utility model to be used by local utilities. "Practical ideal types provide benchmarks with which to understand reality" (Shields 1998, 219) and to serve as tools for direction rather than concrete direction. The practical ideal type of research has helped organize the five components of the Sustainable Energy Utility to create the ideal model for local utilities. The justification for each model component follows.

The ideal framework of the Sustainable Energy Utility should cover five important areas, as indicated in Table 3.1. First, the Sustainable Energy Utility should provide central coordination. Sustainable energy services should be coordinated by as few points of contact as possible and should not be limited to only electricity. The electric utility should also focus on energy efficiency. Additionally, there should be clear policy and planning in place by the energy utility (Byrne & Martinez, 2009; Hughes, 2009; Houck & Rickerson, 2009). Second, the Sustainable Energy Utility should have comprehensive programs that target renewable energy across all customer classes and sectors as well as target all education and outreach opportunities (Byrne & Martinez, 2009; Agbemabiese, 2009; Houck & Rickerson, 2009: Hughes, 2009). Third, the Sustainable Energy Utility should incorporate flexible incentives that incorporate the needs of many different groups. Fourth, the Sustainable Energy Utility should provide financial self-sufficiency by ensuring long-term planning in a way that creates energy savings. Fifth, the Sustainable Energy Utility should set a standard by setting a minimum amount of energy to be produced by renewables (Wiser et al, 2001; Nogee et al., 2002).

[6] See Table 3.1 for Conceptual Framework of the Sustainable Energy Utility.

"The Sustainable Energy Utility, when implemented, offers a structural reform of the energy sector along four dimensions: a transition to carbon-free energy sources; a reorientation from energy as a commodity to energy as a service; the transition to a distributed energy infrastructure; and, the direct involvement of energy users in the energy decisions" (Byrne & Martinez, 2009, 27).

A transition to carbon-free energy sources allows a community to use natural resources like the sun, wind, or heat from the earth rather than fossil fuels or nuclear energy. Most fossil fuels come from the Middle East. The economic impact of this outward flow of local revenue translates to a lost opportunity for reinvestment in community-based programs services and infrastructure and helps empower nations that are sometimes our adversaries (Hughes, 2009, 108-109). According to T. Boone Pickens, the outward flow of revenue was worth $475 Billion in 2008 and will be approximately $10 Trillion over the next ten years (Pickens, 2009). America's dependence on oil is a threat to our national security and our economy. Growing demand and shrinking domestic production means America is importing more and more oil each year–much of it from the world's most unfriendly or unstable regions. We spend more than $200,000 per minute–$13 million per hour–on foreign oil, and more than $25 billion a year on Persian Gulf imports alone (EIA, 2009).

By transitioning to a distributed energy infrastructure, as the Sustainable Energy Utility calls for, utilities are not as reliant on a single source like a massive nuclear reactor, coal power plants, or oil from the Middle East. Rather, the community is able to produce its own energy through the use of solar panels or small-scale wind energy farms. This avoids the problem of building expensive transmission lines from remote areas to population centers, which is a major obstacle for wind and solar farms (Bird, et al., 2003).

The Sustainable Energy Utility offers a means for energy decisions to be based on streams of common benefits for the community and emphasizes the social governance of energy in order to protect the community's interest rather than the interests of energy producers. This innovative form of energy management recalibrates society's energy diet and balances energy consumption to serve community values, instead of commodity values. In this way, the Sustainable Energy Utility helps determine policy direction by focusing on local action within a community. (Byrne, et al., 2009, 89).

In summary, the Sustainable Energy Utility is based on five simple principles:

- central coordination,
- comprehensive programs,
- flexible incentives,
- financial self-sufficiency,
- setting a standard.

Central Coordination

According to Houck and Richardson (2009, 100) there are multiple benefits to central coordination, when it comes to implementing a Sustainable Energy Utility. Central coordination is essential to avoid customer confusion, create cross-benefits among incentives, and reduce administrative costs. Central coordination becomes more crucial if climate policy increasingly becomes the animating force behind energy policy decisions in the next decade, and cuts across different sectors of the economy and jurisdictional boundaries. One can look at the importance of coordination from a customer's perspective and from the perspective of administrative efficiency.

Sustainable energy services coordinated by as few points of contact as possible

Sustainable energy services should be coordinated by a single point of contact[7]. "One-stop shopping," as Kristen Hughes calls it (2009, 113), allows the energy user to build a relationship with a single organization whose direct interest is to help residents and businesses use less energy and generate their own energy cleanly. Simply, the SEU provides "one-stop shopping" for customers who seek diverse strategies for reduced, cleaner, less expensive, and more reliable energy service, as well as funding and other resources by which to implement these strategies (Hughes 2009, 113). With this approach, energy services are integrated by one central actor/organization. The alternative, the lack of central coordination, causes significant customer confusion and creates unnecessary programmatic discrepancies and administrative costs (Houck & Rickerson 2009, 100). When thought about logically, a customer should typically want to deal with as few people as possible to get to the desired destination or goal.

One way the Sustainable Energy Utility ensures that citizens are accessing the information they need to accomplish energy goals and coordinating city energy efforts is by providing an easy-to-use website that contains necessary information. Additionally, hiring a chief renewable energy and energy efficiency officer should help as well. A chief officer is the highest-ranking executive in the company, in a specific field, and is responsible for carrying out the policies of the board of directors on a day-to-day basis. A chief renewable energy and energy efficiency officer should be responsible for coordinating all efforts related to this topic.

According to Steve Krug, another way to reach the public is through easy-to-read and accessible websites with relevant information. He sums up the idea of websites for

[7] See Houck & Rickerson 2009, 100; Hughes 2009, 113; Mathai 2009, 147; Doris et al., 2009; Byrne et al., 2009, Agbemabiese, 2009; Alazraque-Cherni, 2008; Byrne, et al., 2007; Byrne, et al., 2006.

the public with four simple words that he insists the public intuitively is thinking, “Don’t make me think!” (Krug, 2005). A website should have as much content as possible and a customer should be able to navigate through “intuition.” A general rule is that a customer should not have to click more than three times on a website to find any piece of information listed (Porter, 2005, 1), otherwise, a user might leave the site. The three-click rule is not set in stone, it is a simple guideline that designers should attempt to follow.

Not limited to electricity

The energy services the Sustainable Energy Utility provides are not necessarily confined to electricity, although its service area is usually limited to city rather than national-scale territories. This geographic scale makes it easier for the voices of end-users to be more effectively reflected in the setting and implementation of policy goals (Doris et al. 2009). The Sustainable Energy Utility should take a comprehensive approach to efficiency and sustainability. The SEU should find the synergies that are possible in each participant’s circumstance, including opportunities for building envelope, electric and gas appliance, heating and cooling, and transportation efficiency (Houck & Rickerson 2009, 100).

This approach allows the Sustainable Energy Utility to supply services that are usually not possible under more rigidly defined programs. For example, as Houck & Rickerson (2009, 100) explain, the funds from the Sustainable Energy Utility can be used to target the installation of reflective roofs on low-income households, where federal affordable energy programs cannot. Similarly, an SEU can support the simultaneous installation of photovoltaics and solar water heating systems at sites that have high electrical and hot water demand. In order for the SEU to be successful, democratic principles should be followed. The SEU would not replace conventional energy utilities

(public or private) or other private sector-led energy ventures. Rather, the SEU should complement them by providing a focal point for design and implementation of energy efficient and low-carbon energy services. The SEU should support initiatives with information, seed funding, capacity building, and incentives for contractors to deliver services to segments of the population currently beyond the reach of urban-biased services and programs (Agbemabiese, 2009). It should also target non-energy related efficiency means, such as efficient water-use.

One specific way that the SEU does not limit itself to strictly renewable energy generation is through more efficient use of energy around the home or business. Homeowners thinking about going green should start small and shore up the energy efficiency of their homes before taking other steps like adding site-generated renewable power. When customers focus on efficiency, in the form of energy audits and efficient appliances, the focus is turned from putting solar panels on the roof, which is something very visual, to doing something that causes a greater return on the dollar (Content, 2010).

One example of focusing on something other than energy can be seen in San Francisco–focusing on transportation. The city has installed electric vehicle recharge stations infront of City Hall show that it is a real, and viable option for commuters. According to Gavin Newsom, Mayor of San Francisco, “Electric vehicles are the future of transportation, and the Bay Area is the testing ground for the technology. We began using plug-in hybrids in the city’s fleet last year. Now, for the first time, the public can plug-in to the next generation of cars through car sharing organizations and take them for a drive in San Francisco” (Newsom as quoted by Cornell, 2009).

Clear policy and planning in place

According to Matland (1995, 147), in order for policy goals to be clear and consistent, policymakers must minimize the number of actors; limit the extent of change necessary; and place implementation responsibility in an agency sympathetic with the policy's goals. Clear policy and planning at the local level is key because, as Matland (1995, 148) contends, "local service deliverers have expertise and knowledge of the true problems; therefore, they are in a better position to propose purposeful policy."

In order for the Sustainable Energy Utility to be successful, a local utility must take charge and make clear and concise policy due to having a stake in the success of using renewable energy at the local level. Hjern (1982) finds that central initiatives, (top-down initiatives from the federal level), are poorly adapted to local conditions. Local policymakers, on the other hand, have the potential (and should) use democratic principles, as well as listen to the community, as they implement policy. A program's success depends in large part on the skills of individuals in the local implementation structure who can adapt policy to local conditions; it depends only to a limited degree on top-down activities (Matland 1995, 149). In essence, through democratic participation, local populations can have a "voice in affecting energy-related decisions that will directly impact their health, livelihoods, and well-being" (Hughes 2009, 109).

Comprehensive Programs

The SEU should create programs that target efficiency, conservation, and renewable energy across all fuels and customer classes, regardless of utility service territory[8] - it should be comprehensive! There are a range of program options cities may

[8] See Agbemabiese (2009); Byrne, Martinez & Ruggero (2009); Byrne & Martinez (2009); Doris et al. (2009); Houck & Rickerson (2009); Hughes (2009).

use to address their specific energy conditions along with a multitude of administrative mechanisms available to affect change. Cities, for example, have the ability to affect building codes, land use regulations, professional certification programs, partnering with financial institutions, education and training programs, tax incentives and tax breaks, activity fees, tax free bonds, procurement programs, low income assistance programs and more.

Target renewable energy across all fuels, customer classes and sectors

Sustainable Energy Utility programs should target efficiency, conservation, and renewable energy across all fuels (electricity, heating, transportation) and customer classes (low-income, government, industrial, commercial, residential, etc.), regardless of utility service territory (Houck & Rickerson 2009, 100). This is a major departure from supply-side approaches and from traditional demand-side policies, which tend to address only certain types of fuels, or limited "silos" of end users (Houck & Rickerson 2009, 96).

Successful Sustainable Energy Utilities are built on the participation of diverse social groups including local government, community organizations, energy service companies, and academic institutions (Doris et al. 2009). In an era of severe financial limitations, comprehensive programs have the advantage of being better received (Sawyer 1984, 211).

This is a new concept, it would seem, as it is out of the ordinary for utilities to offer strategic savings to *all* customers. Typically, energy utilities only address certain types of fuels or customer classes (Houck & Rickerson 2009, 96). Delivering services to specific customer classes naturally excludes, or inadequately serves, customers that do

not fit neatly into predetermined categories. Sustainable Energy Utilities should adopt a flexible, market-responsive stance in order to avoid this problem.

The Sustainable Energy Utility is capable of focusing on so many different sectors and audiences because of the direct involvement of energy users in energy decisions (Byrne & Martinez, 2009), which reflects the importance of democracy in its implementation. In response to observed shortcomings in conventional energy systems, some populations are demonstrating their desire for a new type of energy development model. The Sustainable Energy Utility should provide advanced services to fit the needs of a range of users, but in ways that lessen environmental pollution, economic volatility, and technological lock-in associated with 20th century energy development (Hughes 2009, 109).

Some communities that have implemented the Sustainable Energy Utility are empowered, and are now required by law to provide customers with a comprehensive set of sustainable energy services, customized to an individual's needs. One way to do this is to provide efficiency audits in the household or business. The Sustainable Energy Utility should target different customer decision points (e.g., purchase/replacement, retrofits, new construction, etc.) and target different end-uses (electricity, heating, and transportation) (Houck & Rickerson 2009, 101). Done properly, an SEU should have the flexibility to respond to customer needs and market changes to achieve deep savings.

A traditionally underserved population with energy programs is low-income individuals and families. Energy costs are a larger burden on low-income individuals and families than on the middle class and wealthy. The SEU should work with these groups in order to be sure that no one in the community is being underserved. One way of doing this is by establishing an "Affordable Energy Services Program." This program would

allow low-income groups to take advantage of weatherization programs to make homes more efficient and to save money. These savings can make a real difference for the average American family, which spends more than 5 percent of their income on home energy costs; low-income households, on the other hand, spend 16 percent of their income on home energy costs! For the average homeowner spending $1,500–$3,000 per year on residential energy, savings of 20 to 40 percent amount to $300 to $1,200 in annual savings (CAP, 2009, 12). As Chance Sparks (2007) points out, green building programs should be affordable and good energy policy means good homes for all customers, even low-to-moderate income level citizens.

Target education and outreach

Outreach and education are key to almost any public policy, especially one that affects an individual. Jacobson et al. (2006, 1), point out, that when thinking of challenging conservation problems, whether it be protecting a rare species, winning support for legislation, cleaning a river, or sustainability management, inevitably, people are part of the problem. Hence, part of the solution is effective public education and outreach. “Effective education and outreach are essential for promoting conservation policy, creating knowledgeable citizens, changing people’s behaviors, garnering funds, and recruiting volunteers” (Jacobson et al. 2006, 1).

The public must know about a policy or program in order to take advantage of it. Utility staff should reach out to the public as much as possible to help create educational programs that inform citizens of their role in saving energy. Some specific techniques that can be used to inform and educate the public are using mass media; developing on-

site programs for natural areas; parks, and community centers; interacting with customers regularly, and branding.

Branding is essential for the communications process to occur as it precedes all other steps in the process. Without brand awareness, no other communication effects can occur. For a consumer to buy a brand they must first be made aware of it (MacDonald and Sharp, 2003, 1). The Sustainable Energy Utility should brand themselves in a way that the public sees them and thinks, “sustainability.”

The public affects the success or failure of environmental management efforts. Public opposition and cost is the major constraint to implementing almost any policy. The need for conservation and sustainability education continues to increase as problems become more complex. From cumulative impacts on river restoration to declines in biodiversity, to increased electricity bills, to using polluting energy sources, and spending money on an energy source that comes from an unstable part of the world, a knowledgeable public is needed to effectively address the goals of sustainable development (Jacobson et al. 2006, 9). In order to tackle some, or all, of these problems, the public should be aware of them and the local utility should do its part to educate the public about the benefits of renewable energy and sustainability policies.

Additional outreach tools that can be used are awards and competitions that motivate and create practitioner-communities and individuals. In some countries, awards are given for “solar cities,” “solar towns” and “solar villages,” often on a regular or annual basis. This creates communities of motivated and like-minded individuals and local officials, who can then serve as mentors and resources for those who wish to start similar activities in their own communities.

In addition to educating people about renewable energy and alternative resources, the electric utility should educate the public about how to use the new technology. One way to do that is by creating renewable energy demonstration centers to provide training and "critical mass." This way, the public can see, touch and learn the new technologies–this is one of the best ways for people to acquaint themselves with new technologies. Many "model cities" have established information and demonstration centers for renewable energy and energy efficiency to provide training and expertise, and to bring together a critical mass of experts, small businesses, and stakeholders to move local innovation (Martinot, 2009, 6).

Flexible Incentives

A flexible, adaptive approach is one reflecting the ideals and practices of a Sustainable Energy Utility. The Sustainable Energy Utility should, ultimately, recognize the basic energy needs and the need for equality of energy access as primary drivers of action (Agbemabiese 2009, 156), and should act. An SEU should have the flexibility to respond quickly and creatively to changing market forces and customer needs. The utility should provide general to specialized services, including free assistance, education, audits, loans, rebates, fee-based programs, net metering, and more (Hughes 2009, 114).

A Sustainable Energy Utility should have the flexibility to deploy financing programs to serve all income levels. Programs should be designed to cover the full incremental cost of sustainable energy services for certain customers, and incentives can be adjusted to more deeply subsidize affordable energy clients (Houck & Rickerson 2009, 101).

By focusing on improvement of home and business use of energy, this model continues to focus on sustainable principles, as well as enhancing participatory

democracy. One of the newest thoughts on energy use for the 21st century is democratic participation (Hughes, 2009, 109). Participatory democracy points to the imperative for populations to have a voice in affecting energy-related decisions that will directly impact their health, livelihoods, and well-being (Hughes 2009, 109). According to Shields (1999, 15) democracy is a key element of "use" because it is the communication and decision-making process which direct where to go and how to use the policy.

One example of this is by encouraging weatherization, or as Secretary of Energy Steven Chu calls it, "saving money by saving energy" (Chu October 30, 2009). Citizens, especially low-income citizens, can save money and use it for other needs and wants when the SEU is in place.[9] For example, low-income weatherization programs with no and low-cost conservation improvements provide more benefits than low-interest conservation loan programs because they are targeted at individuals most adversely affected by high energy costs, provide entry level jobs, and provide a context for teaching jobs (Sawyer 1984, 211). With an SEU in place, it is believed that other social aspects will improve within a community.[10] Flexible incentives allow a community to incorporate a range of structures to meet the needs of different groups (Hughes 2009, 113), and allows for the most good.

Financial Self-Sufficiency

A financing plan ensures long-term self-sufficiency

By allowing the Sustainable Energy Utility to finance itself, the SEU can do two vital things that the 21st century energy utility should be doing: 1) overcome the upfront

[9] For a good look at Affordable Green Housing policies, please view Chance Sparks' ARP from 2007. http://ecommons.txstate.edu/arp/251/

[10] According to Agbemabiese (2009); Byrne et al. (2006); Byrne & Martinez (2009); Byrne, Martinez & Ruggero (2009); Houck & Rickerson (2009); Hughes (2009); Roessner et al. (1980); Sawyer (1984); Slocum (2001)

cost of sustainable energy measures, and, 2) structuring sustainable energy programs to grow without significantly increasing rates, general funding commitments, and public liability.

Financial self-sufficiency gives the utility the capacity to secure sufficient capital to invest in the infrastructure of sustainable energy rather than simply a suite of programs. Financial self-sufficiency allows the utility to plan long-term, rather than having to mostly produce short-term benefits, thus avoiding uncertainty, as seen with the Production Tax Credit of the 1990's (Byrne & Martinez, 2009). To ensure long-term self-sufficiency, a financing plan should generate revenue through the supply of customer-sited sustainable energy services[11]. An SEU addresses the two fundamental financial challenges that slow the expansion of sustainable energy services by overcoming the upfront cost of sustainable energy measures, and structuring programs to grow without significantly increasing rate impacts, general funding commitments, and public liability (Houck & Rickerson 2009, 101).

Through the financial self-sufficiency principle of the SEU, a revolving fund is created to serve the needs of all members of the community. Byrne and Martinez (2009) give the example of a broken-down refrigerator. A household can choose between the *Energy Star* model, which uses 20% to 30% less energy than the less-efficient and less-expensive model. Historically, the customer would choose the less expensive refrigerator. The SEU, however, should remove the advantage of the inefficient model by covering the cost of the difference. "In return, the household sees its refrigerator-based energy costs

[11] See Agbemabiese (2009); Byrne et al. (2006); Byrne & Martinez (2009); Byrne, Martinez & Ruggero (2009); Houck & Rickerson (2009); Hughes (2009); Slocum (2001)

decline, and a portion of those savings flow to the SEU to recover its investment" (Byrne & Martinez, 2009).

One of the most notable recent financial innovations is the use of property-assessed clean energy (PACE) programs, in which municipalities loan money to homeowners for the purposes of installing solar panels and other energy efficient items. The homeowners repay the loans through additions to their property taxes or utility bills, thus eliminating the upfront cost that is often associated with renewable energy and energy efficiency. This approach has the benefit of tying the repayment of the loan to the home itself rather than to the homeowner, and allows for repayment over an extended period of time. This is a good method because the ongoing benefits of reduced utility bills accrue to the current owner, who may not necessarily be the owner who arranged for the energy-efficiency improvements (Turner et al., 2009, 224).

By acting as a resource for other local energy utilities, model cities that develop the SEU early on can open up new income streams. The electric utility of a model city is able to generate income by acting as a consultant to other communities who wish to follow the first actors (Martinot, 2009, 6). A "snowball effect" should then be seen, as other cities in the region begin to consult with the model city.

Energy services are managed in a way to create energy savings

Other recommendations for financing include leveraging customer contributions to the cost of program measures, as well as using revenue streams from program activities to repay liabilities and enable expansion (Houck & Rickerson, 2009; Byrne, et al., 2009). The SEU should have the mandate to develop innovative approaches using third party financing, federal incentives and program revenues. The SEU should also be able to leverage energy funds through other public sector and philanthropic sources.

Delaware, for example, enacted an SEU which was granted authority to raise special purpose tax-exempt bonds to finance activities (Houck & Rickerson 2009, 101). Another source of potential funding will come when, and if, a national cap and trade system is established in the United States. The SEU should support initiatives with information, seed funding, capacity building, and incentives for contractors to deliver services to segments of the population currently beyond the reach of urban services and programs (Agbemabiese, 2009).

The challenges and risks facing a Sustainable Energy Utility are daunting: an SEU must minimize the risk of participant default; the SEU has a high burden to verify energy savings; and the SEU must create a value proposition attractive enough to encourage participation. One recommendation to meet this high burden of energy saving verification includes hiring a sustainability officer, who in order to justify his/her employment, must find at least the same level of savings as his/her salary. “With such a broad mandate, an SEU requires public oversight, exposure to competitive market forces, independent verification and auditing, funding sources insulated from political raiding, and the ability to represent a state or city government as a participant in regional energy and environmental markets” (Houck & Rickerson 2009, 101).

Setting a Standard

The literature on the Sustainable Energy Utility advocates setting a minimum standard of renewable and alternative energy sources. One way to do this is through the Renewable Portfolio Standard (RPS), which sets a solar and wind requirement, thereby encouraging distributed generation. This would guarantee a market for solar and wind energy and encourage site-generated electricity within a particular community. The need to meet the standard would encourage investment in these technologies. A number of

states have mandated that utilities supply a baseline amount of green power to their customers. The RPS establishes renewable energy procurement quotas for utilities according to a schedule typically running for 10-15 years (Byrne, et al. 2007, 4563), which allows states and local authorities to set a goal. In some cases, the goal is a percentage of total energy produced by renewable energy, and in other instances the goal is a set amount of energy produced by renewable energies, as is the case in Texas. This allows a measurable objective. Either the goal is met, or it is not. To date, the RPS has proven to be the most successful tool to realize rapid development of renewable energy options (Byrne, et al. 2007, 4563). This market-based approach provides the greatest amount of renewable power for the lowest price and creates an ongoing incentive to drive down costs of renewable energy supplies (Nogee, et al., 2002; Hempling & Rader, 2001; Nogee, et al., 1999).

Table 3.1 – Conceptual Framework Table	
Ideal Type Categories	**Literature**
Central Coordination • Sustainable energy services are coordinated by as few points of contact as possible • Not limited to electricity • Clear policy and planning in place	Agbemabiese (2009); Houck & Rickerson (2009); Hughes (2009); Roessner et al. (1980); Sawyer (1984); Matland (1995); Hjern (1982); Jacobson (2006).
Comprehensive programs • Programs target renewable energy across all fuels, customer classes and sectors • Programs target education and outreach	Agbemabiese (2009); Bardin (1979); Byrne, Martinez & Ruggero (2009); Byrne & Martinez (2009); Doris et al., (2009); Houck & Rickerson (2009); Hughes (2009); Nogee, Clemmer, Donovan, Deyette (2002); Roessner et al. (1980); Sawyer (1984);
Flexible Incentives	Agbemabiese (2009); Doris, Busche, Hockett and McLaren (2009); Houck & Rickerson (2009); Hughes (2009); Roessner et al. (1980); Sawyer (1984);
Financial Self Sufficiency • A Financing plan ensures long-term self-sufficiency • Energy services are managed in a way to create energy savings	Agbemabiese (2009); Byrne et al. (2006); Byrne & Martinez (2009); Byrne, Martinez & Ruggero (2009); Houck & Rickerson (2009); Hughes (2009); Roessner et al. (1980); Sawyer (1984); Slocum (2001);
Setting a Standard	Byrne, Hughes, Rickerson and Kurdgelashvili (2007); Nogee, Clemmer, Donovan, Deyette (2002); Nogee, Clemmer, Paulos & Haddad (1999); Wiser et al., 2001).

Chapter Summary

The Sustainable Energy Utility is a new concept in the world of renewable energy and efficiency. This tool is rooted in several of the policies first put in place in the 1970's. Many of these policies have been tailored to fit the current energy situation. When major changes are often fleeting, and generally slow at national and international

policy levels, cities and regions are able to make a difference by acting quickly and decisively. Moves toward energy autonomy are the way of the future, and cities, regions, and rural communities everywhere are beginning the journey forward through renewable and sustainable sources (Droege, 2006, 144).

The SEU shows great promise in changing the energy utility of the 20th century into the energy utility that is needed for the 21st century. The previous utility model was focused on rapid development of the energy grid, and producing more and more. The utility of the 21st century will need to be focused on perfecting efficient delivery of energy and doing more with less. Essentially, the utility of the future will need to act in a pragmatic manner, considering technological leadership, the prospect of reduced oil import dependence, air pollution, nuclear safety risks, and climate disruptions to provide additional justification for promoting sustainable energy systems locally (Dunn, 2006, 85).

The review of scholarly literature indicates that there are a variety of issues associated with the development of an energy utility for the 21st century. Issues include central coordination of energy and efficiency policy, comprehensive programs to target all customers and energy sources, flexible incentives, financial self-sufficiency, and setting a standard, as indicated in table 3.1, on the previous page.

The next chapter examines current policies of the San Marcos Electric Utility, and the unique position in which San Marcos sits. San Marcos is uniquely and strategically located to put into practice the components of the Sustainable Energy Utility.

Chapter Four: The Setting in San Marcos, Texas

Chapter Purpose

The purpose of Chapter Four is to provide the setting of the San Marcos Electric Utility (SMEU) and the city of San Marcos, Texas[12]. This chapter will provide context for the city. Examined are political demographics, major institutions, renewable resources and particular policies and programs that are being considered in San Marcos. Now that an ideal model has been developed, the Sustainable Energy Utility, the policies established by the San Marcos Electric Utility will be examined.

Demographics for the City of San Marcos

Political Demographics for San Marcos

The city of San Marcos, Texas, was founded in 1851 and incorporated in 1871 in Hays County, Texas. The form of government for this city of 50,371 people is Council-Manager. The San Marcos City Council is composed of a Mayor elected at-large by the people for a two-year term and six Council Members elected at-large for staggered three-year terms. City Council elections are held on the general election day in November.[13] The Mayor of

Figure 4.1 – The town plat of the town of San Marcos from 1881. Map #76237. Courtesy of the Texas General Land Office Archives and Records, Austin, TX.

[12] For a look at land-use policies in San Marcos, Texas using Geographic Information Systems, please view Abigail Gillfillan's ARP from 2008. This paper can be viewed here: http://ecommons.txstate.edu/arp/273.

[13] The Council enacts policies, adopts ordinances and resolutions, establishes the annual budget to provide services to the public, and sets the city tax rate, and water, electric and wastewater rates for San Marcos.

San Marcos, Susan Narvaiz, was re-elected to her third term as Mayor of San Marcos on Nov. 4, 2008. She was first elected by the people of San Marcos in 2004 and was re-elected in 2006. The City Council members are Kim Porterfield (Place 1), Gaylord Bose (Place 2), Fred Terry (Place 3), Chris Jones (Place 4), Ryan Thomason (Place 5), and John Thomaides (Place 6). The City Manager, Rick Menchaca, manages 517 city employees (San Marcos, 2009). Recent estimates place the San Marcos median household income at $32,205, with an estimated per capita income of $16,753 (city data, 2010). Homes in San Marcos had a tax value of $109,725 in 2008, with an average sale price of $177,758 (San Marcos, 2009).

Importance of Natural Resources in San Marcos

At a City of San Marcos Citizens' Summit, citizens indicated support for conservation of natural resources and a willingness to pay (Gillfillan, 2008, 25). In 2007, Citizen Summit participants were asked what the council's top priority should be. Protecting the natural environment, beautify the City, and provide parks and recreational activities, was chosen over all other categories (Gillfillan, 2008, 25). The Summit also revealed that a significant number of participants were willing to pay additional taxes for natural resource protection than any other activity, including traffic mobility, which came in at a distant second. The Citizen Summit also revealed that the only issue where citizens wanted the government to pass more laws was in the protection of the natural environment. According to Mayor Narvaiz (2006), the results from the citizen's summits and focus groups clearly show residents' expectations of the local government. Citizens' willingness to pay increased taxes for quality natural resource protection is evident (Narvaiz, 2006). Citizens' willingness to protect local natural resources can best be represented by the San Marcos River, and the many community efforts to keep the river

clean, and flowing in a healthy manner, as well as for the protection of native plants and species. It is not a stretch to believe that citizens' willingness to protect the local environment aims to think globally, by acting locally, in which case energy efficiency and renewable energy are natural fits for San Marcos.

According to the City Charter, "The goals of the City Government are to create a strong community, foster a high quality of life, promote neighborhood integrity, support sound community and economic development, conserve and protect the City's natural resources and the environment, and safeguard the health, safety and welfare of the City's residents" (San Marcos, 2009). Clearly, the city places major value on its natural resources and working with the community to protect those resources, which is why the 2009 annual report points out that the City Council adopted "Environmental Protection and Smart Growth" as its fifth goal for San Marcos. The priority of environmental protection, long embraced by the community, is reflected in many projects, and reflected in the policies of community leaders, some of which include the cities efforts to go "green," by acquiring hybrid automobiles for the city fleet of vehicles, and establishing a "Green Team" to promote internal initiatives (San Marcos, 2009, 16).

The San Marcos Outlet Malls

The San Marcos Outlet Malls combine to form the largest outlet mall in Texas and is the fourth most visited attraction in the State of Texas (San Marcos Chamber of Commerce, 2010). The two outlet malls employ approximately 3,540 people, and they are a very large commercial presence in the city. Despite the outlet malls' large presence within San Marcos, it does not appear on Table 4.1, among the top electricity users in the city. The reason for this is that the outlet malls are located outside of the San Marcos Electric Utility service area. The malls, rather, are located in the Bluebonnet Electric Co-

op service territory. Undoubtedly, the outlet malls use a significant amount of energy, however, due to privacy agreements, Bluebonnet Electric Co-op was unable to supply energy/billing information about these clients.

Texas State University – San Marcos

San Marcos is home to Texas State University, a 471-acre university with 29,125 students, as of 2008 (Texas State, 2008, 6). The university is among the 75 largest in the United States, and it dominates the skyline of San Marcos. "The university has a significant impact on the community and its goals. Texas State provides a great opportunity for research and collaboration on important issues in the community" (Gillfillan, 2008, 22), one of those areas for research possibilities is renewable energy and energy efficiency–a topic that has only briefly been collaborated on by the university and the city. In a November 2006 speech by Mayor Susan Narvaiz, she established that the message was loud and clear from the community: improving communication with the university was one of the most important issues for the citizens of San Marcos (Narvaiz, 2006). Citizens clearly understand the importance of the University to the prosperity of San Marcos, and vice versa. Citizens also understand the importance of natural resources to the community, as evidenced by their responses at the 2006 Citizen Summit. With these two pieces of information, it makes sense that the University and the City would work together closely to protect the natural resources in the city and beyond.

Figure 4.2 A bird's-eye view map of the city of San Marcos in 1881. Map #89205. Courtesy of the Texas General Land Office Archives and Records, Austin, TX.

An area for growth, in particular, for San Marcos and the University should be energy efficiency. Knowing that the University (through the cogeneration plant) is the biggest customer of the San Marcos Electric Utility, (it uses approximately 17% of all energy in the city[14]) (San Marcos, 2010b), the University should be a natural partner in reducing energy use and increasing energy efficiency in San Marcos. The cogeneration plant supplies energy to Texas State University for dormitories, classrooms, administrative offices, common areas, and more, which means that the city should target those high-use areas when looking for areas to reduce energy consumption.

The Strategic Location of San Marcos

San Marcos is the county seat of Hays County, located between two major metropolitan areas on Interstate 35, San Antonio to the south, and Austin to the north. One of those major metropolitan areas, Austin, is considered the clean energy capital of the U.S., because of the strong city government providing a sustainable clean economy framework for other cities and utilities around the world, as well as the hundreds of businesses that have developed in this market over the last several years (Hughes, 2009), and because of aggressive policy actions that have created a city-wide laboratory for renewable energy and energy efficiency.

Solar Energy in San Marcos

San Marcos is uniquely positioned within Texas because the city is located in a spot that receives, on average, 4.5 kWh of solar radiation, according to figure 4.3. Figure 4.3 is a map provided by the Texas General Land Office to show Texas solar energy. This map shows the average direct normal insolation, which estimates for solar radiation

[14] An Open Records Request Report provided by the San Marcos Electric Utility, provided a top 20 list of energy users in the city of San Marcos from January 2005-December 2009, showing the top users of energy, their sector, and the percentage of each user. Users 1-10 showed clear differences, but 11-20 were very close in percentage.

to complement the small number of solar measurements that are available. The National Renewable Energy Laboratory (NREL) developed this map. Normal insolation refers to the amount that strikes a surface that always faces the sun. Texas has some of the highest levels in the entire nation, and San Marcos receives a substantial amount, while West Texas clearly receives the most and the Coastal areas receive the least. For these reasons, the San Marcos Electric Utility should pursue on-site renewable energy policies by encouraging solar energy.

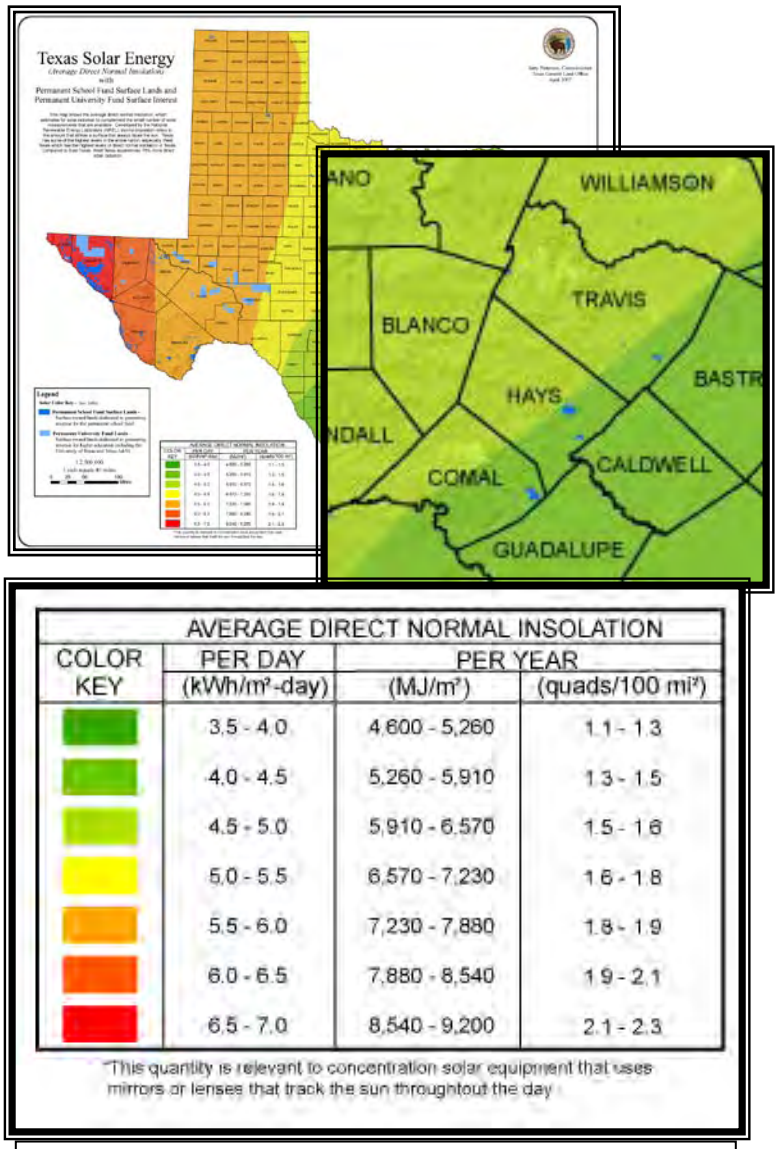

Figure 4.3 – A Solar Energy map of Texas, showing the various levels of solar energy that is available by region. Courtesy of the Texas General Land Office.

Wind Energy in San Marcos

The 5% of energy generated through renewable resources that the San Marcos Electric Utility purchases is predominantly generated through wind resources, which is transmitted from West Texas, and hydro-electric facilities around the High Land Lakes. There is no renewable energy that the utility purchases that is produced by solar or geothermal resources, and none is produced within San Marcos or Hays County. As ideally located as San Marcos is for solar energy, it is equally as negatively positioned to produce energy from wind

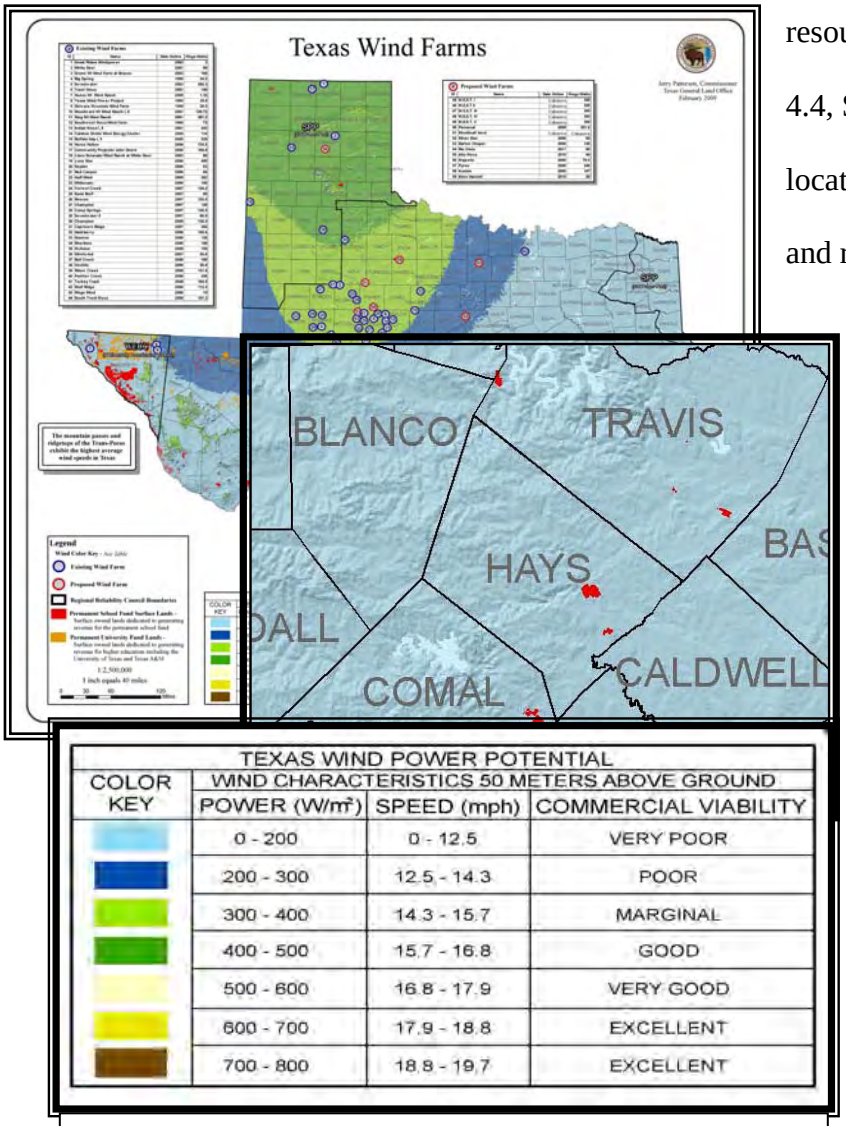

Figure 4.4 – A Texas wind farm map that shows potential wind generation by county. Hays County is considered to have "very poor" commercial viability. Courtesy of the Texas General Land Office.

resources. According to figure 4.4, San Marcos is not an ideal location to produce wind energy, and rates "very poor," because of the low average wind speed of between 0-12.5 miles per hour, which makes it one of the least desirable locations for producing wind energy in the state. San Marcos does however; buy wind energy from West Texas, which is then transmitted. Transmission of wind energy from West Texas to larger population centers to the east, like San Marcos, is among the most expensive parts of producing and using wind energy (Wiser, 2001). For these reasons, on-site renewable energy generation is not encouraged through wind resources. Instead, transmitting energy from West Texas is still encouraged, despite the additional cost.

San Marcos Electric Utility

The San Marcos Electric Utility is a municipally owned and operated retail electric distribution system purchased by the City of San Marcos in 1986. The Lower

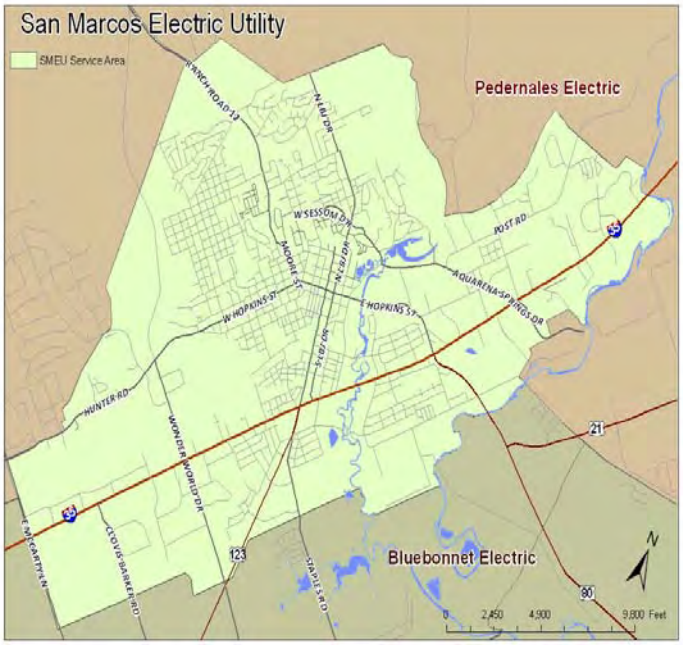

Figure 4.5 – The light-green area shows the San Marcos Electric Utility Service Area. The area to the top represents West of San Marcos, where Pedernales Electric serves. The area at the bottom of the image represents east of San Marcos, where Bluebonnet Electric Coop serves. Image courtesy of the City of San Marcos website. (San Marcos, 2010c). http://www.sanmarcostx.gov/departments/electric/Images/SMEUServiceArea.jpg.

Colorado River Authority sells wholesale power to the City. The Electric Utility serves 19,716 customers in San Marcos, including residential, commercial, institutional and industrial customers (San Marcos, 2010c). Commercial, institutional, and industrial customers are all categorized as part of the Commercial sector for billing purposes.

For the fiscal year 2007-2008, the city of San Marcos had a municipal budget of $136,419,252, of which, the electric utility received $51,508,810, or approximately 38% of the total budget (San Marcos, 2008).

According to the 2008 Annual Report, 68.6% of electric revenue was used to purchase power from the Lower Colorado River Authority (LCRA) (San Marcos, 2009, 17). According to the most current information (2007), the city purchased 617,232,343 kWh (kilowatt hours) from the LCRA. According to estimates in the annual report for 2008, five percent of the power

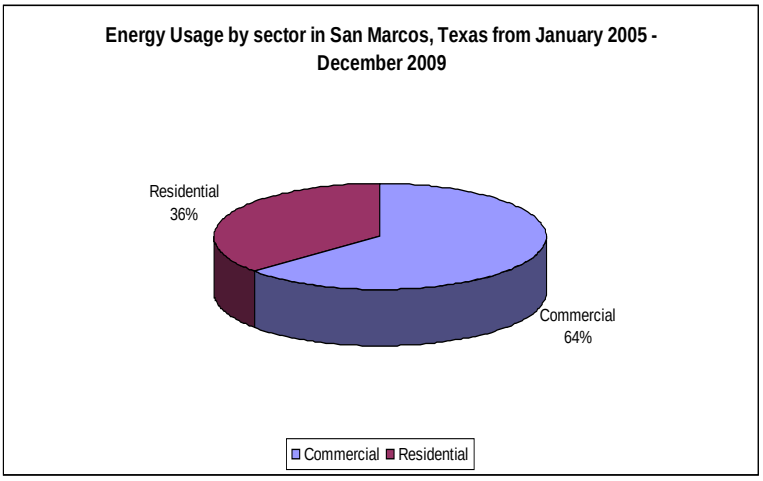

Chart 4.1 – Energy Usage by Sector in San Marcos, Texas from January 2005 – December 2009.

purchased was “green” in the sense that it came from energy produced by wind energy from West Texas and hydroelectric facilities along the Highland Lakes (San Marcos, 2008, 17). In the 2008 budget, adopted on May 15, 2007, the city appropriated $250,000 to fund energy efficiency programs, including performing an energy audit to determine energy efficiency improvements that can be made to city-owned facilities and proposed costs, as well as a fleet analysis and hybrid vehicle purchases. Also, money was appropriated to conduct a survey of residents regarding energy efficient options they might use in their homes (San Marcos, 2007), however, the survey was never conducted.

The San Marcos Electric Utility shares the city of San Marcos with two other electric utilities, Bluebonnet Electric Co-op, to the east, and Pedernales Electric Co-op, to the west, as seen in figure 4.3. The San Marcos Electric Utility provided 2,546,972,771 total kWh between January 2005 and December 2009. Sixty four percent (64%) was for commercial, industrial, and institutional use, while 36% was for residential purposes, (see Chart 4.1).[16]

Table 4.1 shows a list of the top 10 electricity users between 2005 and 2009, along with the percent of

Table 4.1 – The Top 10 Users of Electricity in San Marcos, Texas (January 2005-December 2009)[15]

Names of Customer	Percentage of Electricity for all San Marcos Electric Utility Customers
1. Texas State University – Cogeneration Plant	17%
2. HEB Grocery Inc.	4.3%
3. City of San Marcos	2.2%
4. San Marcos Consolidated ISD	2%
5. Texas State University	1.8%
6. Central Texas Medical Center	1.5%
7. Wal-Mart Super Store	1.5%
8. Hays County	1%
9. Butler Manufacturing	0.8%
10. Lowe’s HIW, Inc.	0.7%

[15] Information comes from an Open Records Request Report from the San Marcos Electric Utility that was prepared in March 2010.
[16] The city of San Marcos does not readily separate its sectors. The “commercial” tag is associated with the commercial, industrial, and institutional sectors.

total usage within the City. According to an Open Records Request Report, four of the top five users are public institutions. Texas State University has two customer numbers in the top five, making up more than 18% of electricity use in San Marcos. The two HEB stores use the second most energy. The city is the third highest user of electricity, using more than 2% of the electricity in San Marcos, followed by the San Marcos Consolidated Independent School District, which uses just short of 2% of the energy in the city provided by the San Marcos Electric Utility.

San Marcos Electric Utility Programs and Policies

The city of San Marcos has enacted several "green" policies focusing on water conservation, pollution and recycling, land preservation, and energy efficiency over the last three years. For the purposes of this research, the focus is on energy efficiency and renewable energy. As seen in table 6.2, the city of San Marcos Electric Utility created the "City of San Marcos Comprehensive Environmental Stewardship Policy," because according to the policy, the city recognizes responsible environmental stewardship as part of its core mission in serving the citizens of San Marcos, and recognizes significant ancillary benefits, such as economic and real estate development, and attracting knowledgeable workers and businesses (San Marcos, 2010). The city has enacted several policies to move the city in the right direction as far as having quality renewable energy and energy efficient policies. Based on the structured interviews, documents analysis, and direct observation, however, there is still room for growth for the San Marcos Electric Utility to be classified as a Sustainable Energy Utility.

A major step that the city has taken is appropriating $250,000 to fund energy efficiency programs, including performing an energy audit to determine energy efficiency improvements that can be made to City-owned facilities and additional cost cuts.

Installing “smart meters” is also a tremendous move, as is offering rebates for customer efficiency.

San Marcos Electric Utility Policies

Table 4.2. Energy Efficient Policies Listed in the City of San Marcos Comprehensive Environmental Stewardship Policy

Existing Policies	**New Policies Being Considered**
Attic Radiant Barrier Rebate	Adoption of Home and Building Energy Standards
Baseline purchase of Renewable Energy	Community Conservation Survey
CFL/LED Bulb Program	General Green Brochure
Comprehensive City Office Practices Evaluation	Home Green Brochure
Cool Roof Rebate	Occupancy sensors for lights in all city facilities
Cool-smart Rebate Program	On-site renewable energy program
Creation of City Green Team	Tiered Electrical Rates
Duct Testing/Repair/Replacement	Voluntary Purchase of Renewable Energy
Energy Analysis	
Energy Efficiency Education	
Energy Star Window Replacement Program	
Green City Buildings Initiative	
Marketing Energy Conservation	
Net-metering Program	
Solar Attic Fan Rebate	
Wall/Atic/Insulation Rebate	
Window solar screens/Film Rebate	
Go Green San Marcos Website	

Description of Recent San Marcos Renewable Energy and Energy Efficiency Policies[17]

The policies that follow are in various stages of action. Some have already been enacted and completed, like net metering; while others are in the process of being administered, like the CFL/LED Bulb Program. Others are in various stages of debate, like tiered electrical rates. All are being considered, all have potential benefits, and all have potential obstacles to being implemented.

Adoption of Energy Standards is a policy the city has not adopted. There are several different programs that the city has considered, one of which is called Energy Star Standards, which is a lighter version of the green building program. The debate centers on the city requiring all new single-family homes to meet the Energy Star standards. This is becoming common among mass-market builders and can be done for little additional cost. Another standard being considered is the ***NAHB/ICC Green Building Standards,*** which is a national green building standard created in 2009, which establishes green standards for new homes, multifamily and neighborhoods. This could be done as a requirement or through incentives/rebates. The benefits of this program include increased energy savings in all structures of 15-18% from the amount of energy used in structures built in 2000 and after. This program is likely to be welcomed more openly than others because NAHB/ICC is a known group, however, it lacks standards for commercial and institutional uses. Another standard is the ***USGBC's LEED Standards for Green Building,*** which is a specialized green standard for new homes, new construction, institutions and neighborhoods and can be done as a requirement, or through incentives. Problems associated with this particular program are that it is the strictest and most

[17] All explanations come directly from the City of San Marcos Comprehensive Environmental Stewardship Policy, which is an internal document, provided by City staff.

cumbersome standard, and most expensive for homebuilders. The adoption of the 2009 International Energy Code provides an increase in energy savings in all structures of 15 to 18% and meets new Department of Energy requirements. The increase to builders is approximately $500 per project.

Attic Radiant Barrier Rebate is a rebate of $.10 per square foot of accessible attic space up to a maximum of 20% of the total cost on Radiant Barrier. Acceptable materials are those that provide maximum reflection of thermal radiation and heat resistance. This includes paint coatings, aluminum foils and thermal shields specifically designed for use in buildings and homes as attic radiant barriers. This policy can save homes and businesses between 8-12% on air conditioning costs. Currently, customers can take advantage of this rebate by applying on the "Go Green San Marcos" website.

Baseline purchase of renewable energy refers to the city purchasing 5% of its energy from renewable energy sources through the LCRA. The policy calls for the amount of energy purchased to increase each year, with the goal of reaching 15% by 2012. According to the structured interviews with members of the City Council and San Marcos Electric Utility staff, there has been little movement from the City to officially reach the 15% goal by 2012. One of the major obstacles cited about renewable energy is that it is priced higher than conventional generation. A press release from February 9, 2007, points out that since January of 2006, San Marcos has participated in the "Choose 2 Renew" program, which simply means that some (5%) of the energy that the city purchases from the LCRA is generated from wind farms in West Texas (San Marcos, 2007b). At the time, the wind energy was actually cheaper than normal sources because of volatile natural gas prices. "We have not only maximized our amount of renewable energy purchases, we have saved our customers a total of $77,994, or an average of

$6495.33 per month," said Kyle Dicke, Customer Relations Manager for the San Marcos Electric Utility. The savings equated to $0.35 per customer city-wide, however, the savings were nearly $78,000 (San Marcos, 2007b).

CFL/LED Bulb Program is an active program that provides CFL/LED bulbs to San Marcos Electric Utility customers at no cost, and is often used as an outreach tool for the San Marcos Electric Utility staff at events and bulbs are given away during energy audits. The program, however, does not ask for any information when giving a light bulb, which prevents follow-up possibilities.

A ***Community Conservation Survey*** was created, yet never distributed because of staff turnover and realignment of City services. Hopes are, however, that the survey will go out sometime in 2010.

Comprehensive City Office Practices Evaluation, evaluates all office practices across the entire city, such as turning off computers at night, turning off lights, temperature management, and other decisions by city employees, who by a 96% margin agreed the city should be a leader in enacting green policies. This particular policy also established city facility retrofits to increase water/energy efficiency, and included HVAC retrofits, solar installations, rainwater collection, green roofs, window awnings, and more. This policy requires city facilities to meet green building standards. One of the issues pointed out with this policy is that the city would serve as an example and provide an opportunity for community education (San Marcos, 2008a).

Cool Roof Rebate is a program designed for new solar water heater equipment to be installed on homes and certified by the Solar Rating Certification Corporation (SRCC). The rebate is only available for solar water heating systems with permanently installed electric backup. Rebates for the solar water heating systems have a minimum of

$400 and a maximum allowable rebate of $800. Currently, customers can take advantage of this rebate by applying on the “Go Green San Marcos” website.

Cool-smart rebate program is a rebate program for replacing older, inefficient air conditioning systems. Customers can also access this rebate on the Go Green website.

Creation of a City Green Team occurred in October 2007 in order to design energy and water efficient practices for The City of San Marcos. Initial goals for the team were “to find ways that City employees could conserve energy and water, as well as learn what citizens think about conservation” (San Marcos, 2007). The Green Team is made up of city employees, who meet quarterly, from various departments, providing a central location for planning. There is not an Energy Efficiency Chief Officer, however, making it difficult at times for decisions to be made across all city departments, according to interviews with city staff. According to the structured interviews, having one person who is able to cross multiple jurisdictions within the city bureaucracy would greatly assist the implementation of green policies. The discussion of hiring a Chief Efficiency Officer was undertaken at the February 2010 Green Team meeting, however the proposal was shelved for a later date.

Duct Testing/Repair/Replacement Rebate This operations and maintenance program offers various rebates on duct insulation and replacement because 20% of air that moves through a home is lost to poorly connected and insulated ducts. This rebate is currently available for application on the Go Green website as well.

Energy Analysis refers to a full-time Energy Efficiency Specialist conducting no-cost energy audits for residential and commercial customers. Through the Free Energy Audit program, the City of San Marcos provides electric utility customers with customized recommendations on how to reduce energy consumption and associated

utility costs. The energy audit covers energy-using appliances, insulation, windows and doors in customers' homes.

Energy Efficiency Education refers to the San Marcos Electric Utility making presentations to civic groups and local school students. The utility has yet to create brochures to educate specific populations. School education programs for children are more enhanced, including Louise the Lightning Bug, Power House, and taking part in Solar for Schools, starting in 2007. Solar for Schools is actually an LCRA program that targets several schools in LCRA's service area with solar arrays that are mounted to the school. Installation in the San Marcos Consolidated Independent School District cost $18,160 (LCRA, 2008). The program was designed to increase awareness and interest in renewable energy sources, particularly solar.

Energy Star Window Replacement Rebate offers $1 per square foot of windows replaced by Energy Star windows. This program has not been put in place at this time due to cost. This rebate is available on the Go Green website.

General Green Brochure provides information on greening the house, beyond just water and energy. This brochure does not yet exist, but it should contain information about third-party verifiers like Energy Star, Green Seal, Green Label, FSC Certified Wood, and more. Links on the Go Green website provides information.

The ***Green City Buildings Initiative*** retrofits city buildings with green features, requiring new buildings to meet a particular standard, and might involve replacing HVAC, installing solar, rainwater collection, green roofs, window awnings, etc. The city serves as an example and also provides an opportunity for community education, and

serves as an example for the private sector. This will require new city facilities to meet green building standards such as Leadership in Energy and Environmental Design (LEED). (San Marcos, 2010).

The ***Home Green Brochure*** is a brochure that should be sent out to builders to accompany every new house. The brochure includes information on recycling opportunities, purchasing renewable energy, the benefits of CFL/LED bulbs, habits to optimize water and energy use, local transportation options, maintenance checklists, proper handling and disposal of hazardous materials, and information on organic pesticides, fertilizers and cleaners. This brochure does not exist.

Marketing Energy Conservation is a policy that refers to the San Marcos Electric Utility working closely with large users to manage consumption. This program targets apartment complexes specifically. While the city's intentions to target apartment complexes are good, the fact is, there are only two apartment complexes in the city, Bobcat Village (#11), and Sanctuary Lofts (#16), that produce enough energy to make the top 20 list of users in the city. There is not any specific program to work with other large energy consumers, like Texas State University, which uses approximately 19% of the energy in the city (San Marcos, 2010b).

The ***Net-metering Program*** establishes a formal net-metering policy for all customers. This is the most recently enacted policy in San Marcos. According to an article in the San Marcos Daily Record, the program started on April 1, 2009 when large apartment complexes first started having these devices installed (San Marcos Daily Record, 2009). According to the research, net-metering allows customers and the electric utility to see immediately what changes in habits mean to the electricity bill. For instance, the customer is able to see what a two-degree drop in temperature on the thermostat will

have on usage, or the electricity bill. The city won the Advanced Metering Infrastructure (AMI) Project of the Year in 2009 for installing smart meters for every water and electric utility customer in the city. The project replaced water and electric meters with modern technology on new meters that can communicate with the electric utility. The project has a cost benefit payout of 5-7 years, due to labor savings, reduced water and electric line loss and increased operational efficiencies (City of San Marcos, 2009c).

The ***Occupancy Sensors for Lights in All City Facilities*** program calls for all rooms within city facilities to have light sensors to turn lights on/off based on movement within the room. The replacement process has not been completed.

On-site renewable energy program provides rebates for people to install on-site renewable energy facilities, such as solar panels and wind turbines. The rebate would include $3.00 per AC watt based on the calculated expected performance of the system that is less than 100 kW. This program could be paired with Texas HB 1937, that passed in 2008, allowing cities to tie on-site renewable energy to property tax. During structured interviews, this topic came up with several people when discussing possible financing options. Not one person, unfortunately, knew that the Texas legislature passed HB 1937.

Solar Attic Fan Rebate covers 20% of cost up to $200 to install a solar-powered attic fan in an existing home. This rebate is available to customers on the Go Green website.

Tiered Electrical Rates is similar to efforts in water conservation, where a tiered system of electrical rates encourages energy conservation. Those users that exceed a certain amount of kWh will have the amount above charged at a higher rate. This program has not been put in place.

Voluntary Purchase of Renewable Energy establishes a voluntary program, similar to CPS Energy's (San Antonio) Windtricity Program, allowing customers to decide if, and how much, additional renewable energy to purchase beyond the baseline amount the city already purchases.

Wall/Attic/Insulation Rebate will provide a rebate of $0.15 per square foot of attic/ceiling insulation installed in an existing house. This rebate is available online at the Go Green website.

Window Solar Screens/Film Rebate provides $0.15 per square foot of windows covered with solar window film or screens on the west and south faces of a structure. Specifically, screens must block 65% of solar gain. This rebate is available online at the Go Green San Marcos website.

One of the first tasks of the previously mentioned Green Team was to conduct a survey of city employees to gauge interest in environmental programs and to receive input on policies that can be enacted internally for the city to become more "green" (San Marcos, 2007a). A survey of city employees was conducted in 2007. The results indicated that 92% of the respondents (city employees) believed development and implementation of green policies should be a city priority, and 96% believed it was important for city staff to take a leadership role by implementing green policies internally (San Marcos, 2007a) to set an example for citizens.

Figure 4.6 - Two hybrid vehicles were purchased by the City of San Marcos Electric Utility. Here, they were on display at the 2010 Green Living Showcase.

The Green Team was also responsible for purchasing several hybrid vehicles and having a design put on them to promote sustainable living in San Marcos.

In March 2010, the City of San Marcos added a "Go Green San Marcos" link on its website to encourage green programs within the city. The new site was added in order to provide a central location for San Marcos Electric Utility customers to receive information about four major areas of concern: Water conservation, land preservation, waste reduction/recycling, and energy efficiency.

The Go Green San Marcos website encourages customers to save energy and save money, and points out that there are many ways to increase energy efficiency and decrease the energy bill. The website encourages many ways for customers to save money and energy that requires very little, if any, investment in time or money. This website provides information on free energy audits, energy efficient heating/AC rebate programs, energy efficient appliance rebate programs, and additional links and resources that customers can use to take advantage of all the different green policies and programs that are available.

Chapter Summary

San Marcos is well ahead of the curve as far as renewable energy and energy efficiency policies are concerned. There is still room for growth, however, which is seen in Chapter five. Many of the policies and programs that the San Marcos Electric Utility has discussed are still in the formative stages, or in the stage of trying to get funding from the city or other sources.

Chapter Five: Methodology

Chapter Purpose

The purpose of this chapter is to describe the methodology used to assess the renewable energy and energy efficiency policies and programs of the San Marcos Electric Utility in San Marcos, Texas. The chapter illustrates the various data collection methods included in the research design and discusses the advantages and disadvantages of each. The evidence is collected using criteria developed from the model Sustainable Energy Utility components expressed in Chapter Three.

Methodology Introduction

The research design selected for this paper is a case study. The techniques of this case study allow a comprehensive assessment of the sustainability utility policies for the city of San Marcos, Texas. No single research method is sufficient to completely understand everything the San Marcos Electric Utility is doing in regards to energy policy. According to Yin (2009, 2), “The distinctive need for case study arises out of the desire to understand complex social phenomena. In brief, the case study method allows investigators to retain the holistic and meaningful characteristics of real-life events.”

Instead of using one research method, such as document analysis, a case study uses several research methods. Yin maintains, “The need to use multiple sources of evidence far exceeds that in other research strategies, such as experiments, surveys, or histories.” By doing case study research, the researcher is able to triangulate multiple levels of data, events and facts to support a finding better than a single source of evidence ever could (Yin 2009, 99). This case study uses document analysis, structured interviews and direct observation as techniques to collect data on existing policies.

The Operationalization Table

The operationalization table is presented in Table 5.1. The purpose of this table is to connect the conceptual framework, the research methodology, the evidence, and the sources. The table outlines the operational relationship between each model component and the corresponding methodology used to explore it. When viewed in its entirety, the research method enables a comprehensive assessment of the San Marcos Electric Utility.

Table 5.1 Operationalization Table

Ideal Type Categories	Research Method	Evidence	Sources
Central Coordination			
Sustainable energy services are coordinated by as few points of contact as possible	Document Analysis	Establish the number of points of contact	- City of San Marcos website - Administrative records - Budgets - Brochures - Presentations - Press releases - News clippings
	Structured Interview	Q1) In order to take advantage of all "green" policies in place by the city of San Marcos, how many people/program heads must a customer contact?	Administrators and staff of the City of San Marcos, City Council members. Administrators and staff of the City of San Marcos Electric Utility
Not limited to electricity	Document Analysis	Existence of additional sustainability policies other than electricity	- City of San Marcos website - Administrative records - Budgets - Brochures - Presentations - Press releases - News clippings

Clear policy and planning in place	Document Analysis	Easy to understand policies that avoid lots of jargon	- City of San Marcos website - Administrative records - Budgets - Brochures - Presentations - Press releases - News clippings
	Document Analysis	Policies are formed democratically – the local population helped create policy that takes local conditions into account.	- City of San Marcos website - Administrative records - Budgets - Brochures - Presentations - Press releases - News clippings
	Structured Interview	Q2) Describe the planning that went into place to develop "green" policies for the city of San Marcos.	Administrators and staff of the City of San Marcos, City Council members. Administrators and staff of the City of San Marcos Electric Utility
		Q3) Describe the level of input the local population had in creating "green" policies for the city of San Marcos.	
	Direct Observation	Attended Green Team meeting on February 10, 2010	Invited by San Marcos Electric Utility Staff
Comprehensive Programs			
Programs target renewable energy across all fuels, customer classes and sectors	Document Analysis	Existence of programs that target wind, solar, etc…)	- City of San Marcos website - Administrative records - Budgets - Brochures - Presentations - Press releases - News clippings
		Existence of programs that target all customer classes	
		Existence of programs that target all sectors (industrial, commercial, residential, government)	
		Resources dedicated to generating energy from wind, solar, etc.)	

		Resources dedicated to targeting low-income and moderate-income households	
		Resources dedicated to different sectors.	
	Structured Interview	Q4) Describe programs that encourage use of solar, wind and other alternative energies.	Administrators and staff of the City of San Marcos, City Council members. Administrators and staff of the City of San Marcos Electric Utility
		Q5) Describe programs that target low-income households.	
		Q6) Describe programs that target industrial, commercial, residential and government sectors.	
Programs target education and outreach	Document Analysis	Existence of education and outreach programs	- City of San Marcos website - Administrative records - Budgets - Brochures - Presentations - Press releases - News clippings
		Resources dedicated to outreach and education	
		The number of outreach and educational programs dedicated to “green” policies and programs.	
	Structured Interview	Q7) Describe education and outreach programs	Administrators and staff of the City of San Marcos, City Council members. Administrators and staff of the City of San Marcos Electric Utility
	Direct Observation	Attend Green Living Showcase on March 20, 2010	Calendar of events for electric utility
Flexible Incentives			

Services incorporate a range of incentives to meet the needs of different groups	Document Analysis	Existence of multiple incentives for different customer groups. Resources dedicated to creating incentives	- City of San Marcos website - Administrative records - Budgets - Brochures - Presentations - Press releases - News clippings
	Structured Interview	Q8) Describe utility policy that gives general to specialized services, including free assistance, education, audits, loans, rebates, fee-based programs, net-metering, etc.	Administrators and staff of the City of San Marcos, City Council members. Administrators and staff of the City of San Marcos Electric Utility
			Administrators and staff of the city of San Marcos Electric Utility
Financial Self-Sufficiency			
A financing plan ensures long-term self-sufficiency	Document Analysis	Existence of long-term plans for "green" policies	- City of San Marcos website - Administrative records - Budgets - Brochures - Presentations - Press releases - News clippings
		Amount of resources dedicated to "green" policies and programs	
	Structured Interview	Q9) Describe funding for "green" policies.	Administrators and staff of the City of San Marcos, City Council members. Administrators and staff of the City of San Marcos Electric Utility
		Q10) Describe how programs are based on customer demand?	Administrators and staff of the City of San Marcos, City Council members. Administrators and staff of the City of San Marcos Electric Utility
Energy services are	Document	Existence of actual energy	- City of San Marcos

managed in a way to create energy savings	Analysis	savings from program	website - Administrative records - Budgets - Brochures - Presentations - Press releases
Setting a Standard			
Implementing a local renewable portfolio standard	Document Analysis	Existence of a renewable portfolio standard	- City of San Marcos website - Administrative records - Budgets - Brochures - Presentations - Press releases - News clippings
		The quality of the standard set	
		Resources dedicated, if any, to setting a standard	
		Existence of goals (amount of energy is produced by renewable energy by a certain date)	
	Structured Interview	Q11) Describe, if any, plans to set a minimum amount of energy to be produced by renewable and alternative energy. What are specific targets?	Administrators and staff of the City of San Marcos, City Council members. Administrators and staff of the City of San Marcos Electric Utility

Document Analysis

Document analysis is one of the three research methods selected for this case study. The most important use of documents is to corroborate and augment evidence from other sources (Yin 2009, 103). Documents are helpful in verifying information from an interview, can corroborate information from other sources and inferences can be made from documents. Document analysis plays an important role in determining what actually happens. Document analysis has many strengths, including the fact that documents are

stable, and can be reviewed repeatedly. Documents are also unobtrusive; they are not specifically created for the study. Documents are exact; they contain exact names, references, and details of an event. Documents are also broad in scope, meaning, documents cover a long span of time, many events, and many settings (Yin 2009, 102). In spite of these strengths, document analysis has weaknesses as well, including irretrievability; some documents can be difficult or impossible to find or obtain. Some documents are biased due to the possibility of a collection being incomplete. Also, there can be bias in documents due to the author of the documents. One of the biggest obstacles of document analysis is access; some organizations may deliberately withhold information from an investigator (Yin 2009, 102). The document analysis will seek to identify the similarities and differences between existing policies in the City of San Marcos and the practical ideal type model (SEU) established in the literature.

Document analysis is used to assess all five ideal type categories. In this study, this type of research determines the existence of policies in San Marcos that reflect central coordination, comprehensive programs, flexible incentives, financial self-sufficiency and determining if a standard has been set by viewing the city web site, certain administrative documents like proposals, progress reports, and other internal records, brochures, budgets, presentations, press releases, news clippings and other articles appearing in the mass media or in community newspapers and other documents available to the researcher. Knowledgeable city staff within the City of San Marcos Electric Utility and city administrators will help select the documents to be analyzed.

Sampling: Document Analysis

Several staff members of the San Marcos Electric Utility provided documents that are used by city staff, while financial documents and reports are freely accessible on the

City of San Marcos website. Documents that were viewed and analyzed are listed in table 5.2.

Table 5.2 List of Documents from the City of San Marcos for Analysis
• 2007-2008 Annual budget for the City of San Marcos • 2008 Annual report for the city of San Marcos, Texas • City of San Marcos 2008 Budget Policy Statement • City of San Marcos comprehensive environmental stewardship policy • "Efficiency task force offers city recommendations for 'best practices,'" Press Release • Green electricity saves money. Press Release • Green policy framework (update) • Green Team update for Council • Mayor's script for employee recognition speech • New directions: San Marcos, Texas 2009 Annual Report • Open Records Request Report prepared for James Harkins by Paul A. Wilson • San Marcos Electric Utility website • City of San Marcos website

Assessment Criteria: Document Analysis

The evidence was collected and categorized by the conceptual framework and measured using a four-point scale to determine how well the policies and programs of the San Marcos Electric Utility meet the ideals of the Sustainable Energy Utility. The highest rating, "Meets All Standards," was given if all standards were met. If the majority of the standards were met, then the rating earned was "Mostly Meets Standards." If a marginal amount of the standards was met, then the component received a rating of "Partially Meets Standards." Lastly, if none of the standards were met, then the component received "Does Not Meet Standards" of a Sustainable Energy Utility.

Structured Interview

Structured interviews were conducted to assess the City of San Marcos Electric Utility. “One of the most important sources of case study information is the interview” (Yin 2009 106). Structured interviews allow for direct questioning of city and utility administrators who have intimate knowledge of the case, in this instance, the San Marcos Electric Utility.

“Overall, interviews are an essential source of case study evidence because most case studies are about human affairs or behavioral events. Well-informed interviewees can provide important insights into such affairs or events” (Yin 2009, 108). The researcher focused the questions directly on the case study topic. Focused questions were presented in open-ended form to encourage more insight into the topic, thus allowing the interviewee to discuss freely and at length the topic at hand. Interviews have many strengths. Interviews are targeted; they focus directly on case study topics. Interviews are insightful; they provide perceived causal inferences and explanations.

There are several weaknesses associated with structured interviews. In some cases, interviews can become biased, due to poorly articulated questions by the interviewer, as well as poorly articulated responses by the interviewee. Also, interviews can create inaccuracies due to poor recall from the interviewee. Among the biggest weaknesses of the structured interview is reflexivity in the interviewee. Simply, the interviewee gives the interviewer what is wanted rather than what may be actually happening (Yin 2009, 102). Another obstacle when conducting a structured interview is to avoid leading questions. A major purpose of an interview might be to corroborate certain facts that have been established. The interviewer must be careful not to lead the interviewee. The interviewer must carefully word questions so that the interviewer appears genuinely naïve about the topic, thus allowing the interviewee to provide a fresh

commentary on the case at hand (Yin 2009, 107). While doing research, it is imperative to question persons with different perspectives (Yin 2009, 107).

Table 5.3 - List of City Employees Interviewed
• Director of Public Services • Conservation Coordinator for Electric Utility • Conservation Technician • Billing Quality Assurance Specialist • Senior-Level Engineer • Assistant City Manager • City Councilman (Place 4)

The interviewer followed the questions derived from the case study protocol, in this case the conceptual framework. The interview took the form of an open conversation, and the interviewer was very careful to stay on topic, always coming back to the questions (Yin 2009, 106).

The researcher questioned administrators and staff of the San Marcos Electric Utility as well as city administrators and city managers. Structured interview questions have been developed from the conceptual framework. The eleven structured interview questions address all five ideal type categories: Central coordination, comprehensive programs, flexible incentives, financial self-sufficiency, and setting a standard. Questions 1-3 assess the first ideal type category, central coordination. Specifically, question one (1) was developed to determine how many different points of contact there were for the City of San Marcos in order for a customer to take advantage of all “green” policies that are available within the city. Questions two and three (2-3) were developed to determine the type of planning that went into place in order to develop green policies for the City of San Marcos, and the level of input the local population had in creating “green” policies for the city. Questions four through seven (4-7) assess the second ideal type category, comprehensive programs. Specifically, questions four through six (4-6) were developed to describe specific programs that target renewable energy across all fuels, customer classes and sectors. Question seven (7) was designed to describe outreach and educational programs that the City of San Marcos has created. Question eight (8) assesses

the third ideal type category, flexible incentives. Specifically, question eight (8) was designed to focus on programs like energy audits to help determine the various ways that individuals and businesses can save energy and how the utility offers special services to customers. Questions nine and ten (9-10) assess the fourth ideal type category, financial self-sufficiency. Specifically, question nine and 10 (9-10) were designed to describe financing plans that ensure long-term self sufficiency and how those programs are based on customer demand. Question eleven (11) assesses the fifth ideal category, setting a standard. Specifically, question eleven (11) was designed to describe if there are plans to set a minimum amount of energy to be produced by renewable and alternative energy and to reveal specific goals and dates to reach those goals.

The interviews were conducted in February and March of 2010. The first interview was with the Conservation Coordinator of the San Marcos Electric Utility. This person then recommended other staffers to interview, including the Electric Utility Director, and the Conservation Technician. Interviews with the Assistant City Manager, Director of the Utility, and Conservation Technician happened at the February 10 Green Team meeting. The interview with City Councilman (Place 4) occurred on March 2. Interviews over the phone with the Billing Quality Assurance Specialist and Senior-Level Engineer were in late March.

Table 5.4: Questions for Structured Interview by Concepts
Central Coordination
• ***Sustainable energy services are coordinated by as few points of contact as possible***
1) In order to take advantage of all "green" policies in place by the City of San Marcos, how many people/program heads must a customer contact?
• ***Clear policy and planning in place***

2) Describe the planning that went into place to develop "green" policies for the City of San Marcos. 3) Describe the level of input the local population had in creating "green" policies for the City of San Marcos.
Comprehensive Programs
• ***Programs target renewable energy across all fuels, customer classes and sectors***
4) Describe programs that encourage use of solar, wind and other alternative energies. 5) Describe programs that target low-income households. 6) Describe programs that target industrial, commercial, residential, and government sectors.
• ***Programs target education and outreach***
7) Describe education and outreach programs.
Flexible Incentives
• ***Services incorporate a range of incentives to meet the needs of different groups***
8) Describe utility policy that gives general to specialized services, including free assistance, education, audits, loans, rebates, fee-based programs, net metering, etc.
Financial Self Sufficiency
• ***A Financing plan ensures long-term self-sufficiency***
9) Describe funding for "green" policies.
10) Describe how programs based on customer demand.
Setting a Standard
• ***Implementing a local Renewable Portfolio Standard***
11) Describe plans, if any, to set a minimum amount of energy to be produced by renewable and alternative energy. What are specific targets?

Sampling: Structured Interview

The structured interview sample included one senior-level management staff member at the San Marcos Electric Utility, the Electric Utility Director, who directs the overall operations of the utility. Another participant was the Conservation Coordinator for the electric utility and the Conservation Technician. Also interviewed was a Billing Quality Assurance Specialist for the electric utility, and a senior-level engineer for the electric utility. The first three staff members mentioned are members of the San Marcos Green Team. The other two members are not, but they provided valuable insight from

non-directly related members of the staff who deal with the specific amount of energy being produced and used.

An Assistant City Manager was interviewed. This person was able to provide a macro-view of the City of San Marcos, as far as all policies being implemented. This person is also a member of the San Marcos Green Team.

City Councilman Chris Jones was also interviewed. He received the Elected Public Official of the Year Award in 2008. He was recognized for his leadership in the city-wide single stream recycling program, the development of a sustainability plan for the City of San Marcos, and a weatherization program for residents of San Marcos (San Marcos Daily Record, 2009).

The interviews were conducted in person and over the phone. The in-person interviews lasted for approximately an hour, while the phone interviews lasted between twenty and thirty minutes each. Interviews were conducted privately so participants could answer the questions freely. The interviewee's names were not revealed in order to protect their anonymity, except for the sole publicly elected official who was interviewed.

Assessment Criteria

The structured interview responses were not rated because of the limited number of interview participants. Instead, the responses were used to provide further insight about standards rated through documents.

Direct Observation

Direct observation was used to develop the case study of the San Marcos Electric Utility. Because a case study should take place in the natural setting of the "case," an opportunity should be created for direct observation (Yin 2009, 109). There are several strengths associated with direct observation research. It covers reality; events are

covered in real time. Direct observation also is contextual; covers context of a "case" (Yin 2009, 102). There are some weaknesses associated with direct observation research. Mainly, this form of research is time-consuming. Another weakness is the selectivity; broad coverage is difficult without a team of observers. Direct observation can cause reflexivity; the event may proceed differently because it is being observed. Also, direct observation can be costly; sometimes, the human observer needs hours (Yin 2009, 102).

In this study, direct observation served as a necessary, strong research methodology for the ideal-type categories. Direct observation, however, was limited in case management because only two events were observed.

"Observational evidence is often useful in providing additional information about the topic being studied" (Yin 2009, 110). Yin points out (2009, 110) that observational evidence is crucial to a case study especially when a new technology is involved because the researcher is able to actually observe the technology in action. This allows for first-hand knowledge of problems. Photographs are encouraged at the case study site, to help convey important case characteristics to outside observers. Permission should be granted before taking photographs. Yin recommends (2009, 111) having more than a single observer make an observation to increase the reliability of observational evidence. During this research, however, there was just one person able to conduct direct observation.

Sample: Direct Observation

During the period of research, there was just one Green Team quarterly meeting and one outreach event in which the San Marcos Electric Utility was directly involved. The Green Team meets quarterly. The meeting attended was on February 10, 2010 at 10 a.m. Green Team staff discussed various policies and procedures to determine what direction the City should move with green policies. Also observed was extensive

discussion on branding sustainable efforts in San Marcos, and in particular how to design a vehicle to reflect sustainable ideas.

The outreach event that was observed was the Green Living Showcase, which was held at the San Marcos Conference Center. The San Marcos Chamber of Commerce hosted this event on March 20, 2010. The San Marcos Electric Utility was one of approximately 50 exhibitors at this event that brought together hundreds of homeowners and business people for a day of workshops, exhibits and demonstrations focused on providing all participants with many tools and resources to help them move toward a cleaner and greener future (San Marcos Daily Record, 2009a). The vehicles that were discussed at the Green Team meeting were at this event, and two photographs were taken.

Assessment Criteria: Direct Observation

The direct observation was measured using a four-point scale The evidence was collected and categorized by the conceptual framework, then measured using a four-point scale to determine how well the policies and programs of the San Marcos Electric Utility meet the ideals of the Sustainable Energy Utility. The highest rating, “Meets All Standards,” was given if all standards were met. If the majority of the standards were met, then the rating earned was “Mostly Meets Standards.” If a marginal amount of the standards was met, then the component received a rating of “Partially Meets Standards.” Lastly, if none of the standards were met, then the component received “Does Not Meet Standards” of a Sustainable Energy Utility.

Human Subjects Discussion

This structured interview research is an exempt category of research under 45 CFR, Part 46, Section 101(b)(3). The research involves survey procedures on appointed and elected public officials. The IRB exemption application was submitted on December

27, 2009. The Exemption request number is EXP2009Y8673. The exemption request was approved on January 5, 2010. See Appendix A for the IRB notice from the University.

Chapter Six: Results

Chapter Purpose

The purpose of this chapter is to gauge the efficacy of programs and policies at the San Marcos Electric Utility. “Public administrators often use research findings to make recommendations to improve programs. In other words, they are asked to gauge the effectiveness of program processes. One way to gauge efficacy of program processes is to develop criteria for this judgment and collect empirical evidence to contrast the reality of the program against the criteria” (Shields & Tajalli 2006, 324). The purpose of this chapter is to determine how close process x is to the ideal or standard (Shields & Tajalli 2006, 324). In this research, “process x” refers to the current policies by the San Marcos Electric Utility. The “ideal or standard” refers to the modified Sustainable Energy Utility that has been developed in this research and is reflected in the Conceptual Framework. The Sustainable Energy Utility is made up of five components:

- Central Coordination
- Comprehensive Programs
- Flexible Incentives
- Financial Self-Sufficiency
- Setting a Standard

The San Marcos Electric Utility Meets All or Most Standards

Research Findings – Green Policy Framework for San Marcos - Document Analysis

The five components of the modified Sustainable Energy Utility have been used to measure how the policies and programs listed in the Green Policy Framework for San Marcos actually meet the standards set by the conceptual framework. Policies listed in the Green Policy Framework for San Marcos are given the following ratings to determine how closely they meet the established criteria: "Meets All Standards" (MA); "Mostly Meets Standards" (MM); "Partially Meets Standards" (PM); and "Does Not Meet Standards" (DNMS). These ratings can be seen in Table 6.2.

Key to Table 6.1			
Meets All Standards	**Mostly Meets Standards**	**Partially Meets Standards**	**Does Not Meet Standards**
MA	MM	PM	DNMS

Table 6.1 - Do the Policies Measure up to the Conceptual Framework and how do they rate? Top Policies in San Marcos According to Document Analysis of Green Policy Framework and the Conceptual Framework

San Marcos Electric Utility Policy	**Central Coordination**	**Comprehensive Programs**	**Flexible Incentives**	**Financial Self-Sufficiency**	**Setting a Standard**
Comprehensive City office practices	MA	MA	MA	MA	N/A
Creation of Green Team	MA	MA	MA	MA	N/A
Energy analysis	MA	MM	MA	MA	N/A

Focus on land use, water use, and recycling	MA	MA	MA	MA	N/A
Go Green San Marcos website	MA	MA	MA	MA	N/A
Green City Buildings Initiative	MA	MA	MA	MA	N/A
Net-metering program	MA	MA	MA	MA	N/A
Occupancy sensors for lights in all city facilities	MA	MA	MA	MA	N/A
Weatherization program	MA	MM	MA	MA	N/A

Table 6.1 identifies nine (9) specific policies that the San Marcos Electric Utility has enacted over the last three years that "Meet All Standards" or "Meet Most Standards" of the Sustainable Energy Utility.

Document Analysis – Central Coordination - Go Green San Marcos website

The Electric Utility has made major progress in the area of Central Coordination. The three areas that the San Marcos Electric Utility has done extremely well with this aspect of the ideal model is the creation of a Green Team, the newly developed "Go Green San Marcos" website, and focusing on more than just electricity by focusing on land use, water use, and recycling. There are three specific aspects that an electric utility should demonstrate to "Meet all standards" of Central Coordination, and those are:

- Sustainable energy services are coordinated by as few points of contact as possible
- Not limited to electricity
- Clear policy and planning

The new website, especially, has allowed customers to easily determine what programs are available, and features all three of these points in an easy to understand fashion. The website is easy to navigate, and intuitive in design. The website developer used simple logic to break down categories of programs that allows the customer to not have to think about where information is located, which, as Krug (2005) points out, is crucial to successful web design. The website is especially useful at focusing on the four major areas of conservation and sustainability: Land use, water use, recycling, and electricity. These four links indicate that the city is focused on more than just electricity – the second component of the Central Coordination ideal-type category.

Figure 6.1 - A screen shot of the "Go Green San Marcos" website. Notice the four categories.

Document Analysis – Comprehensive Programs & Flexible Incentives - Go Green San Marcos website.

When viewing the "Go Green San Marcos" website, a customer can click on the "Energy Efficiency" link in order to find solutions to save energy around the home or business. The customer is also able to find information about four specific areas: "Free Energy Audits, Energy Efficient Heating/AC Rebate Program, Energy Efficient Appliance Rebate Program, and Links/Resources." The links/resources button informs the customer of various federal programs and standards that are used across the nation. The website targets education, as well as focuses on crossing sectors by providing this

information. In this sense, the website, “Meets All Standards” of offering comprehensive programs, and educating the public on how those programs can be accessed.

Central Coordination – The Green Team

The Green Team meets quarterly to discuss City policy, with representatives from most city departments. These meetings are when policy is formed for the city. The fact that the Green Team exists is evidence that San Marcos is a forward-thinking community that takes preservation of natural resources seriously. The one area for improvement on the Green Team would be for the city to hire a Chief Conservation Officer, which is discussed later, and would greatly improve the clear policy and planning aspect.

Document Analysis–Comprehensive Programs-Energy Analysis Policies

The Electric Utility “Meets Most Standards” as far as energy analysis policies are concerned. The one area that the city could improve is by working more with the University, which is discussed later.

The City of San Marcos is the third highest user of all customers in the city, using 2.2% of all energy generated. The San Marcos Consolidated Independent School District, uses another two percent (2%) of electricity in San Marcos. These two entities have taken major steps to analyze the way that employees and departments use energy. San Marcos enacted citywide audits of all city facilities and city employee practices. Also, occupancy sensors in all city facilities were installed. By taking these steps, the electric utility is offering comprehensive programs, and coordinating efforts to focus on efficiency first within the city, and is acting as a model for citizens, which touches upon targeting education and outreach.

The city has done a great job of offering all households and businesses the opportunity to take advantage of efficiency programs, like energy audits. There are three specific programs, Free Energy Audits, the Energy Efficient Heating/AC Rebate Program, and the Energy Efficient Appliance Rebate Program. These three programs allow customers an opportunity to learn where savings can occur, and offers a way for customers to receive assistance through rebates. Rebates are available for many facility improvements, such as: HVAC systems, attic or wall insulation, radiant barriers, duct sealing, programmable thermostats, refrigerators, dishwashers, clothes washers, water heaters, and window air conditioners.

Document Analysis–Financial Self-Sufficiency–Net Metering

The Net-metering program is another great example of San Marcos moving forward. The Net-metering program, or Smart Metering as it is referred to, won the "AMI Project of the Year" award in 2009, for installing "smart meters" for every water and electricity customer in San Marcos. The Smart Metering project improves customers' online access to their accounts, provides hourly readings and lets customers monitor their own use during the month, which is a prime example of central coordination. The new meters also increase privacy with remote meter readings and improves accuracy, which provides better financial self-sufficiency and allows customers to manage their bill, which encourages energy savings.

San Marcos Electric Utility Partially Meets Standards

The San Marcos Electric Utility has done a tremendous job in many areas, as mentioned above. The city has gotten off to a good start, but there is room for growth, as indicated in Table 6.2.

Table 6.2 - Do the Policies Measure up to the Conceptual Framework and how do they rate? Needs Improvement - Policies in San Marcos According to Document Analysis of Green Policy Framework and the Conceptual Framework					
San Marcos Electric Utility Policy	**Central Coordination**	**Comprehensive Programs**	**Flexible Incentives**	**Financial Self-Sufficiency**	**Setting a Standard**
Marketing Energy Conservation	PM	PM	PM	PM	N/A
CFL/LED Bulb Program	PM	PM	MM	MM	N/A
Baseline Purchase of Renewable Energy	PM	PM	PM	PM	PM

Key to Table 6.2			
Meets All Standards	**Mostly Meets Standards**	**Partially Meets Standards**	**Does Not Meet Standards**
MA	MM	PM	DNMS

There are three (3) policies listed in Table 6.3 that the San Marcos Electric Utility has started working on that need improvement. Those policies are marketing energy conservation, baseline purchase of renewable energy, and the CFL/LED program.

Document Analysis–San Marcos Green Policy Framework–Marketing Energy Conservation

The Marketing Energy Conservation program could be improved from the aspect that Texas State University is the largest user of energy in the city, and there is not an active program from the city to bring down electricity usage at the university. The city's intentions to target apartment complexes are good, the fact is, there are only two apartment complexes in the city, Bobcat Village (#11), and Sanctuary Lofts (#16), that produce enough energy to make the top 20 list of users in the city (See Appendix B for the complete list). Even then, those two apartment complexes use just a little more than

1% of all energy in the city.

There is not a specific program to work with other large energy consumers, like Texas State University, which uses approximately 19% of the energy in the city (San Marcos, 2010b), or HEB, which uses 4.3% of all energy in the city. If the city were to establish an audit program for the school and other large energy users other than apartment complexes, a large amount of electricity could be saved, which is why the city "Partially Meets Standards" for this policy.

Document Analysis–San Marcos Green Policy Framework–Baseline Purchase of Renewables

The city "Partially Meets Standards" with their baseline purchase of renewable energy. The city purchases five percent (5%) of total energy from renewable resources. There is not a goal for the future, however. The fifth component of the modified Sustainable Energy Utility is "setting a standard." The city could improve in this area by setting a specific minimum goal of energy to be purchased from renewable resources in the future.

Direct Observation – Comprehensive Programs - CFL/LED Program

The CFL/LED program is successful in the sense that more people are receiving energy efficient light bulbs, however, the way that the city administers the program causes it to only receive a "Partially Meets Standard" rating, rather than "Meets All" or "Meets Most." This program is strictly an outreach effort. The problem though, is that outreach should provide multiple opportunities to interact with a customer. The reason this program receives a "Partially Meets Standard" rating for the comprehensive programs aspect is because the program is executed poorly. The electric utility does not receive any information in return for the free CFL bulbs. The utility needs to get basic

contact information from customers so they can stay in touch with customers about other energy programs that the city offers. If customers gave their e-mail address in exchange for a CFL bulb, this program would receive a "Meets All Standards" rating.

San Marcos Electric Utility Does Not Meet Standards

The San Marcos Electric Utility has also discussed several policies, which in many cases are good, but the city has not acted, which is seen in Table 6.3.

Key to Table 6.3			
Meets All Standards	**Mostly Meets Standards**	**Partially Meets Standards**	**Does Not Meet Standards**
MA	MM	PM	DNMS

Table 6.3 - Do the Policies Measure up to the Conceptual Framework and How Do Rhey Rrate? Did Not Meet and Standards - Policies in San Marcos According to Document Analysis of Green Policy Framework and the Conceptual Framework

San Marcos Electric Utility Policy	Central Coordination	Comprehensive Programs	Flexible Incentives	Financial Self-Sufficiency	Setting a Standard
Adopt Energy Star for Homes Standards	DNMS	DNMS	DNMS	DNMS	N/A
Adopt NAHB/ICC Green Building Standards	DNMS	DNMS	DNMS	DNMS	N/A
Adopt USGBC's LEED	DNMS	DNMS	DNMS	DNMS	N/A
Chief Sustainability Officer	DNMS	DNMS	DNMS	DNMS	N/A
Community Surveys	DNMS	DNMS	DNMS	DNMS	N/A
General Green Brochure	DNMS	DNMS	DNMS	DNMS	N/A
New Home Green Brochure	DNMS	DNMS	DNMS	DNMS	N/A
On-site renewable energy program	DNMS	DNMS	PM	PM	N/A

Tiered Electrical Rates	DNMS	DNMS	DNMS	DNMS	N/A
Voluntary Purchase of Renewable Energy	DNMS	DNMS	DNMS	DNMS	N/A

Document Analysis–Green Policies Framework for San Marcos

The first three policies shown in Table 6.4 are roughly interchangeable, and deal with setting standards for construction of new buildings. The city has yet to adopt any standards, whether they are Energy Star, NAHB/ICC, or USGBC's LEED standards. All of these could be enacted with little cost to the city and would increase energy efficiency by about 15%-18% in all newly constructed buildings. There would be an increase in price for new construction; yet, these standards are something that most model cities are doing. If San Marcos were to choose any one of these policy options, there would be great strides made in energy efficiency in new construction and decrease the likelihood of expensive costs in the future. Since there has not been a standard specified in San Marcos, the city received a "Did Not Meet Standards" rating.

Direct Observation–Green Team Meeting–Chief Sustainability Officer

As stated above, the city has yet to hire a Chief Sustainability Officer to cut across city departments. This is one area where direct observation actually was quite beneficial. During the Green Team meeting in February, the idea of hiring a Sustainability Officer was brought up by lower-level staff. Upper management, however, tabled that particular idea for a later date. Currently, all staff department heads make separate decisions on how their particular department can be more efficient. There is not a singular voice, as might be needed, to centrally coordinate policy, which is why San Marcos "Does Not Meet the Standards" of the Sustainable Energy Utility.

Direct Observation and Document Analysis–Green Team Meeting–Community Survey

A community survey was originally called for in 2007 when $250,000 was appropriated for “green” programs. A survey was created, but it was never administered to the public. If the city were to do this, utility management would be able to gauge what customer priorities are in regards to energy efficiency policies. It was confirmed by city staff that the survey has not been distributed, earning the utility a Did Not Meet Standards rating.

Document Analysis-Green Policy Framework-Brochures

The Green Policy Framework also mentions two brochures, a General Green brochure to educate people about every day activities to save energy. Another proposed brochure would be given to project managers of new construction projects. Neither one of these brochures has been created. Both would be outreach tools for the electric utility in their efforts to educate the public on the importance of energy efficiency. The fact that these brochures have not been produced causes the city to receive a “Does Not Meet Standards” rating for this program.

Document Analysis–Financial Self-Sufficiency-2009 Annual Budget

There has been very little movement from the city to encourage on-site renewable energy production. The State of Texas recently passed HB 1937 to encourage city utilities to make loans to citizens for site-generated renewable energy, like solar, as well as other major home improvements. The loan would then be paid back with property taxes. The city has not yet appropriated any money for this type of program, although there are standard rebate programs in place. For these two reasons, the city receives a “Partially Meets Standards” for financial self-sufficiency.

Document Analysis–Flexible Incentives-Tiered Electrical Rates

The city has not yet enacted a tiered electrical rate program for customers who use more energy than what is normally needed. A similar program exists in San Marcos for water use, and it has been extremely effective. By following the same principles, energy usage should decrease, and energy efficiency is then encouraged. The tiered electrical rate would actually be classified as a disincentive.

Document Analysis–Comprehensive Programs-Voluntary Green Market

San Marcos does not meet the standards of the Sustainable Energy Utility because the city does not have a voluntary green market, and currently there is no plan to develop one. By allowing customers the option of receiving energy from renewable resources, the city would allow customers to have a choice, one of the basic democratic principles of the Sustainable Energy Utility. By allowing voluntary green markets, the utility also allows the market to determine how much renewable energy is used in San Marcos above the minimum amount purchased by the city.

Research Findings–Direct Observation

There were only two events that were observed directly. One was a meeting of the San Marcos Green Team, and the other was the Green Living Showcase. Those results are displayed in Table 6.4.

Key to Table 6.4			
Meets All Standards	**Mostly Meets Standards**	**Partially Meets Standards**	**Does Not Meet Standards**
MA	MM	PM	DNMS

Table 6.4 - Do the Policies Measure up to the Conceptual Framework and how do they rate? Direct Observation Results

San Marcos Electric Utility Policy	**Central Coordination**	**Comprehensive Programs**	**Flexible Incentives**	**Financial Self-Sufficiency**	**Setting a Standard**
Meeting of Green Team	MM	MM	MM	MM	N/A
Green Living Showcase	MA	MM	MA	MA	N/A

Direct Observation-Green Team

Observation of the Green Team was helpful to witness how policy is created. There were several representatives from various programs at the February meeting. The two programs that had the most representation were the electric utility and the Parks Department. The Assistant City Manager led the meeting. Topics discussed included branding, and the Green Living Showcase. Also discussed was the hiring of a Chief Sustainability Officer. The Director of the Electric Utility tabled this idea. The main weakness of the Green Team meeting was the lack of discussion on important issues. More so than anything, by observing the meeting, it seemed that what was discussed was more of a review of what had already been done, instead of what will or should be done. The major exception was discussion about designing the recently purchased hybrid vehicles, in order to brand the electric utility.

Direct Observation–Green Living Showcase

It was important to directly observe the San Marcos Electric Utility staff at the Green Living Showcase. The staff was enthusiastic and helpful with customers who were interested in more information about the utility. There was also a catchy display and a spin-wheel for customers to win prizes. The only place for improvement at this event would be to give city staff the opportunity to follow up with customers.

Chapter Summary

This chapter provides results of the case study of the San Marcos Electric Utility, establishing how close the policies of the city reflect the standards established by the modified Sustainable Energy Utility. The research methodology included document analysis, structured interviews, and direct observation. The final chapter provides a conclusion and offers recommendations for improvement for the San Marcos Electric Utility.

Chapter Seven: Conclusion

Purpose of the research

The first purpose is to establish a practical ideal model for green policies for a local utility. The second purpose is to gauge how closely the energy policies used by the City of San Marcos meets the standards presented in the practical ideal type. The final purpose is to provide recommendations for improving sustainable energy policies in the City of San Marcos. This chapter focuses on those recommendations.

Chapter Summaries

The first chapter introduced the subject and discussed why renewable energy and energy efficiency are important, based on the environment, national defense, and for creating a stable and local source of energy. In addition, the first chapter explains why focusing on the local level is important to driving change. The second chapter provides a historical context of renewable energy and energy efficiency policy at the national level by reviewing how Presidents since the Arab Oil Crisis have dealt with the issue. The second chapter also introduces and defines various policies that have been put in place across the United States for the last 37 years, since the Arab Oil Crisis, when the renewable energy and energy efficiency movements began.

The third chapter establishes an ideal model for a local energy utility, called the Sustainable Energy Utility. Chapter Four places the setting for this research in San Marcos, Texas, and reviews the renewable energy and energy efficiency policies in this city. Chapter Five, the conceptual framework is operationalized within a discussion of the research methodology. Chapter Six presents the results of the case study of the San Marcos Electric Utility. This chapter examines several recommendations based on the

research to improve the policies for the City of San Marcos. Following the recommendations, a brief discussion of the strengths and weaknesses of this study is presented, and suggestions for future research on local electric utilities and renewable energy and energy efficiency follows.

Conclusions

For practical ideal-type research, the research purpose is to gauge "what should be done" to improve an administrative process (Shields & Tajalli 2006, 324). "What should be done" refers to recommendations to improve renewable energy and energy efficiency policies for the City of San Marcos. The model assessment tool for the Sustainable Energy Utility consists of five practical ideal-type components developed from the literature. Those five components are:

1. Central Coordination
2. Comprehensive Programs
3. Flexible Incentives
4. Financial Self-Sufficiency
5. Setting a Standard

A case study of the San Marcos Energy Utility was conducted using the five components of the practical ideal type. The research indicates that San Marcos meets three of the five components of the Sustainable Energy Utility. The two areas that the energy utility is lacking most are plans for financial self-sufficiency, and setting a minimum standard for the future. The utility could improve in the comprehensive programs and central coordination areas. For the most part, the San Marcos Electric Utility "Partially Meets Standards" established by the Sustainable Energy Utility. The areas in which San Marcos meets all standards are (1) sustainable energy services are

coordinated by as few points as possible, through the green team and Go Green San Marcos website; and (2) by not limiting itself to electricity.

Table 7.1 indicates how well the San Marcos Electric Utility measures up to the Sustainable Energy Utility by rating the Utility on each aspect of the SEU.

Table 7.1 – Meeting the Practical Ideal Type of the Sustainable Energy Utility: Does the City of San Marcos Meet the Ideal Standards Established by the Sustainable Energy Utility?

Elements of the Sustainable Energy Utility (SEU)	**Meets All Standards**	**Mostly Meets Standards**	**Partially Meets Standards**	**Does Not Meet Standards**
Central Coordination		**X**		
Sustainable energy services are coordinated by as few points of contact as possible	**X**			
Not limited to electricity	**X**			
Clear policy and planning			**X**	
Comprehensive programs		**X**		
Programs target renewable energy across all fuels, customer classes and sectors			**X**	
Programs target education and outreach			**X**	
Flexible Incentives		**X**		
Financial Self-sufficiency			**X**	
A financing plan ensures long-term self-sufficiency				**X**
Energy services are managed in a way to create energy savings		**X**		
Setting a Standard			**X**	

Recommendations for the San Marcos Electric Utility

After conducting extensive scholarly research, and seeing what other "model cities" have accomplished, there are 23 recommendations that the San Marcos Electric Utility should implement. An outline of the recommendations appears in Table 7.2.

Table 7.2 – Recommendations for the city of San Marcos to meet the ideal standards	
Elements of the Sustainable Energy Utility (SEU)	**Policy and Program Recommendations**
1. Central Coordination	
Sustainable energy services are coordinated by as few points of contact as possible	• Hire a Chief Efficiency and Renewable Energy Officer and staff • Increase content on "Go Green San Marcos" website
Not limited to electricity	• Encourage solar and other efficient water-heating technologies • Focus on efficiency first • Modify municipal lighting
Clear policy and planning	
2. Comprehensive programs	
Programs target renewable energy across all fuels, customer classes and sectors	• Require solar-ready construction • Establish voluntary green markets • Discounted weatherization for homes based on property appraisal • Solar-powered street lights • Target major users
Programs target education and outreach	• Create and develop a contact list of customers in San Marcos interested in "Going Green" • Encourage community outreach • Develop additional lessons for schools • Develop renewable energy and energy efficiency workshops • Build a demonstration house/building • Create partnerships with university • Distribute customer survey • Brand San Marcos as a "green" community
3. Flexible Incentives	• Enact PACE legislation • Establish a local Production Tax Credit
4. Financial Self-sufficiency	
A financing plan ensures long-term self-sufficiency	• Enact tiered electrical rates • Regional purchasing partnerships • Consult other communities – become, and act, as a model city
Energy services are managed in a way to create energy savings	• Continue to push efficiency first
5. Setting a Standard	• Set a goal of 15-20% of energy to be generated from renewable resources and stick with it

Central Coordination Recommendations

1. **Hire a Chief Efficiency Officer and staff**. By hiring a Chief Efficiency Officer and staff, one officer is able to cross jurisdictional lines within the city bureaucracy and enact renewable and energy efficiency policies. This will allow a singular effort on the part of the city, rather than different department heads having differing ideas on how best to enact these types of policies. Additional staff will help pursue additional program goals.
2. **Increase content on "Go Green San Marcos" website**. The initial content on the brand new "Go Green San Marcos" website is excellent. There is always room for more information about whom to contact within San Marcos and the surrounding areas to assist a customer with energy efficient programs like audits, construction, etc. The city government should establish an infrastructure for citizens, and the website is a great tool for citizens to be informed. "Green" businesses could underwrite the website by being featured for certain services. This opens up a new stream of revenue for the city to allow for financial self-sufficiency.
3. **Focus on efficiency first**. By focusing on efficiency first, the city is able to encourage smarter growth of renewable energy. Since solar and wind is less efficient in the short run, and because it cannot be stored, focusing on efficiency allows renewable energy to be used more effectively. By focusing on efficiency, the city is able to tackle a cheaper problem (efficiency) before tackling a more expensive problem (renewable energy).

Comprehensive Programs Recommendations

4. **Require solar-ready construction**. Revise the building code to require "solar ready" specifications, such as orientation and unobstructed solar access for new homes. Initial cost is the primary consumer obstacle to installing rooftop solar, and customized installation constitutes up to half of the cost of these systems.
5. **Establish voluntary green markets**. Overwhelmingly, studies indicate many customers' willingness to pay more for green power. As a result, utilities began offering retail customers green power at a premium in the 1990s. The success of these programs sparked offerings across the country. As a result, the US hosts the world's largest and most active customer-driven green power market. The City of San Marcos should offer customers the opportunity to access renewable energy as well. Currently, renewable energy is essentially forced. Allowing customers the opportunity to make the choice for themselves should generate interest, provided education campaigns are successful.
6. **Discounted weatherization for homes based on property appraisal.** Austin offers free weatherization upgrades on homes if they have a taxable property value less than $150,000. San Marcos should follow suit by offering discounted weatherization upgrades based on income and property value to assist low-income customers.

7. **Solar-powered streetlights.** The technology is available for streetlights to run on solar power during the day. Expanding the program that has solar panels on street signs would result in savings for the city.
8. **Target major users.** Four of the top five energy users in San Marcos are governmental entities. All city facilities have been, or will be, audited for energy use. The top energy user in San Marcos is Texas State University, which uses 19% of all energy in the city, between two accounts. By conducting a thorough energy audit of all university facilities, the City and university will be able to establish where efficiency can occur for the University and City. There is potential for huge energy savings here! This also creates the opportunity for partnership with a major institution within the community. In addition, targeting major users will provide awareness in the community of the issue.
9. **Create partnerships with the university**. Establish partnerships with Texas State University to create educational opportunities, and other possibilities. There is a new engineering school at the University that can provide students opportunities to build and learn about renewable energy and energy efficient technologies. By having a school dedicated to this topic, the possibilities for innovation in the future are broadened because there will be an open laboratory for students to work and create. Also, there are opportunities to establish partnerships with the business school to create energy efficient business plans that can later be enacted in San Marcos or the region. Creating partnerships has the possibility of keeping

some of the best and brightest minds in San Marcos, in San Marcos. There are also opportunities to partner with the design school to incorporate "green" technologies into interior design. By partnering with the communications school, the possibility for students to create "green" advertising and public relations campaigns is an option as well. The City could establish scholarships, contests, or prizes at a minimal cost, and receive dozens of ideas from the young, and vibrant student body at Texas State. This has a joint benefit, as the City and university often publicly state that they are both interested in fostering a mutually beneficial relationship (Narvaiz, 2006). Creating partnerships also assists city staff, who commented about the problem of not having enough "manpower" to enact many of these policies or develop programs. One of the best examples of creating partnerships in this arena is at the University of Texas. That university's association with the local business community and City of Austin, through the Pecan Street Project, is a prime example of what can be done. A September 17, 2009 press release from the City of San Marcos states that "A partnership of City of San Marcos officials, business leaders and graduate students at Texas State University is resulting in efficiency recommendations to improve management of the City's fleet of vehicles" (San Marcos, 2009a). Since then, there has been no documented proof that a partnership between the university and the City, regarding renewable energy or energy efficiency, has existed, despite the City Manager saying "We will continue working with Texas State and

the MBA graduate program to evaluate City operations," City Manager Rick Menchaca said. "In the long run, we will gain improved operations, greater efficiencies and cost savings that will benefit the people of San Marcos" (San Marcos, 2009a). One additional recommendation would be for the Masters of Public Administration program to partner with the City when establishing best practices for the public, rather than the School of Business Administration. In the end, this partnership assists both institutions in developing a "green" image, which helps with another recommendation, branding.

10. **Brand San Marcos as a "green" community**. By branding San Marcos as "green," outside businesses and individuals will associate clean, healthy, and efficient living with the City of San Marcos, and hopefully choose to move there. This is especially important for renewable energy and energy efficiency companies who are looking for an inviting place to build a business headquarters, and potentially employ local citizens in well-paying, intelligent jobs. Austin has been a perfect example, attracting hundreds, if not thousands, of jobs to that city with its "green" image.
11. **Create and develop a contact list of customers in San Marcos interested in "going green".** Capture customer information at outreach events. When distributing free CFL light bulbs, attempt to get an E-mail address so that the city can stay in contact with the person to keep them up-to-date on new energy efficiency and renewable energy programs from the City of San Marcos. By staying in contact with individuals interested

in this topic, the City stands to inform the community better of what programs are available into the future. Outreach should provide multiple opportunities to interact with customers.

12. **Encourage community outreach**. Encourage the community to create groups dedicated to sustainability and energy efficiency. There are already groups for water efficiency and recycling. Assist the community in establishing energy as being as important as those two noteworthy causes. Austin has several groups that have formed energy efficiency groups, and this has turned into a formidable lobbying group on energy efficiency's behalf.
13. **Develop additional lessons for schools**. The children are our future. By creating more lessons and teaching students about the importance of energy efficiency, energy independence, and potential environmental and health risks, they will carry the message for future generations. Partner more with LCRA and the Solar for Schools program.
14. **Develop renewable energy and energy efficiency workshops**. Establishing places and events that customers can go to in order to learn more about energy efficiency will create an awareness in the community of the issue, and provide places where people can learn about everyday fixes to the problem. By providing annual meetings, or quarterly sessions, the community is involved in the decision-making process, which is one of the key democratic elements to the Sustainable Energy Utility.

15. **Build a demonstration house/building**. The City should build a demonstration house designed to showcase consumer interface options, renewable energy features, advanced power architecture for simpler and efficient system integration, and energy management components of a modified energy system. These demonstrations would not only allow for on-site testing and measurement of future technologies, but also serve as a powerful public education and outreach opportunity. This is an additional opportunity to coordinate with local businesses that may be interested in offering energy efficient products to the facility in exchange for getting the word out about products at local stores.
16. **Distribute customer survey**. Learn about the preferences of electric utility customers in regards to renewable energy and energy efficiency. This is a major point for the Sustainable Energy Utility. By getting to know what the community is interested in, policy can be tailored to the people of San Marcos, rather than for City staff guessing what precisely interests citizens.

Flexible Incentives Recommendations

17. **Enact PACE legislation.** Develop rules and a funding plan to implement Texas HB 1937 (PACE), which allows homeowners to avoid the high initial capital costs of renewable energy by attaching the cost of solar installation and other efficiency upgrades to the property, rather than the customer, through property tax bills.

18. **Establish a local production tax credit**. Encourage production of solar energy on big-box businesses that install solar panels on flat surfaces that are not being utilized otherwise.

Financial Self-Sufficiency Recommendations

19. **Enact tiered electrical rates.** Similar to efforts in water conservation, a tiered electrical rate encourages energy conservation. Users that exceed a certain amount of kWh will have the amount above charged at a higher rate. This is an example of a disincentive.
20. **Regional purchasing partnerships**. Partner with surrounding communities. The Central Texas region (Austin, San Antonio, New Braunfels, Fredericksburg, etc.) has millions of public power customers. That size translates into significant cost savings if distributed generation and other utility infrastructure improvements are coordinated.
21. **Consult other communities. Become, and act, as a model city.** Once establishing San Marcos as a "green" model city, consult other cities of similar size that are interested in moving in the same direction. This is a service that other communities should be willing to pay for if they are serious about becoming green. If San Marcos establishes itself as a model small-to-midsized community, other cities with similar demographics should follow suit, creating a snowball effect within the region.
22. **Continue to push efficiency first.** Efficiency should be the first step in creating the ideal energy utility for the 21st century. By continuing to push efficiency first, the utility turns into an energy co-manager with the

customer, instead of an energy supplier. Pushing efficiency first also opens the door for the most effective use of site-generated electricity (solar). The less electricity that a building uses, the easier it is for the sun, or other renewable resources, to power it.

Setting a Standard Recommendations

23. **Set a goal of 15-20% of energy to be generated from renewable resources**. The goal of 15% of energy to be produced by renewable energy in San Marcos has not been pursued since being set in 2007, according to City staff. Work to meet a goal of 15-20% by 2015-2020. By setting a goal, the City can better pin point where efficiency savings can occur and where to allocate resources. According to the scholarly literature, the Renewable Portfolio Standard has been among the biggest successes in establishing an open market for renewable energy, especially in Texas (Holt & Wiser, 2007). It makes sense, therefore, for municipalities to follow the lead of the states in this remarkably successful policy, especially in Texas, where renewable energy is plentiful, if harnessed properly.

Ease of Implementation

As seen in Table 7.3, some of the recommendations made are easier to implement than others. Generally, the easiest to implement are the ones that involve outreach and educational efforts (Ex. Developing additional lessons, increase content online). For the most part, these policies could be implemented very quickly and easily. The outreach recommendations could be done by current staff, without many additional labor hours expended. There are three recommendations in the "easiest to implement" category that are not outreach-related. Those policies are "Set a goal of 15-20% of energy to be generated from renewable resources," "Target major users," and "Continue to push energy efficiency first."

Table 7.3 - Ease of Implementation of Recommendations

Easiest to implement	• Continue to push efficiency first • Create and develop a contact list of customers in San Marcos interested in going "green". • Develop additional lessons for schools • Develop renewable energy and energy efficiency workshops • Distribute customer survey • Encourage community outreach • Increase content on "Go Green San Marcos" website • Set a goal of 15-20% of energy to be generated from renewable resources • Target major users
Medium amount of difficulty in implementing	• Brand San Marcos as a "green" community • Create partnerships with University • Establish voluntary green markets • Hire a Chief Efficiency and Renewable Energy Officer and staff • Solar-powered street lights • Modify municipal lighting
Most difficult to implement	• Build a demonstration house/building • Consult other communities - become, and act, as a model city • Discount weatherization for homes based on property appraisals • Enact tiered electrical rates • Enact PACE Legislation • Establish a local Production Tax Credit • Regional purchasing partnerships • Require solar-ready construction

The "medium amount of difficulty in implementing" category is slightly more difficult than the "easiest to implement" category because these will typically take more

money and time to implement. There has already been discussion of hiring a Chief Efficiency and Renewable Energy Officer; it is just a matter of pulling the trigger on this decision. Hiring staff, however, can be difficult as there is typically a long process of interviewing candidates and establishing funding to consider. Creating partnerships with the University is one of the most important priorities in this category because there are many areas for partnerships to occur. According to speeches by the Mayor, increased partnerships between the City and the University are a major priority for citizens. Protecting natural resources is the most important priority for citizens.

The recommendations in the "most difficult to implement" category are typically more expensive and will require extensive debate because these recommendations have the most potential to directly cost customers additionally, as well as incorporating other political entities across the region.

Table 7.4 - Prioritizing the Urgency of Implementing Recommended Policies

Most Urgent	• Establish a voluntary green market • Target major users • Distribute customer survey • Create partnerships with University • Continue to push efficiency first • Set a goal of 15-20% of energy to be generated from renewable resources • Encourage community outreach
Medium Urgency	• Regional purchasing partnerships • Hire a Chief Efficiency Officer and staff • Establish a local Production Tax Credit • Enact PACE Legislation • Discounted weatherization for homes based on property appraisals • Enact tiered electrical rates • Consult other communities - become, and act, as a model city • Brand San Marcos as a "Green" community
Least Urgent	• Create and develop a contact list of customers in San Marcos interested in "Going Green" • Increase content on "Go Green San Marcos" website • Require solar-ready construction • Develop additional lessons for schools • Develop renewable energy and energy efficiency workshops • Build a demonstration house/building • Modify municipal lighting

Prioritizing Recommendations

The recommendations made have also been prioritized, as seen in Table 7.4**.** The most urgent range from the very easy (encourage community outreach; setting a goal) to being moderately difficult to

implement (hire a Chief Efficiency Officer; creating partnership with the University). The most urgent policies listed should have the most impact on saving energy for customers and informing the community of issues and programs available.

Strengths and Weaknesses of the Research

One area where this research could be improved is more extensive statistical analysis could be done, however, the practical ideal type of research does not necessarily call for this. Strengths of this research include providing a strong historical background to the issue of renewable energy over the last 30 years. This research also established what the current policies for the San Marcos Electric Utility are and how those policies can be improved to allow San Marcos to have a Sustainable Energy Utility, as outlined by the research.

Suggestions for Future Research

The most obvious area for additional research would be to develop a citizen survey so the electric utility will know exactly where to focus priorities. Also, developing a citizen survey is something that was mentioned several times as something that needed to be done but wasn't.

Other future research on electric utilities, renewable energy and energy efficiency could focus on cost-benefit analysis of specific policies in a certain municipality. This study would have benefited from the presence a cost-benefit analysis of certain policies by establishing the actual costs associated with some of these recommendations.

Follow-up studies could show how the City of San Marcos has progressed with its energy utility policies and how it has or has not followed through with the recommendations presented. Additional considerations are to focus on interactions

between local, county, state, and federal governments when creating energy policy and examining the various legislation that has been enacted at each level to encourage, or discourage, the use of renewable energy and energy efficiency.

Conclusion

The San Marcos Electric Utility has made great strides in a short amount of time in regards to becoming a green leader. The city has begun to think globally by acting locally. With a little more work, the San Marcos Electric Utility will fit the mold of the modified Sustainable Electric Utility that has been described in this research. There is room, however, for growth in San Marcos. The city is well on its way to becoming a model for small-to-medium-sized cities in Texas, and beyond. For years, citizens of San Marcos have expressed their desire to keep the city and its natural resources clean and protected, and the electric utility can take advantage of the green attitude in this community by moving energy policy in the direction recommended here.

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APPENDIX

Appendix A – Human Subject Exemption

Exemption Request EXP2009Y8673 - Approval

Exemption Rec

OSP IRB [ospirb@txstate.edu]

Sent: Tuesday, January 05, 2010 10:34 AM

To: M
Harkins, James S

DO NOT REPLY TO THIS MESSAGE. This email message is generated by the IRB online application program.

Based on the information in IRB Exemption Request EXP2009Y8673 which you submitted on 12/27/09 13:47:33, your project is exempt from full or expedited review by the Texas State Institutional Review Board.

If you have questions, please submit an IRB Inquiry form:

http://www.txstate.edu/research/irb/irb_inquiry.html

Comments:
No comments.

==========

Institutional Review Board
Office of Research Compliance
Texas State University-San Marcos
(ph) 512/245-2314 / (fax) 512/245-3847 / ospirb@txstate.edu / JCK 489
601 University Drive, San Marcos, TX 78666

Appendix B – Open Records Request for Information

A	B	C	D	E	F	G	H
Open Records Request Report							
Prepared for:	**James Harkins**			**Reporting Period:**		**Jan 2005 to Dec 2009**	
Prepared by:	**Billing Quality Assurance Specialist**						
Comm/Residential							
		Residential		Total % Energy	Total Total kWh	Commercial	
	Total kWh	% Energy	Total kWh			% Energy	
	1,621,261,367	36%	925,711,404	100%	2,546,972,771	64%	
Top 20							
		Commercial		Residential		Total % Energy	Total Total kWh
Cust No	Name	% Energy	Total kWh	% Energy	Total kWh		
###	TEXAS STATE UNIV - COGEN	17.04%	434,066,891	0.00%	24,677	17.04%	434,091,568
###	H E BUTT GROCERY INC	4.28%	108,945,018	0.00%		4.28%	108,945,018
###	CITY OF SAN MARCOS	2.16%	55,085,971	0.00%		2.16%	55,085,971
###	SMCISD	1.98%	50,511,602	0.00%		1.98%	50,511,602
###	TEXAS STATE UNIVERSTIY	1.79%	45,507,997	0.02%	561,507	1.81%	46,069,504
###	CENTRAL TEXAS MEDICAL CENTER	1.53%	39,021,127	0.00%		1.53%	39,021,127
###	WALMART-SUPER STORE	1.46%	37,256,287	0.00%		1.46%	37,256,287
###	HAYS COUNTY	0.96%	24,398,632	0.00%		0.96%	24,398,632
###	BUTLER MANUFACTURING	0.82%	21,004,782	0.00%		0.82%	21,004,782

###	LOWE'S HIW, INC.	0.72%	18,447,129	0.00%		0.72%	18,447,129
###	BOBCAT VILLAGE APTS - TSU	0.07%	1,837,973	0.64%	16,382,029	0.72%	18,220,002
###	OMI W/W TREATMENT PLANT	0.65%	16,528,498	0.00%		0.65%	16,528,498
###	SAC-N-PAC STORES INC.	0.52%	13,333,634	0.00%		0.52%	13,333,634
###	WAL-MART STORES TEXAS	0.45%	11,504,984	0.00%		0.45%	11,504,984
###	GRANDE COMMUNICATIONS	0.45%	11,371,248	0.00%		0.45%	11,371,248
###	SANCTUARY LOFTS	0.38%	9,769,960	0.00%		0.38%	9,769,960
###	TARGET	0.33%	8,472,960	0.00%		0.33%	8,472,960
###	FLEX-TECH HOSE & TUBING, INC.	0.32%	8,083,008	0.00%		0.32%	8,083,008
###	EMBASSY SUITES SAN MARCOS	0.32%	8,041,433	0.00%		0.32%	8,041,433
###	CENTURY TELEPHONE	0.30%	7,701,520	0.00%		0.30%	7,701,520
Public Sector CustomersCustomer numbers							
		Commercial		Residential		Total % Energy	Total Total kWh
Cust No	Name	% Energy	Total kWh	% Energy	Total kWh		
###	CITY OF SAN MARCOS	2.16%	55,085,971	0.00%		2.16%	55,085,971
###	HAYS COUNTY ABSTRACT CO	0.01%	322,514	0.00%	65,502	0.02%	388,016
###	HAYS COUNTY	0.96%	24,398,632	0.00%		0.96%	24,398,632
###	HAYS CO ANIMAL HOSPITAL	0.02%	541,974	0.00%		0.02%	541,974
###	HAYS COUNTY ESD #3	0.00%	126,075	0.00%		0.00%	126,075
###	HAYS COUNTY EMS	0.01%	318,531	0.00%		0.01%	318,531
###	SMCISD	1.98%	50,511,602	0.00%		1.98%	50,511,602
###	TXDOT	0.00%	13,817	0.00%		0.00%	13,817

###	COMANCHE HILL APTS - TSU	0.02%	423,482	0.15%	3,753,862	0.16%	4,177,344
###	TEXAS STATE UNIV - COGEN	17.04%	434,066,891	0.00%	24,677	17.04%	434,091,568
###	BOBCAT VILLAGE APTS - TSU	0.07%	1,837,973	0.64%	16,382,029	0.72%	18,220,002
###	CLEAR SPRINGS APTS - TSU	0.02%	427,866	0.10%	2,517,606	0.12%	2,945,472
###	TEXAS STATE UNIVERSITY	1.79%	45,507,997	0.02%	561,507	1.81%	46,069,504
###	CAMPUS COLONY APTS - TSU	0.00%	24,831	0.03%	891,098	0.04%	915,929
###	UNITED STATES POSTAL SERVICE	0.08%	2,069,920	0.00%		0.08%	2,069,920
###	U S FISH AND WILDLIFE SERVICE	0.16%	4,054,969	0.00%		0.16%	4,054,969

Appendix C – Green Policy Framework for San Marcos

San Marcos Green Policy Framework

Operations and Maintenance

Program	Description	Status	If current, possible enhancements	Issues
City Fleet Fuel Reduction Program	Reduce fuel consumption 3%. Implemented proactive procedures to enhance fuel efficiency, such as fleet utilization and acquisition review, operator awareness training, ongoing fuel conservation measures, fuel management tracking system, progressive preventative maintenance, long drain program, synthetic products, and alternative fuel systems	Reduced fuel consumption ___% in FY 06-07 compared to FY 05-06. 98% of fleet is on synthetics		
Low VOC roadway striping	uses roadway striping materials with fewer VOCs, have less impact on ambient air quality.			
Fleet usage efficiency evaluations and progressive maintenance	Reviews use of fleet vehicles and continually evaluates them for efficiency. Implements preventative maintenance to avoid increased tailpipe emissions and prolong vehicle life			
Direct Deposit	Employee payroll can be deposited directly into their bank accounts.	391 currently participate		
E-Gov & Multiple Locations	Online porgrams include library book renewals, library hold requests, library online catalog, citizen request system, parks & rec program registration, utility billing & online payments, paperless agenda. Two city-owned utility bill payment centers are available, along with HEB bill payment locations.		Begin electronic submission of other administrative projects, i.e. plats, zoning changes, building permits, WPP, etc. to reduce paper use and not force people to visit city hall if it is not necessary. Digitize as many records as possible so buildings more productive and not used for storage as much.	More expensive to implement on additional boards. Could look at putting entire packets on Internet. Cost to scan everything.
Idling of Heavy Motor Vehicles	In 2006, Council approved an ordiannce prohibiting vehicles with a gross weight of 14,000+ pounds from idling.	Any citations?		
Green Power	Purchase maximum amount of Renewable power available from LCRA, 6%.	Long term contract negotiations are in progress.	Work with LCRA to allow additional purchase of renewable power.	Green power is priced higher than conventional generation
Water Audit/Leak Detection & Repair	Monthly & annual pre-screen water audits to determine and control unaccounted water use. System wide leak detection program.	Unaccounted water use below 15%, the goal established by AWWA.	Become more aggressive, attempting to reduce unaccounted water to 10% or even 5%.	

Universal metering	meter maintenance program allows the City to accurately track water consumption.			
Occupancy sensors for lights in all city facilities	Replace conventional switch with motion sensor so lights shut off automatically when room is unoccupied.	new		
Paperless agenda	Electronic agenda packet for City Council rather than 30+ paper packets with 250+ pages.	Resource conservation; approx. 6,800 sheets of paper saved each Council meeting	Expand to all boards and commissions, or at least those with heavy paper loads.	
Employee Flex hours	Employees could work 4/10hr. Days rather than 5/8, reducing a day of commuting each week. Could also shift hours early or later and keep the 8 hr., reducing emission peaks at 8 & 5 and possibly allowing extended hours	new		Rush hour congestion really not a huge issue in San Marcos, more related to student release times at university.
Smart Water/Electric Meters	Smart Meters allow near real-time monitoring of energy/water consumption to assist with detection of leaks and hi consumption. They also allow customers to monitor their electric/water usage daily or hourly so they may make informed decision about usage patterns.	Active		
Solar-powered grease control chemical feed sites.	Remote grease control chemical feed stations are equipped with solar panels for power.	5 stations currently set up for using solar power.		
Capital				
Program	**Description**	**Status**	**If current, possible enhancements**	**Issues**
Purchasing alternative fuel vehicles	including more alternative fuel vehicles in city fleet.	___ E-85 compatible vehicles; ___ gas/electric hybrids; ___ propane compatible vehicles	Could establish policy that requires alternative fuel vehicles, requiring a burden of proof that an alternative fuel vehicle is inadequate for the vehicle's planned use.	
Acquiring Green/Open Space	Acquiring Green/Open Space for habitat conservation, passive recreation, etc.	City has 867 acres of parkland classified as green space or open space.	_____ recommends _____ acres of open space per 1,000 population. Acquire _____ additional acres by the year _____.	
Constructing trails in city parks	with Greenbelt Alliance, restoring and constructing new trails throughout newly acquired city land.	___ feet of trails installed over last __years		
Sidewalk retrofit program	Installing sidewalks in existing neighborhoods and replacing those in disrepair. Promotes pedestrian transportation.	___ feet of new sidewalks installed over last ___ years; ___ feet replaced over last ___ years	Additional funding to allow more feet to be constructed per year.	
Bicycle facility retrofit program	Installing bike lanes, paths, or identifying bike routes on existing streets	new; currently being done with road reconstruction/ widening	Provide signage on all ROW where they are ready to be designated bike routes, stripe those roads designated for bike lanes if pavement width sufficient, etc.	

Green City Buildings	City facility retrofits to increase water/energy efficiency. May include HVAC retrofits, solar installations, rainwater collection, green roofs, window awnings, etc.	Active	Require new city facilities to meet green buidling standards such as LEED.	City would serve as an example and also provide an opportunity for community education. Taking action makes requirements for private sector more palatable.
Biofuels/Propane Fuel Station		In 2004, the City and University dedicated a propane fuel station at Texas State to provide alternative fueling for fleet vehicles.	Develop second propane fuel station at a city facility. Consider incentive to existing private fuel stations to provide a propane pump, biodiesel, E-85.	
Tree Planting Program	Plant trees throughout the city to reduce urban heat island effect. Trees also function as carbon sinks.	new		Could be tackled a number of ways: City planting in ROWs along sidewalks, providing trees to homeowners, providing trees to existing commercial businesses, etc.
Ultra-light rail/Rapid bus	to complement anticipated heavy commuter rail. Could be a street car system. Connect commuter station to key destinations: outlet, university, pockets of high density residential/mixed use. Similar to conventional light rail (DART), but with smaller, more maneuverable cars and using energy storage rather than continuous electrification (cables or 3rd rail). Rapid bus is essentially a rubber-wheeled train--it has dedicated ways like a train, but without rails.	currently use CARTs, but in 2010 funding system changes as San Marcos becomes a small urban area	At a minimum, could be good for connecting station with campus. Could be extended up LBJ N. of campus, or S. toward concentrations of housing and the outlet mall. Rapid bus might be more practical outside of the downtown area.	Fixed stations good for economic development (see TOD). ULRT costs similar to bus service, but considered better long-term investment. Less expensive than true light rail. Size better for San Marcos. Easily expanded by adding cars or increasing route frequency. High up-front cost. Might partner with university.

Bus service	provide mass transit so people don't have to use personal automobiles.	using CARTS. but in 2010 funding system changes as San Marcos becomes a small urban area	CARTS is not particularly effective at marketing and promoting ridership. City could reevaluate all stops and routes to ensure the most used routes are efficient. Also work with university.	Station flexibility. Students used to buses. High up-front cost unless partnering with other entities, like the university. Most are diesel, but could use biodiesel to help out. Buses tend to have a more negative connotation than rail.
Establish construction materials recycling center	to complement a green building initiative. Scrap could be recycled to eventually become MDF, particle board, etc.	new		Largely unknown. Would require capital start-up. Perhaps supplement Green Guy to begin providing service? Would allow a restriction on construction dumpsters
Investing in Downtown Redevelopment (county buildings, environmental problems, etc.)	Work with county to redevelop sites downtown when they leave for new campus. Also cleanup environmental problems at sites downtown to make them available for redevelopment	new		Environmental clean-up can be expensive. Need better relationship with county. Perhaps purchase buildings from them?
Water Quality and Detention Program	Retrofiting existing portions of city with water quality and detention for stormwater runoff, such as downtown.	new. Has been discussed in the past.		Possible opportunity to work with University and their ponds. Might look at special districts or perhaps an impact fee to fund. Can be expensive. Should be carefully designed so as not to be eyesores. Can function as wildlife habitats/artificial wetlands

Energy Efficient Street Lighting	Change out of conventional 100, 150, 175, 250 or 400 watt mecury vapor or high pressure sodium fixtures to a more efficent fixture.	Pilot project in place and analysis is continuing.		More efficient lighting could result in a decrease in light output. Public safety will be a concern.
LED Traffic Signals	Replace conventional traffic lights with more efficient LED fixtures.	Complete		

Development Codes & Incentives

Program	Description	Status	If current, possible enhancements	Issues
Open Burning Prohibition	no person shall burn material in the city limits. Eliminated grills from hundreds of apartments in the City	In place, unknown whether citations issued frequently		
Water Conservation Ordinances	Prohibits water waste, use of sprinklers during daytime, charity car washes, non-recirculating water features and use of open hoses. Requires new irrigation systems and commercial construction to meet water efficiency standards. Encourages xeriscape, limited turf areas and proper preparation of landscape areas.	Active		
Bicycle & pedestrian facilities required when developing for any new streets	Requirement of LDC	in place	possibly require bicycle parking facilities at destinations?	
Adopt USGBC's LEED standards	Specialized green standards for new homes, new construction, institutions, neighborhoods. Could be done as a requirement or through incentives/rebates.	new	The adoption of the 2009 International Energy Code will provide an increase energy saving in all structures of 15 to 18% and meet new DOE requirements and the increase to builders is approx. $500	LEED is by far the strictest standard. More expensive for homebuilders, etc. than other similar programs. Not sure if the results are all that different.
Adopt NAHB/ICC Green Building Standards	Green standards for new homes, multifamily and neighborhoods. Will be a national standard for inclusion in International Codes as an option. Could be done as a requirement or through incentives/rebates.	new	Adopt 2009 IECC code which will lower energy use in homes and commercial buildings by 15 to 18 % from the amount of energy used in structures built in 2000. This code meets DOE requirements for the USA	Standard from a group more likely to be accepted by builders/developers. Will be a national standard, so more familiarity in long run. Appears to lack standards for commercial and

				institutional uses.
LDC lighting standards/Dark Sky Ordinance	Addresses light pollution. Requires full cut-off fixtures and more stringent maximum light levels on properties.	Have some standards in LDC, but still allow blister lights, and non-cut-off lights.	Make requirements more stringent and consistent with a Dark Sky Ordinance. See Tucson, Flagstaff as larger examples. If we adopt the 2009 IECC then we will be lowering outside lighting requirements.	Popular in cities trying to maintain a small-town character by keeping stars visible. Created originally for cities near observatories. Light pollution is a less known area of green building. Might get resistance from commercial developers. Full cut-off fixtures push all lighting downward, so more efficient.
Strengthen tree preservation requirements	Encourage tree preservation, rather than just focusing on replacement.	current standards provide guidance for replacement, but are somewhat lacking in providing an incentive/requirement to keep smaller existing trees on-site.	Could be done as a new requirement, i.e. "trees over 12" in caliper shall be preserved", or as an incentive, i.e. "if ___ trees over 12" are preserved, ___ amount of required landscaping may be omitted".	Individual homesites not as big of an issue when it comes to clearcutting--more common with neighborhood wide tract and commercial properties.
Business attraction	Work to attract higher paying jobs / increase San Marcos worker skills so they don't have to commute to Austin	new		Exactly what jobs should we target? How do we better train citizens for these jobs?
Mixed Uses	Consider changes to the LDC to promote mixed uses. Could consider form-based, rather than use-based zoning.	existing MU district is not very effective or popular. Often required PUD overlay to achieve intent of district	Create an additional 1-2 more intense mixed use districts. Incentives for mixed use, such as reduced on-site parking, density bonus, increased height, etc. A stronger move would be to adopt form-based zoning, which regulates the impact of the use more than where it can necessarily go.	Form-based zoning largely foreign in Texas (learning curve), but developers may like its flexibility. Adding new MU districts would be less controversial, but add to an already large

				number of districts
Alternative Infill Development standards	similar to mixed uses above. LDC is designed mostly for greenfield, suburban-style development. Infill redevelopment difficult as a result. Alternative parking standards, zoning, lot coverage, etc.	new	Start an infill stimulus program that gives tax breaks for new homes on infill lots. Provide start up loans or grants.	Few major issues, but will require caution in writing new standards to avoid unintended consequences (massive parking problems, incompatible design/uses, etc.)
Transit Oriented Development	near transit stations, allow much higher densities and mixed uses, less focus on car and more on pedestrian.	new. At this point would require a PUD, which could be a problem as infill sites may not be at least two acres.	Establish TOD, as base zoning or as overlay.	Would maximize economic potential near transit, density more efficient to serve. However, some might be concerned about how this might impact the character of San Marcos as well as infrastructure.
Conservation Development	Cluster development to the next level. At least 50% of the property set aside in conservation easement. Urban density where houses are developed, but surrounded by large open spaces.	Cluster option available in LDC, but not actively used.	Could be done as a requirement over the recharge zone, as a condition to utility extension, etc. Could also be done as an incentive with a density bonus.	If designed correctly, developer saves on infrastructure, so city saves on infrastructure maintenance. Houses backing greenspace sold at a premium. More thought (expense) goes into design.

Historic Preservation Tax Incentive	Provide tax incentive to restore houses in historic district. For example, not taxed on value increased as a result of restoration for five years	new. Has been proposed previously.		Some revenue lost initially, but made up later from more valuable restored houses. Several nearby cities have done studies to show this incentive to be revenue positive. Restoring existing structures is, by its nature, green building
Green Valley Economic Development Policy	City attempts to become the Silicon Valley of Green research and development, and those companies. Renewable energy product manufacturers, etc.	new.		Have to figure out how to target these industries. What will attract them here? Have to watch out for the bad start-ups that are beginning to show up (reminds us of internet start-ups in mid 90s)
Alternative Urban Street Design	Create more urban-style street sections for use in older parts of the city. Helps facilitate infill.	new	existing designs are suburban-style. Wide lanes, shoulders, wide grass strips, etc. not always compatible with older parts of city.	
Citizen Programs				
Program	**Description**	**Status**	**If current, possible enhancements**	**Issues**
Energy Audits	Free energy audits for residential and commercial electric customers. Includes evaluation of HVAC systems, duct systems, insulation, weatherization, etc.	Active	Any additional equipment needs to improve on audits?	
Adopt-a-Park	Community groups can adopt a portion of a park to help maintain, do light planting and post signs.	in place. ___ acres of park are participating through ___ organizations		
River Cleanups	twice a year city sponsors a volunteer program to clean up the SM river.	___ pounds removed in 2007		
Organic vegetable donation program	Nature Center grows and donates organic vegetables to the Women's Shelter. Individuals can use a small plot at the Nature Center provided a portion is donated	Pounds donated?		
Bank & Vegetation Restoration Program	with Lion's Club, restoring eroded banks and remove invasive material so they can be replaced with native vegetation.	unknown		

Schoolyard Habitiat consultation for local school districts	Nature Center provides consultation to local schools on how to locate funds and design and install a schoolyard habitat	___ schools have schoolyard habitats in place	Look into partnering with Texas Wildscapes program?	
Environmental Education Programs and Services	Nature Center provides low cost environmental education programs and services to interested organizations and the community on topics like xeriscaping, sustainable landscape design, native plant indentification, etc.	___ programs, attended by ___ people in 2007	Ways we can get the word out more? Survey to find out what topics might interest people?	
Household Hazardous Waste Collection	4 collection events per year at the permanent HHW collection site and diversion of wastes through education and waste exchange components	amount collected in 2007?	Integrate with neighborhood cleanups or perhaps Bobcat Build to allow more convenient collection	
Recycling (Solid Waste)	curbside collection of recycling once a week; drop off center for multi-family and commercial. Encouraged through publications, mail-outs, youth educational programs.	Curbside recycling diverted 998,020 pounds from the landfill. Green Guy drop off diverted 3,025,180 pounds of material, 7,525 gallons of oil, and 2,400 oil filters	Begin curbside recycling for multi-family--a blue dumpster or something.	Might require modifying solid waste contract. Problems locating an additional dumptster.
Conservation Staff	Full-time Conservation Coordinator and Conservation Tech implement energy and water conservation programs such as audits, public/school education, rebates/incentives, etc.	Active		
Water Conservation Pricing	Increasing block rate structure for water. Wastewater billed based on winter averages.	Active	Consider higher seasonal water rates and steeper tiers to target high water users	
Water/Energy Conservation Education	Public and school education programs to provide information on water/energy conservation. Inlcudes community events, school/public presentations, articles/ads, etc.	Active		
Water Audits	Includes evaluation of leaks, flow rates, flush volumes and other water uses. Customer receives report detailing specific water conservation strategies and their expected savings.	Active		
Plumbing Retrofit Program	Free low-flow showerheads and faucet aerators provided to San Marcos citizens through water audits community events.	Active		

Wash-Smart Rebate	Encourages use of efficient clothes washers. Rebate of up to $100 for residential water customers that purchase a qualifying efficient clothes washer.	Active	Expand to multi-family and commercial and instutional water customers.	
Flush-Smart Rebate Program/Free HET Program	Encourages single and multi-family residential water customers to replace existing high-volume toilets with new high-efficiency models through rebates and free distribution events.	Active		
ICI Conservation Programs	Programs to enourage water conservation by Industrial/Commercial/Institutional customers. Programs have included Water Efficiency Achievement Awards and Pre-Rinse Spray Valve Exchange Program.	Inactive		
Reuse of treated effluent	Treated wastewater is provided to industrial users to offset potable water use. Reuse water is provided for the American National Power facility to cool their power-producing turbines. The City is also contracted to provide reclaim water to TXI/Hunter Industries.	Active	Expand service to other ICI customers. Run parallel lines in new neighborhoods to use effluent for landscaping.	Can be expensive.
Rain Barrel Rebate Program	Rebate offered to single-family residential water customers for purchase of rain barrels or tanks.	Active		
On-site renewable energy program	Provide rebates for people to install on-site renewable energy facilities, such as solar panels, solar water heaters, wind turbines, etc.	new		
CFL Distribution Program	CFLs provided free of charge to San Marcos citizens through energy audits and community events.	Active		

New Home Green Brochure	A brochure sent out to builders to accompany every new house. Include household recycling opportunities, purchasing renewable energy, benefits of CFL/LED bulbs, habits to optimize water & energy use, local transportation options, maintenance checklist, proper handling & disposal of hazardous materials, information on organic pesticides, fertilizers, cleaners.	new		
General Green Brochure	Information on greening your house, beyond just water & energy. Could include information about 3rd party verifiers like Energy Star, Green Seal, Green Label, etc.	new		
Efficient Irrigation Rebate Program	Encourages use of efficient irrigation equipment and techniques. Previous programs inlcude Rain Sensor Rebate Program.	Inactive	Rebates for weather-based irrigation controllers.	
Commercial High-Efficiency Toilet (HET) Rebate Program	Encourages hotels/motels to replace high-volume toilets with efficient models. Funded 50/50 through Edwards Aquifer Authority (EAA) Conservation Grant Program.	Propsed 2010		
Energy Efficient Heating/AC Rebate Program	Encourages purchase of efficient heating/AC products such as HVAC systems, attic insulation, radiant barrier, duct sealing, etc.	Proposed 2010		
Energy Efficient Appliance Replacement Program	Encourages purchase of energy efficient home appliances including refrigerators, dishwashers, clothes washers, water heaters and room AC. Funded through federal EECBG Program.	Proposed 2010		
Energy Efficient Appliance Rebate Program	Funds full replacement cost of old inefficient appliances with new EnergyStar models for low-income customers. Funded through federal EECBG Program.	Proposed 2010		

Energy Efficiency Education	SMEU presents to civic groups and local school students. Also have brochures to educate, including seasonal brochures targeting specific populations. School education programs for kids are more enhanced, including Louise the Lighting Bug, Power House, and Solar for Schools	in place	Building Inspections is currently training Building contractors on new 2009 IECC code.	