PERCEIVED SOCIOECONOMIC IMPACTS OF WIND ENERGY IN WEST TEXAS

A Thesis

by

NICOLE D. PERSONS

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

May 2010

Major Subject: Geography

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Approved by:

Chair of Committee,	Christian Brannstrom
Committee Members,	Wendy Jepson
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ABSTRACT

Perceived Socioeconomic Impacts of Wind Energy in West Texas. (May 2010)

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Chair of Advisory Committee: Dr. Christian Brannstrom

Wind power is a fast growing alternative energy source. Since 2000, wind energy capacity has increased 24 percent per year with Texas leading the U.S. in installed wind turbine capacity. Most socioeconomic research in wind energy has focused on understanding local opposition, especially aesthetic impacts on the surrounding landscape. Recent studies have addressed reasons for social acceptance of wind farms, suggesting that positions both favorable and unfavorable to wind power are subtle and intricate, rather than monolithic, and rooted in place-specific issues. In the case of Texas, scholars have reported that the minimal permitting process is the dominant variable that explains the rapid rise of wind power in the state's western region. However, scholars have yet to study the place-based local or regional factors that structure and inform acceptance of wind energy by key actors who negotiate with wind-energy firms. This thesis presents empirically determined, statistically significant social perspectives regarding socioeconomic wind energy impacts.

I determined social perspectives by using Q-Method in Nolan County, Texas, a major site of wind-power development. Q-Method allows researchers to generalize about social perspectives, but not about how widely or deeply populations ascribe to

social perspectives. Q-Method combines qualitative and quantitative techniques beginning with semi-structured interviews to collect statements on wind power, followed by participant ranking of statements on a “most disagree” to “most agree” scale. Key actors surveyed included landowners with wind turbines, elected and civil-service government officials, and prominent local business and community leaders. My findings identified five significant clusters of opinion, two of which shared strong support for wind energy on the basis of perceived positive economic impacts. Three clusters of opinion were less favorable to wind energy; these arguments were based upon opposition to tax abatements, support of tax abatements, and concerns over negative impacts to the community. Consensus emerged over the idea that positive views toward wind-energy development were unrelated to broader commitments to renewable energy. The support of key actors in favor of wind energy is contingent upon direct financial benefits from wind-energy royalties, political views on taxes, notions of landscape aesthetics, and sense of community.

DEDICATION

To my friends and family

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I would like to thank my committee chair, Dr. Brannstrom, and my committee members, Dr. Jepson, and Dr. Brody, for their guidance and support throughout the course of this research.

Thanks also go to my friends, colleagues, department faculty, and staff for making my time at Texas A&M University a great experience. I would like to thank Elizabeth Summers for her help with transcribing interviews. I also want to extend my gratitude to NextEra Energy Resources, which provided funding but had no influence on this research, and to all the participants who were willing to partake in the study.

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1. INTRODUCTION

For centuries ranchers and farmers have cursed the wind for drying out fields and killing crops, but now many have been brought into a new era of production-wind power. Land-based wind energy farms have increased across the globe, and most recently in countries like China and the U.S. In the U.S., Texas has become the leader in wind energy capacity, with many wind farms on ranch and farm land. Wind energy farms have created some social and economic impacts; yet, most socioeconomic research in wind energy has focused on understanding local opposition, especially aesthetic impacts on the surrounding landscape. Recent studies have addressed reasons for social acceptance of wind farms, suggesting that positions both favorable and unfavorable to wind power are subtle and intricate, rather than monolithic, and rooted in place-specific issues. In the case of Texas, scholars have reported that the minimal permitting process is the dominant variable that explains the rapid rise of wind power in the state's western region. However, scholars have not yet studied the place-based local or regional factors that structure and inform acceptance of wind energy by key actors who negotiate with wind-energy firms. This thesis presents empirically determined, statistically significant social perspectives regarding socioeconomic wind energy impacts.

In this thesis I describe five social perspectives, determined by using Q-Method, regarding wind-power development in Nolan County, Texas. Key actors tested statements that had been made by stakeholders in wind-power development. Key actors who responded to the survey included landowners with wind turbines, elected and civil-

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This thesis follows the style of *Annals of the Association of American Geographers*.

service government officials, and prominent local business and community leaders. I identified five significant clusters of opinion, two of which shared strong support for wind energy on the basis of perceived positive economic impacts. Three clusters of opinion were less favorable to wind energy; these arguments were based upon opposition to tax abatements, support of tax abatements, and concerns over negative socio-economic impacts of wind energy on the local community. Consensus emerged over the idea that positive views toward wind-energy development were unrelated to broader commitments to renewable energy. The support of key actors in favor of wind energy is contingent upon direct financial benefits from wind-energy royalties, political views on taxes, notions of landscape aesthetics, and sense of community.

This thesis is organized as follows. Section 2 provides a review of the relevant literature, with special concern for gaps in knowledge regarding socio-economic impacts of wind-power development. Section 3 describes the method used for this study. Section 4 provides a description of the five factors or social perspectives revealed in the factor analysis. Section 5 provides a further discussion on important themes found after factor analysis. Section 6 provides final conclusions of the thesis. Materials in the Appendix summarize technical and quantitative aspects of the study.

2. BACKGROUND AND SIGNIFICANCE

Although fossil fuels dominate as the main form of energy in the 21st century, a part of every aspect of society, social and environmental costs could jeopardize our way of life (Solomon et al. 2003, 302). As a result, renewable energy sources have begun to be implemented to offset the reliance on fossil fuels. Land-based wind turbines have the potential for supplying a significant portion of electricity demand in the U.S. and beyond (Lu et al. 2009).

Since 2000, wind energy capacity in the U.S. has increased 24 percent per year (Bohn & Lant 2009). In 2009, global wind energy capacity increased 31 percent, bringing the cumulative capacity to 157.9 giga watts (GW). One-third of the additions to global wind energy capacity in 2009 was made in China (GWEC 2010*).* Despite China's rapid growth of new wind energy development, the U.S. continued to be the leader in installed wind energy capacity into 2010. According to the American Wind Energy Association (AWEA), by the end of 2009, the U.S. had a cumulative wind energy capacity of 35,159 megawatts (MW), with 9,922 (MW) wind energy capacity installed in 2009(AWEA 2010b). In 2008, wind energy supplied less than 2 percent of U.S. electricity (Wiser and Bollinger 2009, 7) moving toward a government target for wind energy to provide 20 percent of U.S. electricity by 2030 (Department of Energy 2008). Texas led in newly installed wind turbine capacity with 2,292 (MW), 23 percent of all wind energy capacity installed in 2009 in the U.S. (AWEA 2010b). Texas continues to be the state leader in total installed wind turbine capacity with 9,410 (MW) while Iowa and California are ranked second and third in installed wind energy capacity (Table 1).

Table 1 Top three states in existing wind turbine capacity. (AWEA 2010a).

State	Existing Wind Turbine Capacity (MW)	Wind Turbine Capacity-Under Construction (MW)	Rank
Texas	9,410	302	1
Iowa	3,670	200	2
California	2,794	121	3

The Great Plains has attracted publicity as having the most potential for new wind energy development in the U.S. “America’s Wind Corridor”, from Western Texas to the North Dakota/Canadian border, has been used by T. Boone Pickens, who aims to combine “the world's greatest wind power corridor and enormous reserves of clean natural gas” to “build a bridge to the future — a blueprint to reduce foreign oil dependence by harnessing domestic energy alternatives and buying time for us to develop even greater new technologies and distribution systems” (Pickens Plan 2010).

Within geography, renewable energy sources, which have different spatial characteristics than fossil fuels, have not yet been fully examined (Solomon et al. 2003). According to Solomon and colleagues (2003), geographers have focused on “changing geographies of power generation” and the commercialization of new technologies (307). One energy source which has not been explored as in depth as fossil fuels or nuclear power is wind energy. Scholarly work in geography has not kept pace with the rapid growth of wind energy development over the past decade. Recent geographic scholarship

on wind power in the U.S. has focused on state-level variables to explain the wide state-by-state variability and the rapid rise of wind power (Bohn & Lant 2009). In Europe, scholars have focused on planning and permitting processes, often focusing on local opposition to wind-farm development that are based on concerns over aesthetic changes of the landscape and concerns about global warming and the environment (Aitken 2009; Aiken et al. 2008; Devine-Wright 2007; Ellis et al. 2007; McLaren Loring 2007; Toke et al. 2008; Warren & Birnie 2009).

Perceived socio-economic impacts related to wind power development are poorly known, in part because the issue has been confused by studies using the Not in My BackYard (NIMBY) or Please In My BackYard (PIMBY) concepts. In addition, the study of perceptions regarding wind power has largely focused on aesthetic issues rather than perceived social and economic benefits and drawbacks. Recent work by Ellis and colleagues (2007) on local opposition to wind power indicates that scholars should seek to determine types and forms of positions against and in favor of wind power. This more subtle approach, which is well suited to the method used in this study, allows scholars to move beyond the much criticized NIMBY and PIMBY explanations to perceptions of wind power development more broadly.

2.1 Limitations of NIMBY and PIMBY Approaches

Opposition and support for wind energy tends to be generalized by policy makers into NIMBY and PIMBY. NIMBY means a person, group, or community is opposed to wind energy only when the turbine is planned to be located in their local vicinity, or

"backyard." According to Wolsink, "the NIMBY syndrome links a positive attitude to wind power with a resistance against a particular project" (2000, p. 53). PIMBY refers to a person or community that wants a turbine to be located in their "backyard" only for a perceived personal economic gain. PIMBY is predominately used to refer to the acceptance of wind farms in the U.S. Great Plains (Sowers 2006). In some cases, researchers generalize survey responses as NIMBY attitudes, because some respondents state their desire for the turbines to be "out of sight, out of mind" (Warren et al. 2005, p. 866). Places associated with NIMBY are generally perceived scenic landscapes such as Nantucket Bay off the Massachusetts coast (Rodgers & Olmstead 2008).

The NIMBY approach has come under criticism. Several scholars argue that NIMBY creates the erroneous assumption that the reasoning of objectors, commonly labeled as selfish or deviant, lacks valid motives. NIMBY has been used to explain "'deviant' behavior on the part of objectors…despite a large body of literature that undermines the concept of NIMBYism as a credible theoretical construct" (Ellis et al. 2007, p. 520). Wolsink (2007) argues that the NIMBY term is overused and simplistic; for him, NIMBY opposition is only one of four possible sources of opposition to wind power. The real NIMBY scenario exists when local opponents maintain a favorable attitude toward wind energy, but reject wind power development in their neighborhood. Wolsink (2007, p. 1201) identifies three other sources of opposition: (a) aesthetic or "landscape value" concerns; (b) concerns over the planning phase; and (c) concerns over the construction methods. Other scholars have argued that because NIMBY has become an overused term to label opposition to wind farms as selfish: the "opponents to wind

power developments are often aware of the potential to be branded as ‘NIMBY’ and therefore will seek to avoid being portrayed as such” (Aitken et al. 2008, p. 785). Thus, a growing body of work suggests that opponents to wind farms organize on well-informed decisions rather than simplistic concerns that the wind farm is in their “backyard.”

Overall, these criticisms suggest that NIMBY should not be used to describe opposition to wind farms. Rather, scholars should understand opposition to wind energy as valid, well-informed decisions, which may suggest various socio-economic impacts that may not be immediately apparent to outsiders. For example, Ellis and colleagues (2007) and Fisher & Brown (2009) argued that objectors to wind farms were not misinformed or selfish, as implied by the NIMBY concept. They found that objectors were concerned about environmental impacts, aesthetic impacts on the landscape, as well as local economic impacts.

By extension, similar criticisms could be leveled at the PIMBY concept, which describes strong local support for wind energy development. Alleged PIMBY sites are mainly located in the U.S. Great Plains region (Sowers 2006). The PIMBY concept also implies selfish and financial motives for supporting wind energy, particularly personal monetary gain from land royalties given by the wind energy companies. Supporters of PIMBY emphasize that, on average, land royalty payments in Iowa are $2,000 per turbine per year for thirty years (Sowers 2006). Cases of support for wind energy based exclusively on personal financial gain may occur, but this is likely a shallow and a limited representation of support for wind power development. Other opinions held by strong supporters are perceived economic gains for their local community and region,

which are not considered as PIMBY because this idea implies perceived improvement for the entire community. In addition, climate change and the need for renewable energy have also been cited as reasons for supporting wind energy (Ellis et al. 2007).

In light of criticisms of NIMBY and PIMBY approaches, scholars have offered alternative models for understanding support and opposition to wind power development. For example, Wolsink (2007, p. 1200) has called for an approach that "should acknowledge the complexity of a planning situation rather than simplify it on the basis of questionable assumptions." Therefore, studies should include decisions made by supporters and opponents who have developed their opinions based on ideas about themselves, their community, and the broader environment. This approach suggests that the key factors in public acceptance of wind farms include public perception of equity and fairness (Wolsink 2007). One way that people perceive the process of wind farm development is through the inclusion of the public in the beginning stages of the planning process (Wolsink 2007). To some degree, criticisms of NIMBY and PIMBY recall studies that focused on changing attitudes during the planning, construction, and operation and maintenance (O&M) phases of wind power development. Scholars have found that despite local opposition during the planning and construction phases, perceptions of wind power tend to result in eventual acceptance during the O&M phase (Pasqualetti 2001; Wolsink 2007).

Two models represent changes in perceptions and acceptance. One model accounts for changes of attitudes throughout each phase. During the planning phase of a wind project, the majority of the local community favors wind energy developments, and

then acceptance of the wind farm slightly decreases during the project (Pasqualetti 2001). The second model accounts for changes in attitudes before a plan for the wind farm, as the project is planned, and after the turbines are built (Wolsink 2007). Despite these differences, both models result in the same conclusion: acceptance is consolidated after the construction of the turbines. The models generalize perceptions and attitudes that may change differently for various people, but they are limited in describing a time frame for which it is believed there is acceptance after construction. For example, there is no mention of changes in perceptions and acceptance of the wind turbines after several years of operation and maintenance. Changes in acceptance, or rejection, should be studied over longer periods.

Since attitudes can change over time (Pasqualetti 2001; Wolsink 2007), the "information gap" concept implies there can be a change from opposition to support during the planning phase. Accordingly, local opponents are educated and given the right information on wind energy, they will begin to support the wind energy development in their local community (Warren et al. 2005). The information gap concept is based on the idea that members of local opposition have selfish motives (NIMBY) with little basic knowledge of wind energy. It is believed that opposition is not based on experience but on ignorance and misinformation (Short 2002). Warren and colleagues (2005) state the information gap needs to be highlighted and information can be given to potentially change these perceptions. However, Ellis and colleagues (2007, p. 520) argue that there is little basis for correlating "knowledge of wind power and its acceptance," and they go on

to argue that “many objectors appear extremely well informed about these issues.” Therefore, opposition is not based on ignorance, but rather on well-informed decisions.

2.2 Planning and Permitting Processes in Wind Power Development

In addition to critiques of NIMBY and PIMBY generalizations, much of the recent literature on wind energy has focused on the planning and permitting issues found in various European nations and in most states in the U.S. As Bohn & Lant (2009) suggest, local-based permitting processes can be very complicated, and can allow several opportunities through planning and public hearings, for wind power development to be postponed or abandoned by local opposition. Many more studies on the influences of planning and permitting processes have focused on European wind energy development. Some of the European studies have focused on concerns of local opposition (Aiken et al. 2008; Devin-Wright 2007; Ellis et al. 2007; Warren & Birnie 2009), influence of “expert’ and “lay” knowledges (Aitken 2009), comparison of planning systems (Toke et al. 2008), and the influence of public participation on wind energy development (McLaren Loring 2007). Some European studies (Ellis et al. 2007; Warren et al. 2005; Fisher & Brown 2009) have attempted to understand rationalities and perceptions surrounding wind energy, as a means to “inform more effective strategies within the planning process” (Fisher & Brown, 2517). The European literature on planning and permitting processes of wind farm development reveal the pivotal role these processes can have on the implementation of wind farms. However, studies have not tried to focus on the

rationalities and perceptions surrounding wind energy in areas without required planning and permitting processes. This information is also useful in determining not only opposition but also the subtle variations of support, and perceived socioeconomic impacts in a region that has been the epicenter of new wind energy development.

2.3 Aesthetic Issues in Wind Power Development

Several studies that have focused on opposition to wind farm development have found aesthetic concerns to be important. The claim that wind development harms landscapes includes Altamont Pass, California (Pasqualetti 2001), Cape Wind, Massachusetts (Rodgers & Olmsted 2008), and Remington, Maine (Bohn & Lant 2009). In these conflicts, opponents perceived that "wind development had transformed a beautiful landscape of nature into a whirling landscape of power" (Pasqualetti 2001, p. 691). Local opposition to the wind turbines also included other objections such as noise (Pasqualetti 2001), impacts to boating (Rodgers & Olmsted 2008) and impairment to wildlife (Pasqualetti 2001; Rodgers & Olmsted 2008; Bohn & Lant 2009). Several studies determined that impacts to the landscape were the primary reason for opposition, with little emphasis on other perceived negative impacts. For example, Pasqualetti (2001) examined the opposition of a wind farm located near Palm Springs, California, arguing that opposition was based on the perceived negative transformation of the landscape. This wind farm was located along the route to the resorts of Palm Springs, which has a scenic desert mountain landscape. The opposition grew when turbines of various sizes and

shapes were seen to have cluttered the area. In addition, many were opposed to the wind farm as many turbines did not function properly or at all, and some wind turbines were perceived to be very noisy. According to Pasqualetti, the result of this conflict was that wind firms educated the public on wind energy and promoted negligible impact on the environment. In response to the perceived negative impacts on the landscape and environment, wind farm polices implemented in the area included: limiting the location of turbines, safety and scenic separations, height limits, color limitations, reporting of bird strikes by a turbine, and removal of inoperable wind turbines. Policies concerning noise control of the wind turbines were also implemented. In addition, Pasqualetti found that public acceptance and opposition of turbines varied throughout the cycle of the wind farm project. High public approval was found before the project began, and decreased during the construction phase of the project. However, public acceptance increased again after the construction process was completed.

According to Pasqualetti (2000), it is important to understand the spatial or aesthetic costs of wind energy because these will figure strongly into future wind energy developments. Descriptions of other energy sources and their fuel chains are discussed to compare nuclear and coal to wind. These fuel chains have allowed the public to forget where these sources originate because they are visible elsewhere. However, Pasqualetti argues that renewable resources such as wind will be a prevalent reminder of energy production as it dominates a landscape. This alone helps to identify why wind energy is associated with landscape-related complaints. The idea of different landscapes having different values should be more prominent in the literature as a way of determining future

sites that may experience strong opposition to wind farms due to their affect on the landscape. In particular, landscapes less valued for elite tourism and retirement than Palm Springs deserve attention from scholars interested in sources of community support and opposition to wind power. Wind-power development in the U.S. Great Plains provides this opportunity. According to Sowers (2006), the impact of wind turbines on the landscapes of the U.S. Great Plains was not an issue with landowners and community members because turbines were seen as "just another piece of farm machinery…that made the fields they occupied much more productive" (Sowers 2006, p. 107). Therefore, wind energy developments and local opposition due to aesthetics can be directly related to place-based factors, such as perceptions of how the turbines fit into the landscape.

2.4 Economic Studies of Wind Power Development

Scholars also have begun to consider economic impacts of wind power development. Three frameworks are commonly used to understand the socio-economic impacts of wind energy. First, various studies, at a national or state level, have used quantitative data (Bohn & Lant 2009; Vachon & Menz 2006; McLaren Loring 2007; Toke et al. 2008). The latest example, by Bohn and Lant (2009), explained the growth of wind power by a regression model including wind velocity, state permitting policies, electricity demand, and various other variables. In their reasoning, the lack of permitting hurdles is the dominant variable in explaining the rapid rise of Texas in terms of wind power. Since Texas has minimal permitting procedures, perceptions in relation to wind energy are not considered during public hearings and town hall meetings. In addition,

government permitting or sitting decisions do not necessarily account for the subtle variation in perceptions, and do not consider perceptions of social acceptance. This study allows for understanding perceptions of wind energy that have not been able to be voiced in public hearings or town hall meetings.

Bohn & Lant have provided explanations as to why wind power development has increased but they have not explained why certain geographic locations have seen dramatic increases in wind power development, such as areas in West Texas. Bohn & Lant note that "other variables unique to Texas (e.g., availability of investment capital, landscape character, public attitudes towards wind power) could also be responsible for this statistical advantage" (94). In their study, Bohn & Lant see the rise of Texas as a result of a minimal permitting process. However, they do not discuss why particular sites developed as clusters, nor are they concerned with how perceptions of wind power development, including perceptions of landscape character can influence successful wind energy developments.

The second method of understanding socioeconomic impacts of wind energy is by use of questionnaire or interview-derived data to analyze perceptions of opponents and supporters of wind energy at the local or case-study level or communities or county-level regions (Ellis et al. 2007; Fisher & Brown 2009; Pasqualetti 2000; Pasqualetti 2001; Wolsink 2007). These studies predominately use questionnaires and semi-structured or open-ended interviews to gather information on the perceptions of wind energy development.

However, two studies (Ellis et al. 2007; Fisher & Brown 2009) have provided an alternative means to study socioeconomic impacts of wind energy by the use of Q-Methodology. Ellis and colleagues acknowledge motivations to object or support wind energy developments are complex but Q-Method helps to identify "what are, ultimately, matters that reflect deep values and conviction" (540). In addition, Fisher & Brown (2009) argue that prior analyses of wind farm debates have characterized perception in "monolithic conceptualizations of support and opposition," while they have sought to focus on the "more qualitative and explanatory, rather than descriptive" (2517). In this thesis, I drew inspiration from how these scholars used Q-Method as a way to understand the subtle reasons why stakeholders have strongly supported wind energy development, and the socioeconomic impacts of wind development that has been in place for several years, but does not influence future planning and permitting processes because the non-existent processes in Texas.

Third, economic studies of wind energy communities focus mainly on employment (Baranowski 2004; Hinshelwood 2001; Parkhill 2007; Strachan et al. 2006). Studies including other economic impacts of wind energy at a local level are not-peer reviewed (Baranowski 2004; Houghton et al. 2004; Grover 2006; New Amsterdam Wind Source LLC 2008; Texas Christian University 2009). These articles have included additional aspects, such as property taxes, school property taxes, and land royalties. They reveal the importance of these factors at the local level, but indicate that there needs to be continued research on those issues.

Employment is one of the main reasons for the state and wind-energy firms to promote wind energy. Job creation and the prospect of attracting higher paying jobs suggest economic gain for wind-development sites. According to a U.S. Department of Energy report by Baranowski (2004), economic studies on wind energy developments indicate an increase in local job creation. During the construction phase, local companies are hired to build roads and erect turbines. Permanent jobs are required for operation and maintenance (Baranowski 2004). Some communities with proposed wind energy developments perceive the new industry as a way to decrease unemployment rates (Hinshelwood 2001; Parkhill 2007; Strachan et al. 2006), as it is believed that local residents will fill new jobs. According to Ek (2005), places with lower incomes may put more emphasis on employment than those with higher incomes.

Some studies have used an economic model developed by the National Renewable Energy Laboratory (NREL), called the Job and Economic Development Impact Model (JEDI) (Texas Christian University 2009). This model is generally used to determine the number of jobs that will be directly created by the wind energy development in a certain region. However, JEDI models can have inconclusive results if the wind development is in an area of low population and cannot account for wind farms or employees living and commuting from surrounding counties (Texas Christian University 2008) and therefore has another spatial limitation. This model needs to be used in conjunction with other studies that involve interviews from the community the model is testing.

In Texas, wind farms tend to be constructed on private properties, which require firms to establish land-use agreements with landowners and royalty payments. Land royalty payments have been summed to a municipal scale, but it is not known how land royalty payments affect perceptions of wind energy or how payments affect the local economy. In cases of off-shore wind farms, there have been debates on whether the wind energy company should pay royalty payments to the community for using public lands (Houghton et al. 2004). The debate over royalty payments for public land could result in different perceptions and effects on the local economy. A non peer-reviewed case study on wind energy economic impacts in Sweetwater (New Amsterdam 2008) indicates that over 1,200 jobs in Nolan County were associated with the wind industry by mid 2008. Projections by local employers indicate that approximately 1,330 people will have jobs in direct relation to the wind industry in 2009. Based on the U.S. Census estimation of jobs in Nolan County in 2003 (6,370 jobs), the projection of 2009 wind energy jobs would account for 21 percent of the total available jobs in 2003.

The non-peer reviewed literature indicates that tax revenue from wind energy developments is significant to local communities. Data on tax revenue support the main argument that wind energy positively impacts local economies (Grover 2006; Houghton et al. 2004; Ouderkirk and Pedden 2004; Texas Christian University 2008). These data coincide with local supporters of wind energy who perceive economic growth of their local community. Further study needs to be conducted to determine if beneficial changes have occurred in the local community due to an increase in tax revenue. If no changes have occurred to benefit the entire community, then changes in perceptions need to be

investigated. Similarly, if no changes have occurred to benefit the community after these improvements have occurred, it needs to be determined if there are changes in perceptions of opponents and supporters.

3. OBJECTIVES, STUDY REGION, DATA AND METHODS

In this section, I outline the research objectives, describe the study region, and specify the methods I used to obtain data. I devote much detail to outlining how I followed the Q-Method because it has not been conducted widely in human geography or environmental studies, although some excellent examples exist (Robbins 2005; Ellis et al. 2007; Fisher & Brown 2009).

3.1 Research Objectives

This study aims to investigate the range of perceptions of wind energy and the associated socio-economic impacts held by key stakeholders in the Sweetwater, Nolan County, Texas. Although several studies have indicated significant local opposition to wind power (Bohn & Lant 2009), little work has focused on the reasons for supporting wind power. Sweetwater, the Texas leader in wind power capacity, presents a case with no apparent opposition, even as it has become a major area for wind power (New Amsterdam 2008). I focus on how stakeholders view the impacts of wind energy on the local community, landscapes, taxes, property values, and energy and land usage. To determine subjective positions of key individuals, Q-Method was used. Q-Method has been used to empirically determine various subjective positions among stakeholders working in a particular domain or area (Webler et al. 2009). Q-Method combines qualitative and quantitative techniques beginning with semi-structured interviews to collect statements on an issue, and in this case, wind power. Participants subsequently

rank (“most disagree” to “most agree”) the same statements in a semi-normal distribution. Dedicated software is used to conduct the type of factor analysis that is a hallmark of Q-Method (Eden et al. 2005; Ellis et al. 2007; Robbins 2005).

My study aims to accomplish three Objectives:

Objective 1: Create a concourse of statements on the perspectives of wind energy and associated social economic impacts on Sweetwater, Texas. Developing a concourse, the first step in Q-Method, is based on various sources to determine the variety of discourses on the socio-economic impacts of wind energy. Between February and May 2009, I obtained several statements from the local newspapers, the Sweetwater *Reporter*, and Abilene *Reporter News*. Other statements were collected from government documents and websites on wind energy in Nolan County. Moreover, statements were derived from the transcripts of ten semi-structured interviews of key stakeholders in the Sweetwater region. Some interviews were carried out in April, while many others will be done in the May-June field campaign. These stakeholders included elected officials, government employees, prominent community leaders, and landowners with wind turbines. From these sources, 200 statements were obtained and reduced to twenty-seven final statements to form the Q-Sample. These statements encompassed several important foci, including but not limited to aesthetics, taxes, landowners, and community. During the interviews, respondents were asked general questions relating to their perceptions of renewable energy sources, the environment, possible affects on public infrastructure, changes in taxes, wind royalties, and changes in the housing and labor markets. In addition to these interviews, secondary sources (newspapers, pamphlets) were analyzed to collect

statements on wind power and perceived social and economic impacts of the wind energy industry on the local community. I obtained approval of this phase of research by the TAMU IRB (Appendix A).

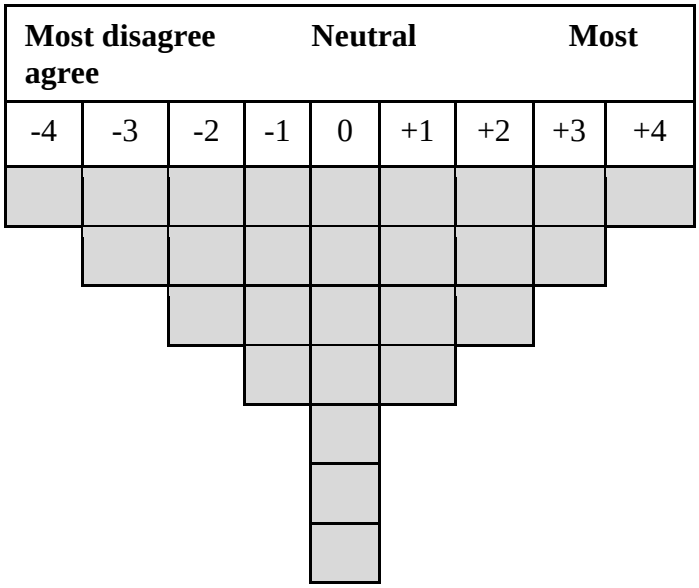

Figure 1. Quasi-normal distribution for Q-sort of 27 statements.

Objective 2: Obtain and analyze Q-Sorts performed by key stakeholders (P-Set). Once the Q-Sample was developed (27 statements), each statement was printed on separate cards. These cards were used to conduct Q-Sorts, in which the P-Set were asked to rank each statement on a range from +4 (most agree) to -4 (most disagree) forced into a quasi-normal distribution (Figure 1). The P-Set consisted of twenty-one key stakeholders, including the ten interviewees from Objective 1 (Appendix B). The P-Set

were collected by purposive sampling between June and July 2009 to ensure the perspectives obtained were from prominent community stakeholders. Relative positions of statements were recorded and an open-ended interview was conducted immediately after the sorting; this interview elicited the respondent's rationale for sorting (Robbins 2005, p. 211), adding an important qualitative dimension, as advocated by Eden and colleagues (2005). In this regard, Q-Method is a means to obtain a richer semi-structured interview, as respondents are asked to justify why they placed certain statements in highest or lowest scoring categories. TAMU IRB approval was also obtained for this objective. After the field campaign, analysis of the data was performed with the freeware PQMethod, which accomplishes three essential tasks: calculation of the correlation matrix: significant factors are extracted and rotated; statement factor scores (*z* scores) are calculated (Addams & Proops 2000; Robbins 2005). For each respondent, factor loadings and statistical significance were determined. These results formed the basis for the qualitative component: preliminary description of the factors, which is necessary for Objective 3.

Objective 3: Iteration of preliminary findings with respondents. A second field campaign was conducted in January 2010, following preliminary interpretation of factors. The recent literature in human geography has called for this iteration phase as a necessary "qualitative" component of Q-Methodology (Robbins 2005: 214; Robbins 2006: 194-5; Robbins and Krueger 2000: 640-1). Following the procedure outlined by Robbins (2006: 194-5), six semi-structured interviews were conducted. Respondents were asked to reflect on the factors, on their results, and on the ideal statements for other factors. Factors were

presented as preliminary “types” or belief systems. IRB approval for this phase of the research was sought after factors the factors were interpreted. Upon completion of this phase, preliminary description of factors were modified, as the key actors critically engaged the preliminary findings, questioning both the method and the “types” or belief systems that describe the factor loadings. Some respondents disagreed with some of their own “loadings” and the initial descriptions of the factors. The basis for their agreement, or disagreement, was elicited.

3.2 Study Region

Although European nations have been the focus of many wind energy studies (Ek 2005; Ellis et al. 2007; Warren et al. 2005; McLaren Loring 2007; Toke 2005), and European nations have had the highest amount of installed wind energy capacity for many years, the U.S. in 2009 held the highest amount of wind energy capacity in the world, with 35,159 megawatts (MW) (AWEA 2010b). In the U.S., 48 billion kilowatt-hours (kWh) are produced by wind farms across the country, which produces enough power for 4.5 million homes (AWEA 2010a). The goal set by the U.S. government is to have at least 20 percent of the nation’s electricity supplied by wind by 2030 (Department of Energy 2008).

Texas leads the U.S. in installed wind energy units (Department of Energy 2009). Texas has increased from 180 MW in 1999 to 9,409 MW in 2009 and 302 MW is currently under construction (AWEA 2010a). There are many reasons why Texas has become the leading state in wind energy production. First, Texas’ wind climatology has

shown many areas as valuable for wind energy production. A Texas wind resource map arranged by Texas State Energy Conservation Office (SECO), which was based on Alternative Energy Institute (AEI) wind data, shows viable geographical areas in West Texas and the panhandle of Texas for wind energy production. Many areas are within wind power classification of class 2-4.5 with some small areas reaching class 7. Second, Texas has a pressing need for added electricity production for highly populated areas within the state, such as Dallas/Fort Worth, San Antonio and Houston. The Texas state government enacted legislation to promote wind energy production in Texas. Some state polices include Renewable Portfolio Standard (RPS), Net metering, and Generation Disclosure Rules (GDR) (Vachon & Menz 2006). Texas Senate Bill 20 has also allowed for Texas wind energy growth, since it promoted an increase in Renewable Portfolio Standards and building of transmission utilities and transmission lines to facilitate the growing wind industry (Senate Bill 20). From Senate Bill 20, Competitive Renewable Energy Zones (CREZ) have been created. CREZ were determined based on areas of ideal wind energy production. Once these areas were determined, transmission lines and infrastructure can be built (at tax payers' expense) for wind energy inputs before any wind farms have been built (State Energy Conservation Office 2009). In addition, Texas has the lowest permitting requirements in the U.S. (Bohn & Lant 2009, p. 94). The lacking of sitting requirements is thought to be a major attraction to the wind industry (Parker 2008a, p. 16). Court challenges to wind farms, such as the Coastal Habitat Alliance complaint against the Texas Land Commissioner and Public Utility Commission, have not been successful (Parker 2008b, p. 9-10).

Within Texas (2009), Nolan County has the highest capacity of installed wind energy. In 2008, over 2,500 MW of wind energy were produced, with 3 GW expected to be produced by 2009 (New Amsterdam 2008). Nolan County is home to the two largest wind farms in the world as of mid 2009. The NextEra Energy Resources Horse Hollow Wind Energy Center has a 147 1.5 MW turbines in Nolan and Taylor Counties (NextEra Energy Resources 2009). The largest wind farm in the world, the E.ON Climate & Renewables Roscoe Wind Farm was completed in mid 2009, with over 625 turbines producing over 781.5 MW. The study area map (Figure 2) show the locations of wind farms in Nolan and Taylor Counties in relation to Abilene, Sweetwater, and Roscoe.

Support for wind power in Nolan County is reported to be strong among the public and elected officials (New Amsterdam 2008). In Taylor County, however, landowners in 2006 filed nuisance suit against the Horse Hollow wind farm. In August 2008, an appeals court upheld a district court ruling against the plaintiffs in *Rankin v. FPL Energy*; the plaintiffs have appealed to the Texas Supreme Court (Parker 2008b, p. 9).

Wind farms in the central Great Plains will be critical for the U.S. to meet the goal of obtaining 20 percent of the nation's electricity from wind. Sweetwater (population = 15,000 in the 2000 Census) has many similar characteristics to other towns in the Great Plains which may be faced with wind energy installments. Sweetwater, like many small towns in rural America, has had a considerable decline in population. In 2002, Sweetwater received the title "Fastest Shrinking City in Texas" (Myers 2009), but may see a turnaround due to the wind energy industry.

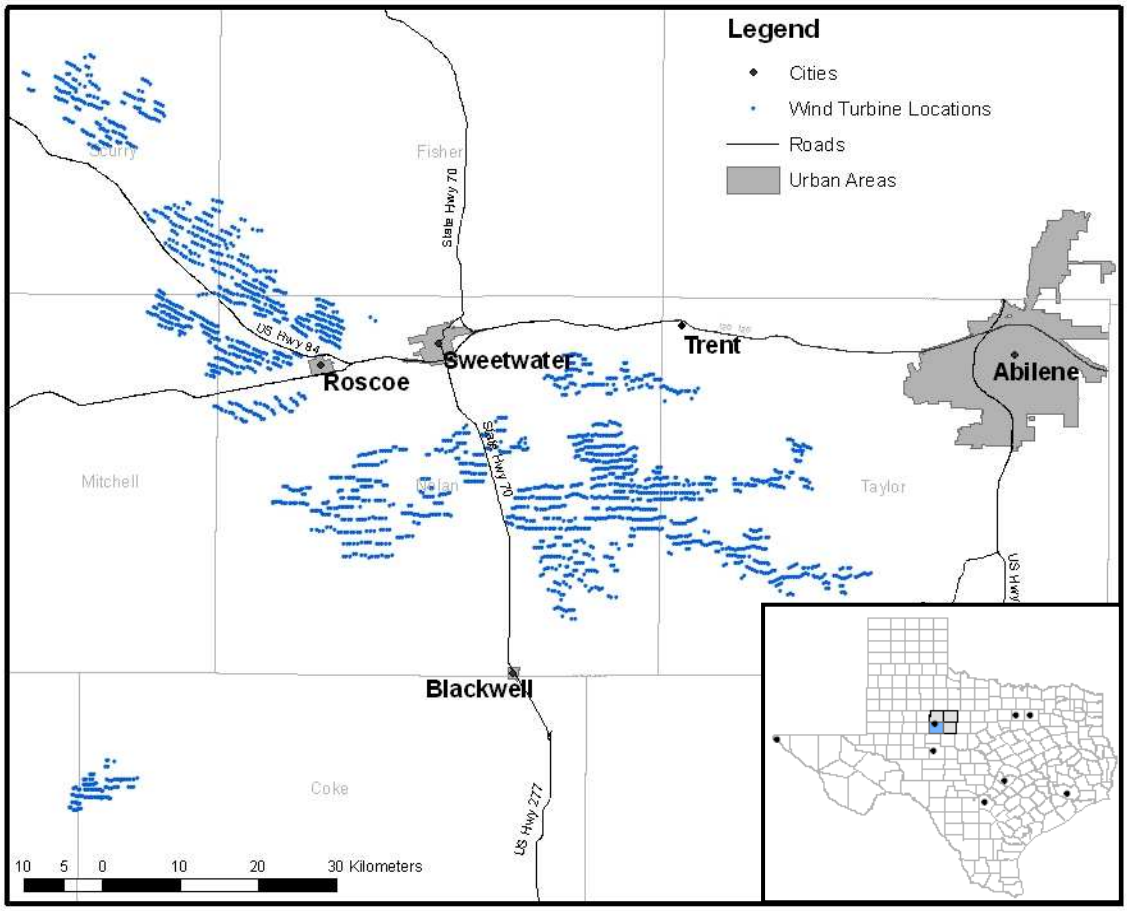

Figure 2. Study area map. The total number of turbines located in and around the study region are approximately 2,900. However, based on the rapid development of wind farms located in this region, the total number still underestimates the total amount of wind turbines on the landscape. Wind turbine locations (2,437) were obtained from the Texas Christian University (TCU) database. Approximately 110 turbines are located in Coke County and 286 turbines are located in Scurry County (separate from the Roscoe Wind Farm). Additional turbine locations (498) were added, using 2008 Aerial Photos (Source: TNRIS) of Nolan and Taylor Counties. The additional turbines located in Nolan County were verified using a map obtained from the Nolan County Tax Appraiser District in March 2009.

3.3 Q-Methodology

In 1930, William Stephenson, a psychologist and physicist at Oxford University, developed Q-Methodology (Q-Method). Stephenson brought together his training in physics and psychology to develop a technique to measure social perspectives (Brown

1980, McKeown & Thomas 1988; Eden et al. 2005, 414). Q-Method is used to reveal key stakeholders' attitudes or subjectivity on a particular subject (Addams & Proops 2000). Robbins & Kruger (2000, 637) argue that "Stephenson rejected the notion that subjectivity could not be studied scientifically, subscribing instead to an ontology that assumes subjectivity has a measurable internal structure."

Q-Method is unlike other forms of scientific measurement, as the respondents are doing the measuring, rather than being measured (Brown 1996; Addams & Proops 2000). Addams & Proops (2000, 19 original emphasis) suggest that Q-Method "does not set out to measure anything objectively, but rather rests on the assumption of intra-individual differences in significance…the importance is the *relative* position of statements to each other." Therefore, Q-Method is used as a tool to understand subjectivity and for discourse analysis by combining qualitative and quantitative techniques (Webler et al. 2009). Discourse is "the ensemble of social practices through which the world is made meaningful and intelligible to oneself and to others" (Johnston et al.1994, p. 136) or a set of attitudes and views on a particular subject (Addams & Proops 2000). Related to discourse is the "communication concourse" which is all statements made on a particular topic (Stephenson 1978).

Opinion polling or large-*n* surveys based on random samples have been the dominant approach to understanding perceptions related to wind energy; this approach has often resulted in monolithic concepts (Devine-Wright 2005; Ellis et al. 2007; Fisher and Brown 2009), such as NIMBY. Q-Method measures subjectivities, or social perspectives, among a small sample of stakeholders. Q-Methodology has been used to

satisfy a need to explain rather than describe (Devine-Wright 2005; Fisher and Brown 2009) “matters that reflect deep values and conviction” (Ellis et al. 2007, 540). Q-Method aims to compare “individual subjectivity” instead of “correlating opinions across population traits” (Fisher and Brown 2009, 2520). Some often “mistakenly equate [Q-Method’s] small sample populations with poor representation and generalizability,” however it is “a misunderstanding of what is being generalized in Q [-method] study—characteristics of subjectivity rather than characteristics of populations” (Robbins 2005, 215). Q-Method cannot statistically represent the wider population. This, Q-Method practitioners study subjectivity in a relatively small sample and aim to uncover the “intimate structures” (Fisher and Brown 2009, 2520) which exist not only within the small sample, but also exist within the wider population. The main difference between Q-Method and large-*n* surveys is that Q-Method “seeks to determine the structures of subjectivity and their variance, whereas R-methods seek to characterize populations of subjects” (Robbins 2006, 11). Some authors argue (Fisher and Brown 2009; Robbins 2005) that the patterns found to exist in the Q-sample will also exist in the wider population because there is finite variation of opinion. Generally, there are fewer discourses than there are individuals, and these social perspectives are shared and communicated among people (Fisher and Brown 2009; Robbins 2005). In other words, Q-Method indicates the breadth of perceptions that exist on a particular issue, but it cannot indicate statistically how widely these perceptions are distributed across a population (Venables et al. 2009).

Q-Method is a relatively new technique employed by human geographers, and has been applied more frequently in other social sciences such as political science and psychology (Robbins & Krueger 2000). Human geographers have used Q-Method (Brannstrom n.d; Eden et al. 2005; Robbins 2005; Robbins & Krueger 2000) as a qualitative and quantitative approach to understand the subjectivity people have on various topics. Geographers have written about the use (or lack thereof) of Q-Method in human geography and associated applications or limitations (Robbins & Kruger 2000). Robbins & Kruger (2000, 645) argue Q-Method can be used as a tool to obtain a greater understanding of subjectivity of various topics in geography such as "difficult-to-grasp notions of relative and relational space," political subjects, and environmental perceptions. They argue that Q-Method "seeks to elucidate the structure of subjectivity and examine the relationship between social phenomena and subjective interpretation" (Robbins & Krueger 2000, 641).

Q-Method is comprised of five main steps. When developing the concourse, interviews, secondary sources, such as newspapers and pamphlets, are analyzed to collect statements on perceptions and subjectivities. Statements are carefully chosen, followed by the ranking by respondents. Factor analysis of the Q-sorts identifies statistically significant clusters of statements that represent similar perceptions or belief systems.

Developing the Concourse

The first step of Q-Method is developing the concourse. Developing the concourse is the most time-consuming process of the Q-Method, but there is relatively little attention to this phase in the literature (Eden et al. 2005). The concourse is "a set of

statements that represents the sum of the discourse on the research topic" which the researcher must construct or develop (Eden et al.2005, 414). The main goal of creating the concourse is to determine the breadth of perceptions held by the stakeholders in the research study, instead gathering all possible perceptions of the population, which would be done by using large-*n* surveys.

The concourse usually consists of dozens of statements collected partly through secondary materials, such as newspaper articles, pamphlets and newsletters, but mainly by semi-structured interviews of key actors. Usually approximately 100-300 statements are identified initially and put into several categories or themes. These themes or foci come from the discourses and from previous literature to organize the set of statements. These themes are later used as a guide for the selection process of the Q-Sample.

Q-Method researchers conduct interviews to understand the context of the study and the extent of the domain (Webler et al. 2009). During the interview process, the statements are gathered through a naturalistic approach which retains the "raw verbiage" of the interviewees, making it "an interactive process driven mainly by the participants, rather than by the researcher" (Eden et al.2005, 415). Theoretically, this reduces researcher bias (Robbins & Krueger 2000; Webler et al. 2009), but bias is not eliminated because the researcher still must select which statements that encompass the Q-Sample (below).

The next question the researcher should ask is how to decide when the concourse is complete. This is a subjective process, based on the research data and resource constraints. Eden et al. (2005, 416) state that collection of qualitative data should be

stopped when it has reached a "saturation point," the moment at which statements begin to repeat.

Developing the Q-Sample

The next step in Q-Method is developing the Q-sample. Once the large set of statements is categorized, the number of statements is narrowed to between twenty and sixty (Webler et al. 2009). Fewer than twenty statements may not represent the range of perceptions held by the sorters, but if too many statements are selected it may become too cumbersome for respondents to perform the ranking (Webler et al. 2009). Strategic sampling, in which researchers separate the concourse into several categories or foci based on literature or preliminary research, can be used to finalize the Q-Sample (Webler et al. 2009, 8-9).

An ideal Q-statement is unlike statements in a large-*n* survey, where researchers aim for unambiguous statements with explicit meanings so that each respondent interprets the question the same way. In Q-Method, each statement is independent and does not relate to other statements, and should not contain double meanings (Webler et al. 2009). A good Q-Statement is short, with "stand-alone" sentences that can be easily understood and "salient… [which] is meaningful to the people doing the Q-sorts." But statements should contain some "excess meaning" for various interpretations (Webler et al. 2009, 9, 16). However, too much excess or unclear meaning in a statement could make it difficult to rate or compare perspectives, so it may be easier for the sorters to rank similar Likert-type questions found in surveys (Eden et al. 2005).

In addition, it is important that both positive statements and negative statements are chosen for the Q-Sample. However, whether a statement is truly negative or positive is highly subjective and is based on the each sorter's perception of statements. Webler and colleagues (2009, 17) state that it is not necessary to have equal positive and negative statements, but that statements should resemble the content of an entire concourse, or should retain the tone of the original statement. Webler and colleagues also suggest that respondents find it easier to react to positively phrased statements.

Ideally, each statement would be used verbatim so that researchers do little or no editing. However, many Q-statements need to be edited or paraphrased if the meaning of the statement is lost when taken out of context. Most statements are paraphrased slightly to shorten the length of the statements (Robbins 2006). Nevertheless, statements should be edited carefully to ensure the meaning of the statement was not changed. The statements should also be edited to depersonalize the statements by eliminating personal pronouns, and to clarify what the interviewee was referencing. In addition, statements may be re-worded to ensure the terminology and language was appropriate for all sorters (Eden et al. 2005).

The process of developing the Q-Sample is one of the most subjective phases of Q-Method, the literature provides little transparency on sorting through hundreds of statements to arrive at the Q-sample. Eden and colleagues (2005, 416) state that the evolution of the concourse to the Q-Sample can take at least several weeks or longer, and criticize other researchers for having few "factual sentences about the concourse."

Conducting Q-Sorts

The next step is conducting the Q-sorts. Only a small number of participants are needed to conduct Q-Method successfully, usually between twenty and thirty participants, representing a wide range of perspectives. These participants are selected by purposive rather than random sampling. The participants should be key actors within a defined study region, and they should have a strong knowledge on the topic, while representing a wide range of beliefs or opinions (Webler et al. 2009). Participants are asked to rank each statement on a normal distribution (Figure 1). Forcing respondents to sort the statements on a normal distribution is a debated practice (Webler et al. 2009). Most studies have the respondents arrange the statements in a normalized distribution, because "it forces participants to contemplate the Q-statements in a thoughtful way… [and] helps participants reveal their preferences" (Webler et al. 2009, 19) and relationship between statements (Robbins 2006).

Respondents are asked to rate each statement between the range of (-4 to -6) as most disagree to (+4 to +6) as most agree. Statements rated as zero (0) are statements which the participants note as neutral or are undecided. Again, forcing statements into a normal distribution presupposes each participant will sort the same number of statements having positive, negative, and neutral salience, which is very unlikely (Webler et al. 2009). However, it would be impossible to predict the respondents' perceived (negative, positive, or neutral) connotation of a statement.

Factor Analysis

Once the rankings of the statements (Q-sorts) are conducted and recorded, the Q-Sort results are subjected to the type of factor analysis that is a hallmark of Q-Method (Eden et al. 2005; Ellis et al. 2007; Webler et al. 2009). An example of dedicated freeware, PQMethod is used to complete the factor analysis that "is a mathematical technique that reveals underlying explanations for patterns in a large set of data" (Webler et al. 2009, 25).

Factor analysis for Q-Method is a tool to understand of the range and clustering of perceptions. Therefore, interpretation of the factor analysis is based on the knowledge of the subject. This knowledge is used to determine rotating the factors, in case there is little correlation between a factor and individual participants (Eden et al. 2005; Webler et al. 2009) and by rotating the factors, meaningful relationships will become more apparent. Varimax rotation is generally used instead of manual rotation as it is an algorithm that rotates the factors, such that each individual will be associated with only one factor (Webler et al. 2009). Rotating of factors, which results in different clusters and loadings, is rather subjective. Determining the number of factors is also subjective, and has not been adequately addressed in Q-Method literature. The best advice is that after rotating the data, usually two to four factors are salient in which participants are clustered based on their analogous perceptions. These rotated factors should have eigenvalues greater than 1.00 (Addams & Proops 2000) but should also have meaningful interpretation within the confines of the study or the literature on the topic. Webler and colleagues (2009)

suggest four characteristics the final set of factors: simplicity, clarity, distinctness, and stability.

Interpreting Factors

The interpretation and naming of the factors is a significant part of establishing an understanding of the range of perceptions. Q-Method should not be viewed as an unbiased quantitative methodology because of factor analysis; rather, the quantitative values should be used "in a more qualitative, interpretative setting in order to raise questions and interrogate data" (Eden et al. 2005, 421). Generating descriptions for each factor should be based on the distinguishing factors that were flagged during the factor analysis. To understand the social perspectives of each factor, interviews conducted after each Q-Sort should be used to understand the rationale for statement rankings by respondents (Webler et al. 2009). Once each factor is described, the next step in Q-Method is to compare and contrast the social perspectives of each factor (Webler et al. 2009). In addition, consensus statements that are identified through factor analysis can help to understand similarities between factors. Once the comparison is complete, the preliminary descriptions should be validated through interviews by sorters with high factor loadings (Webler et al. 2009). This should provide constructive feedback to determine if the descriptions are accurate of their social perspectives.

3.4 Data

The first phase of research for this thesis began in late January and early February and ended in April 2009, with a general search and review of peer-reviewed literature on wind energy that resulted in many recurring themes: opposition to wind farms; aesthetic impacts on the landscape; planning processes of wind energy construction; incentive taxes; and wind energy employment. After the study site of Nolan County, Texas was selected, it became apparent that some of the themes prevalent in the literature were relevant in the study region, and therefore the themes were incorporated into the first draft of the semi-structured interview schedule.

A recent study (New Amsterdam 2008) on the economic impacts of wind energy in Nolan County, Texas was used for background information on wind energy projects, projected employment of the wind energy sector, and wind royalties landowners have received in the study region. New Amsterdam (2008) was also used as a source to develop a semi-structured interview schedule that included landowner royalties, labor, taxes, school improvements, and construction. These categories and associated questions were used because these ideas were thought to be important to residents of the study region, as the study was conducted by a group led by the current mayor of Sweetwater for the purpose of influencing Texas state legislature on future wind development, promoting the West Texas Wind Energy consortium, and promoting the benefits the city of Sweetwater has received. In addition, three preliminary interviews were conducted in March 2009 to gather information on the city and to determine names of key stakeholders and potential interviewees.

Interview Schedule

Interviews are an important step to gathering the statements that are fundamental to Q-Method. Unlike other sources of qualitative data, "interviews…are collected directly from the individuals who are creating and experiencing the social phenomenon under study" (Klofstad 2005, 359). Interviews also allow a research to collect people's opinions and perceptions (Dunn 2005; Klofstad 2005) on a given topic, which is the main focus of Q-Method. There are three types of interviews generally used: personal interviews, focus groups, and questionnaires (Klofstad 2005). A personal interview is a one-on-one conversation, and results in a substantial amount of description and information, but limits the number of respondents who can be interviewed. Focus groups are a made up of a number of respondents and result in group discussions which reveal opinions among groups of people. Focus groups result in a less amount of descriptive information than personal interviews, but allow for a greater number of participants. Questionnaires are predefined list of questions that are filled out by many participants, but must be highly structured to ensure the same questions are asked of all participants (Klofstad 2005). Questionnaires allow for a larger population to be surveyed, but is associated with a limited amount of descriptive information. Personal interviews are used as a part of Q-Method, because focus groups may obscure individual opinions and perceptions without the influence of others' opinions and perceptions. Unlike questionnaires, Q-Method is used to understand the breadth perceptions of key stakeholders, instead of extrapolating this information to infer the perceptions of the general public.

The relationship between the interviewer and interviewee is an important aspect of interviewing. If the interviewee feels comfortable with the interviewer, they are more likely to communicate freely about their opinions (Dunn 2005, 91), however it is important to obtain a professional relationship with the interviewee. Building rapport with the respondent may be helpful in understanding what they are saying. This rapport may be increased with thorough preliminary research, which shows the respondent that the researcher has invested a considerable amount of time on the topic and the region. Dunn (2005, 92) also suggests a warming-up period in which you start the interview with small talk or "catching-up" talk, which allows the respondent to become more comfortable and relaxed.

There are three formats of personal interviews: structured, semi-structured and unstructured interviews (Dunn 2005, 80). The format that was chosen for the phase I interviews was semi-structured interviews. An interview schedule was created to obtain information on particular topics that were deemed significant from pervious literature and preliminary research. An interview schedule is a reference which has the important topics and questions that the interviewer wants to address (Dunn 2005), while allowing for flexibility. This flexibility is important, as it allows for the person who is being interviewed to elaborate or discuss other important issues that are relevant to them personally, that may not have been covered by the questions in the interview schedule.

Preliminary Interview Schedule

The first section of the interview schedule (Appendix B) consisted of general questions. The first questions asked in the interview established background information

of the interviewee. The next question was to describe what Sweetwater was like before the establishment of the wind industry. This question was to determine their perceptions of Sweetwater as a community and what the wind industry may have done to change it. The answers to this question were also used in relation to verifying the U-shaped attitude model found in the literature (Pasqualetti 2001). The U-shaped attitude model determines how perceptions change before, during, and after wind turbine construction. Therefore, establishing what the community was like before the wind industry relates to the perceptions held before wind turbine construction. This question had some variation, but in every interview, the interviewee described how population was dwindling and how the town was diminishing, but the wind industry had revived the region economically. Similar questions relating to the affect of the wind industry on the community were also listed under the general set of questions, but were generally asked later in the interview.

The next section included in the interview schedule was a set of questions related to the planning process that occurred before wind turbine construction. This set of questions was asked to determine if any community meetings were held regarding the wind industry starting construction in the region, or if there was a permitting process that was required for wind energy companies to build near the community. This section was included based on the literature referring to wind farms. Most of the scholarly literature focuses on the complex permitting processes that wind energy companies must endure to build turbines in other countries or other regions of the U.S. The permitting process established by state government can affect the ability for a wind farms to be constructed. The state of Texas has minimal permitting processes for wind energy industries as a way

to attract wind farm developers (Bohn & Lant 2009; Parker 2008a). The only permitting process that occurs in Texas is meetings between landowners and wind farm developers; therefore, landowners' perceptions on wind energy are important to understand because they are one of two key groups of people in the wind energy development stage.

This minimal permitting approach is unlike other states in the U.S. Washington and Oregon have a simplified permitting process, and all other states follow a standard local permitting process. These processes are compared in Table 2, which shows the many steps needed for approval in a standard permitting process as compared to a simplified permitting process found in Texas. Texas permitting is a faster and simpler process that has placed few barriers to in rapid development as opposed to other locations that have adopted the standard permitting processes or simplified permitting. Table 2 indicates conflicts at the various permitting steps with an asterisk (*). The Local-Based (Standard) Model allows for more opportunities for opposing and obstructing construction of a wind farm. However, it is important to note Texas is not without conflict and cases of opposition but have fewer opportunities to delay or prohibit the permitting process. These cases have only occurred during the construction process, as there are no public hearings or applications prior to construction. One of the main cases of opposition not included in Bohn & Lant (2009) was the Babcock & Brown wind farm located off the Gulf Coast of Texas. The Coastal Habitat Alliance filled a lawsuit in 2007 against Babcock & Brown on grounds that the wind farm would be detrimental to the wildlife along the coast. The case was dismissed because in the state of Texas, developers do not need state or federal approval to erect turbines on private land.

Table 2 Types of wind-energy permitting process in the U.S. *Indicates conflicts to a wind farm during that step (modified from Bohn & Lant 2009).

Local-Based (Standard) Model	**Simplified State-Level Permitting**	**Minimal Permitting Requirements (TX)**
1. Planning and first public hearing	1. Application submittal	1. Secure Land-lease agreements
2. Application review*	2. Application Review	2. Public Utilities commission approval
3. County or state decision*	3. Public Hearings	3. Construction*
4. Financing and power purchase agreement	4. Adjudicative proceedings	
5. Adjudicative proceedings and judicial review	5. Final decision and Appeals (OR)	
6. Construction*	6. Gubernatorial Decision (WA)	
7. Operation and Maintenance*		

In addition, the Texas State court system ruled that it is not necessary to conduct an environmental impact report, or obtain public comments (Industrial Wind Action Group 2009; Parker 2008b). Therefore, including statements on the permitting process was irrelevant based on the deregulated or almost non-existent permitting process in

Texas. I concluded that questions on permitting process are unnecessary and was later removed during the revision of the interview schedule after the initial five interviews.

The next section in the interview schedule was to determine the perceived impacts of the wind turbines on the landscape and to establish if there was a change in these perceptions over time. These questions were directly tied to the literature that focuses on the negative aesthetic impacts of wind energy on the landscape (Pasqualetti 2000; Pasqualetti 2001). In addition, aesthetics was deemed an important topic because of a lawsuit that occurred in the neighboring county, Taylor County. On August 21, 2008 in *Rankin v. FPL Energy*, the district court dismissed the case of perceived negative aesthetic impacts on the landscape due to wind turbines constituted a valid reason for a nuisance suit. The district court allowed a jury to determine if the noise of the turbines constituted a lawsuit and the court decided against the plaintiffs (Parker 2008a; O'Neal & Lampeter 2007).

One question pertained to the interviewees' attitudes towards the wind turbines before, during construction, and once construction was completed, thus corresponding to the U-shaped attitude model (Pasqualetti 2001). However, most interviewees stated their attitudes did not change over the course of the construction period or after construction. Most stated that they believed they were interesting to look at, with some thought they improved the surrounding landscape. Those who did not like the aesthetic impact the wind turbines initially had on the landscape stated they did not mind the turbines as much anymore. Some interviewees stated they got used to seeing the turbines across the skyline, and it did not bother them anymore, or they would overlook the impact the

turbines had on the landscape because of what the wind energy industry had provided for the local community. No specific questions were asked relating to the auditory impacts of the wind turbines, as it was evident most turbines in the region were built enough distance away from houses to prevent any auditory nuisances.

The next section of questions in the interview schedule related to the perceived environmental impacts of the wind industry on the region. The questions were directly related to environmental studies (Barrios & Rodriguez 2004) to determine if people in this region have perceived any of the environmental impacts other locations have experienced. This section also included questions on the impacts of the wind industry on hunting practices. This was determined to be an important topic from preliminary research (Texas Christian University 2008) and from initial interviews. The interviews revealed that provisions for hunting were included in the land leases between landowners and wind energy companies.

Perceptions of various energy sources were deemed an important topic. A relevant discovery to the topic of energy was found during the preliminary research period. The Tenaska Trailblazer Energy Center (TTEC) is a proposed coal-fired electricity plant to be built in Nolan County, approximately nine miles east of Sweetwater, Texas. The TTEC is a low-sulfur coal plant that will have the capability to capture 85-90 percent carbon dioxide (CO_2) emissions produced and transport the CO_2 via pipeline to the Permian Basin oil fields. The process will be used in enhanced oil recovery (EOR) and geological storage (Tenaska Inc 2009). The project is estimated to cost more than $3 billion to build, providing an estimated 1,500-2,000 construction jobs and one hundred permanent jobs as

needed. Permit applications were filed for the plant in 2008, with a final decision to be made by 2010. Once the energy center is approved, construction is scheduled for late 2010, with operations starting in 2015 (Tenaska Inc 2009).

Supporters argue that the TTEC would have substantial positive impacts on the local economy and labor market, but opponents stress negative air-quality impacts and excessive use of water. Several newspaper articles, letters to the editor, and signs posted along roads have highlighted the debate on the TTEC. Opposition to the TTEC in the Sweetwater region is based mainly on pollution and water usage (Fig. 2). Many residents perceive the TTEC will not be able to sequester 85-90 percent of CO_2 emissions as well as other harmful toxins that will be released into the air, threatening the health of their community. This argument, however, has not proved compelling, so opponents have taken issue with the amount of water needed for cooling each day. The debate is evident through signs strewn throughout Sweetwater. For example, the opposition to the TTEC has a sign in downtown Sweetwater that states, “Dear Commissioners, WATER YOU THINKING?! Dry lakes, Dry Aquifer, DRY COUNTY! Where will we get water? Say No to Tenaska.”

This argument resonated with the scarcity of water in West Texas, as the TTEC would require a substantial amount of water each day. If TTEC employs normal wet cooling, it would require ten million gallons of water per day. However, based on the scarcity of water, TTEC is investigating a dry cooling method that would require approximately one million gallons of water each day, but would significantly impact the project’s economics (Tenaska Inc 2009).

Figure 3. Sign showing opposition to the Tenaska Trailblazer Energy Center. Window is in downtown Sweetwater (Photograph taken by: Nicole Persons).

The convergence of the TTEC project and the wind energy industry in Nolan County is important to this study because it is possible that perceptions and opinions regarding wind energy are intertwined with opinions on the TTEC. One question I wanted to ask was whether wind energy had altered opinions on energy more broadly, and using the TTEC was a good prompt in creating discussion with respondents. Comparisons between the TTEC project and the wind energy industry could reveal underlying perceptions and motivations regarding wind energy. Therefore, based on the significance of the TTEC project in Sweetwater, questions were asked during the semi-

structured interviews to determine various perceptions of energy sources and whether the TTEC will affect the image of Sweetwater as the wind energy capital.

Themes absent from current scholarly literature on the impacts of wind energy include perceived changes to public infrastructure, sense of community, and the labor market but these seemed to be appropriate geographical issues relevant to the topic. Questions encompassed wear-and-tear on roads and other possible strains on public infrastructure. From the initial interviews, it was also determined that changes to county schools and the county hospital had resulted from increased tax revenue from the wind energy industry. It was important to gather the perceived positive and negative impacts the wind energy industry and resulting tax revenue has had on the local public infrastructure. Also related to the impacts on public infrastructure was the impact on the sense of community, or sense of place. From the semi-structured interviews it was determined that some key actors perceived that the wind energy industry had either positively or negatively changed the sense of community in Sweetwater, Texas. Changes in the labor market due to wind energy construction, and the associated impacts of the construction boom-and-bust cycle, have also been absent from scholarly literature but were prevalent in preliminary research and initial interviews. Therefore a section of questions were created to discern the perceptions of the wind energy labor market, employees, and the local impacts. The answers to the questions relating to public infrastructure, community, and labor resulted in numerous concourse statements, which were aggregated into the community category to represent all the perceived impacts the wind energy industry has had on the local community.

Other important factors related to wind energy development are the processes of tax abatements, wind royalties, and landowner benefits; these, therefore, were themes covered in the semi-structured interviews and the concourse. Many factors have contributed to the dramatic increase in wind energy development in the U.S. and specifically the state of Texas. One important factor that has helped wind energy development is federal and state government tax credits or incentives, such as federal Production Tax Credit (PTC) (Bohn & Lant 2009; Parker 2008a; Vachon & Menz 2006). The Texas State Senate enacted a Renewable Portfolio Standard (RPS) in 1999 and expanded it in Senate Bill 20 in 2005, which required retail electric providers to phase-in renewable energy to the electrical grid (Parker 2008a). On a local scale, various counties across Texas, including Nolan County, have implemented tax abatements to entice wind energy companies to build in their county.

The tax abatement process consists of a taxing entity (such as a county, school district, or hospital district) allowing a tax payer (individual; firm) to pay a reduced percentage of the required taxes for a certain period. For wind turbines, Nolan County commissioners decided that the wind energy company would pay 40 percent, and Nolan County would abate 60 percent, of the taxes for the first five years. For the following five years, the wind energy company would pay 60 percent of the county taxes and the county covers 40 percent. After ten years the wind energy company would pay 100 percent of the county taxes (11_01_24Apr09)[1]. The abated taxes are taxes on the monetary value of the turbine in addition to the taxing of electrons (production of energy over time). On

[1] (Respondent 11, Interview 01, 24 April 2009) Interview recorded, transcribed, coded.

average a new turbine is still valued at between $750,000 and $1,000,000 (05_01_24Apr09). However, as each year passes, the wind turbine depreciates in value, which decreases the amount of taxes received by the tax entity, in addition to the tax abatement agreement. Therefore, tax abatements have created debate in Nolan County, raising the issue of whether tax abatements should be used at all, and whether tax abatements stimulate economic development. Nonetheless, tax abatements are considered to be one of the crucial factors that have led to the state of Texas becoming the leader in wind energy capacity.

The permitting process discussed previously revealed that the relationships between the landowners and wind energy developers are crucial to the development of wind farms in Texas. Since there is a minimal permitting process in Texas, the main negotiation is between the landowner and the wind energy company. The contract between the two parties is a wind lease. This contract enables a wind developer to construct turbines on a landowner's property and as a result, the landowner is compensated through wind royalty or lease payment. Wind royalties are an important aspect of the wind energy industry in Texas, and therefore questions were included to determine the social and economic impacts the wind royalties have had on the local community.

Revised Interview Schedule

After the first five interviews were conducted, it was evident that the interview schedule needed to be revised and shortened. Several questions, mainly related to planning processes, were eliminated. The planning processes (i.e. community meetings)

either never took place or were not significant to the interviewees. The revised schedule (Appendix C) allowed for a more cohesive set of questions, but also allowed for more contribution from the interviewee. The second round of interviews was conducted in May 2009; interviews were less structured and encouraged interviewees to elaborate on their opinions. Some questions were also eliminated from some interviews, as the questions were asked for general information or for example, how the tax abatement process works. This was not a relevant question for all of the interviewees and therefore eliminated on some of the interview schedules.

However, some questions were asked of all interviewees to gather a range of perspectives on subjects that resulted in strong opinions and various viewpoints. One question that was asked of every person was, “Has the wind industry affected the sense of community?” This question resulted in a range of opinions, with varying degree of significance to the interviewee. This question and many other significant questions resulted in many Q-statements that made up the concourse. A question was deemed significant when it produced a wide range of opinions. These questions generally dealt with issues that have been debated in the community. For example, question number three under the subheading of Energy was “What is your opinion of the Tenaska Trailblazer Energy Center Plant? Do you think the Tenaska plant complements wind energy, or takes away from Sweetwater’s image of being the Wind Energy Capital?” This question resulted in many different opinions as the proposed Tenaska Trailblazer Energy Center was a significant topic to many of the interviewees. These questions resulted in many different statements about energy and even a comparison between conventional and

renewable energy. The answers to these questions allowed a greater understanding of the various perceptions of different types of energy sources in comparison to wind energy.

Selecting Participants

Q-method is based on the perceptions of the elites, decision makers, or key stakeholders, as opposed to the perceptions of the general population. Therefore, systematic, probabilistic, convenience, random sampling, or other sampling methods is unsuitable. Purposive and snowball sampling are effective ways to obtain key stakeholders for the sorting necessary in Q-Method. The snowball sampling technique comprises of initial contacts providing references to others whom are relevant for the researcher to contact. Wright & Stein (2005, 495) propose that snowball sampling is "designed for the explicit purpose of obtaining systematic information in situations in which convenience sampling is inappropriate and probability sampling is unrealistic." Stakeholders were initially defined as people prominent in political and technical aspects of city and county government, and also state services provided in Sweetwater. Stakeholders were asked whom they perceived as other key actors or stakeholders associated with wind energy development, and whom they perceived as key individuals with no association with wind energy. These key stakeholders may have been missed without the input from several key stakeholders who know which people have been either affected by the wind energy development or had a role in aiding wind energy companies. Snowball sampling is also important in revealing people's perceptions of the key actors are and are not in relation to the wind energy development in Nolan County. However, an important aspect of Snowball sampling is adhering to confidentially policies (Wright &

Stein 2005). Therefore, the person who made the referral was left unknown to the referred contact, unless it was otherwise approved by the person who made the referral. This was to ensure the confidentiality of those interviewed and prevent any emotional harm to participants.

Phase I Interviews, Transcripts, Coding

The first list of potential interviewees was determined through purposive sampling determined during preliminary research. It was determined that key stakeholders consisted of local elected government employees that were pivotal in the wind energy industry in Nolan County and landowners with turbines on their property. Following the purposive strategy, five semi-structured interviews in April 2009 were conducted and another eighteen people were suggested through the snowball sampling technique. The snowball sampling technique is crucial for this study as it is the best way to determine the key actors involved in the local community and the wind energy industry. Preliminary research determined that the key actors were local elected government officials and landowners with turbines. However, as more interviews were conducted, the list of key actors expanded to include local business owners, non-elected government officials, representatives of taxing entities (school and hospital districts), lawyers, and other prominent individuals. The snowball sampling technique also revealed that landowners should be separated into ranchers and farmers because of different perspectives toward wind power.

In addition to the peer and non peer-reviewed literature, preliminary research continued through the collection of newspaper articles and websites. Articles were

gathered from two local newspapers in the region, the Sweetwater *Reporter* and the Abilene *Reporter*. The online archives for both newspapers consisted of approximately two years of articles. Even though the archives did not include articles written before or during the main construction phase of the wind turbines, the articles still contained relevant and important information that was used as a source for developing the concourse. The local newspaper staff wrote most of the articles gathered. However, some of the articles included letters to the editor, as well as comments left on the newspaper website. These comments were written by individuals and usually consisted of strong opinions on topics related to wind energy and were selected as statements for the concourse. Over sixty articles were used for background information on the community and the wind energy industry in the region, determining the key actors of the wind energy industry in Nolan County, and as additional sources for developing concourse statements.

Following transcription and coding of interviews, several statements were highlighted as significant for the purpose of determining the Q-sample. A statement was deemed significant if it represented a perception or opinion that was either similar or different than what other have stated, or emphasized as important during the interview. The emphasis was either made explicit by the interviewee or it was deemed significant if a considerable amount of time was spent describing this opinion, or it evoked a strong emotion which could be evident through their word choice or demeanor. For example, the following segment from one of the preliminary interviews (07_01_23April_09) reveals an important issue to the respondent and was deemed a significant statement:

> Why in the world would you do that [abate taxes] if you need to build a new jail, or you need to be worried about infrastructure on

> your roads at some point in time? You need to be collecting that tax….take care of it as you are doing it. As the infrastructure degrading is going on, you got to take care of it. Of course I'm on the soap box, but there's going to be a day of reckoning**,** when all this stuff hits, and if they haven't collected tax on. It easier to tax it along, then get it all at once, especially at a lower tax rate.

Statements were chosen according to three criteria: the interview question; association with a specific topic; or an extreme opinion. The statements that were chosen based on the interview question that was deemed significant during the collection process. The answers to these statements were automatically added to the list of preliminary statements. This ensured the statements represented the appropriate range of perspectives.

Over 200 statements were selected based on the categories of the semi-structured interviews to ensure a wide range of topics relating to the effects of wind energy on the local community. This selection process is known in the literature as strategic sampling (Webler et al. 2009, 8-9), where the concourse is separated into several categories or foci based on literature or preliminary research. Statements were also chosen based on sub-topics in each category. For example, an opinionated statement relating to taxes would have been selected to be in the initial statement list, but was also chosen because it related specifically to tax abatements. Therefore, a list of categories emerged as the selection process proceeded. Initially, sixteen categories were developed to organize the topics of the statements: attitudes, aesthetics, energy, economy, environmentalism, public infrastructure, land royalties, community, taxes, labor, time before the wind industry, housing market, land owners, hunting, and what another community should do if faced with the wind energy industry.

During the initial selection process, some statements appeared to be informational or technical in nature. Informational and technical statements focused on labor or taxes remained mostly such as how the tax abatement process was conducted in Nolan County or the type of jobs associated with the wind industry. These were considered during the first set of statements because the statements could be combined with another statement, made by the same respondent, to clarify. If the statement could not be combined with a statement that referred to a perception rather than background information, then the statement was eliminated. However, an important statement that was selected as one of the final statements appeared to some people to be a mere fact, where others found the statement to be an opinion. Statement number 13 was stated in the interview as a statistic: "There are a minimum of 300 full-time wind energy employees located in Sweetwater that were not here eight years ago. If you do not count the employees that work for government agencies, the wind industry would be the second largest employer in Sweetwater." However, it was included in the Q-sort to determine if people in the community perceived that at least 300 wind energy employees work in Sweetwater. This is an example of a statement that has relatively few shades of meaning, in that respondents would perceive employment differently.

After ten interviews were conducted and 300 statements were developed, it was evident the information and perceptions of those interviewed had reached a certain level of saturation or repetitiveness. The main goal of creating the concourse is to determine the breadth of perceptions held by those in the community, whereas gathering all possible

perceptions that are slightly different than others collected is less relevant (Eden et al. 2005).

The process of selecting statements from interview transcripts was based on many different factors. One of the factors that related to the inclusion of a statement in the concourse was whether I saw the statement as appropriate and on the emphasis used and demeanor of the person during the interview. If during the interview there were specific topics or statements that received strong emphasis by the interviewee, that statement was highlighted and selected. In addition, if a specific topic emerged in several interviews and was not prompted by the interview schedule, those statements were also included in the initial concourse.

Establishing the Q-Sample

The list of 300 statements was whittled down to a manageable number of 150 statements, mainly by eliminating statements that were repetitious or had unclear meanings. Statements were repetitious because the answers referred to the same questions among interviewees with similar perspectives. During this process, the statement categories were changed or eliminated, which resulted in the organization of the statements. Once the category changes were made, clarifications to statements were made. For example, statements that needed additional information to elucidate what the interviewee was referencing were added to include those supplementary meanings.

Developing the concourse takes a considerable amount of time to ensure the concourse is representative of the range of perspectives on a subject. Additionally, finalizing the Q-sample can also take several weeks, but volunteers can help to finalize

the statements (Eden et al.2005). A rating scale (Appendix D) (based on Q-Method literature) was developed to rank the 150 statements in a more objective approach (Webler et al. 2009, Eden et al. 2005). This rating scheme was used to eliminate statements to help in finalizing the Q-Sample. The rating criteria included a ranking scale from 1-5, with number one as the lowest ranking. A statement with a rating of 5 is a statement with the highest ranking and is excellent in considering the domain of the project. In addition, the statement has a clear idea with most respondents having an opinion about the statement. A statement with a rating of a 3 or below by one or both thesis advisers were either completely eliminated from the statement list, or incorporated with another similar statement.

After each of the 150 statements were ranked using the rating scale, eighty statements were chosen if the rating was a 4-5 rating, or if a statement that was important to include and could be edited to have a higher rating. It was also determined that statements relating to the Tenaska Trailblazer Energy Center should not be included in the final Q-statement list. Questions relating to the Tenaska coal plant were included in the initial interviews as a comparison between conventional and renewable energy sources; however, the some Tenaska statements selected for the initial list were on the specifics of the proposed coal plant. These statements represent perceptions significant to those in the community, but are not relevant to the wind energy industry.

From the eighty statements, the final twenty-seven Q-statements were chosen. The final statements were chosen based on a revised set of categories. The new set of categories was developed by combining the previous sixteen categories into five

categories that encompassed all of the topics of the original categories: aesthetics, energy/environmentalism, community, landowners, and taxes (Appendix E). A fewer number of categories did not limit the various topics, as the new categories encompassed many different topics. Many categories were integrated into the community category because the previous categories such as public infrastructure and local economy have direct impacts on the local community. The category “attitudes” was created to represent changes in attitudes towards the wind energy. However, this category was a misnomer because all of the statements represented attitudes or opinion. Therefore, the “attitudes” category was eliminated and the statements were placed in other categories. Approximately five statements from each category were chosen for the final list, except the “community” category. The “community” category consisted of several more statements than the other categories because it included statements on labor issues, housing market, and other perceived impacts on the local community.

The final statements were selected in the same manner as the previous selection process. Many statements were combined if the statements had similar perceptions, or if the same person declared both statements. In addition, it is important to retain the range of perceptions for each topic. Statements were compared against each other if the statements were on the same topic. A statement was chosen over another if the opinion projected through the statement was more of an extreme viewpoint than a conservative attitude. More extreme statements were chosen because it would evoke a strong opinion from those who would be participating in the Q-Sort. It was important that both positive statements and negative statements were chosen. The positive statements revealed

positive perceptions of wind energy, whereas the negative statements revealed more negative impacts of the wind energy industry.

Once the Q-sample statements were finalized, the statements were printed onto index-sized cards. For each card, an identifying number (for each statement) was printed on one corner. For convenience of the researchers, the number was printed opposite the statements so the numbers could be recorded while sitting opposite of the sorter, reducing error. To show the sorters what the layout of the statements should be, a chart was constructed (Figure 1) and printed along with the statement cards. Two sets of cards were printed, and each card was laminated.

Phase II: Conducting the Q-Sort

Phase II was to conduct the Q-Sort in May through August 2009. Twenty-one participants were purposively chosen, as I described in section 3.3 (Appendix E). Each participant was asked to read through all of the statements. Then the participants placed the statements into three piles: agree, disagree, and neutral. For example, statement number four was a comment made by one of the stakeholders during one of the first interviews: “The people that think the turbines are unattractive are the same people who do not own any turbines or will never own one.” Therefore, during the Q-sort, the participant decided if they agreed or disagreed with the statement. If they did not agree or disagree with the statement, it was placed in the neutral pile. This was done for all twenty-seven statements. Next, respondents had to decide where each statement would be placed on the normal distribution (Figure 1). Participants were told that “one statement can be placed in each white box and for example only one statement can have a ranking

of +4, which is a statement you would most agree with. Next, only two statements can have a ranking of a positive 3 and so on." Some respondents had a difficult time ranking statements, when they had many statements that they either agreed or disagreed with. Overall, participants found that they either agreed or disagreed with most of the statements, and put only a few statements as neutral. This process forced people to consider carefully which statements were most important to them. Overall this process took between 20 and 30 minutes to be completed by each respondent. The following statements reveal the respondents perceptions on the sorting process and about the overall content of the statements. For instance respondent 01 stated,

> I think that a lot of [the comments are] job related, but I also tried to step away from my job, and look at as an individual from the community. When we have an opportunity to bring in an industry…that we have employed 300 jobs still, and that is a tremendous impact to our community, and if this continues to go on, how can you really be so negative towards something that is good for the environment, good for our community, and has good paying jobs. I think some of the comments that I wasn't surprised to hear, concerns about the rents and house values…I see someone that if you are making so much an hour, and their rent went up 200 dollars that would be tough to pay…but that is what the market demands, and you have an opportunity to bring the level of pay up. There are some sections of people that are going to be left out, but as a whole if you look at today versus 5 years ago. There are people making more money than they were 5 years ago…and they have more opportunity to spend more money, which in turn helps the community.

Some respondents commented on the how many statements they perceived were positive and negative. For instance participant 04 stated that "I felt more negative statements were generated than there should be, because it is mostly positive. Anything else, positive doesn't get a lot press. You get a whole lot of press from negativity. Our

coal plant, the negative comments get a whole lot more than what can be beneficial. I think it's pretty equal for pro and con." In comparison, respondent 05 stated that "I personally I haven't heard this negative talk, but I am also not a coffee shop person, or beauty shop person. So I do not hear these negative comments" (05). A business owner stated,

> I think it covers [the breadth of perceptions] pretty good. I had more statements that I agreed with than disagreed with, I think that pretty reflects the population that we are 60-40 in terms of how you feel about the turbines… I think this is kind of augmented with the coal plant coming in that you know, otherwise the turbine thing would have died down somewhat, but the coal plant is keeping the concept of energy on people's mind more and also gets us into the political of the coal represents the oil and gas and the turbines represent the green. Ultimately it's good for this community. It's put us in the news and at the forefront… even if it's not putting anything in your pocket, just for the exposure. We are feeding the big city…that signified a political change…which has brought you to town. The people that are worried about how it looks…there's a lot more prime real estate in the state of Texas that needs protected. They would be lucky to get people to drive and go see the turbines and have some sort of an excursion" (26).

About two-thirds of the respondents did not feel the sort was difficult to complete. The remainder found the sorts very difficult to complete. For instance participant 25 commented, "Well the hardest part was determining those very statements that are positive negative and positive in the same card, and placing them in a relatively to the strength of their statements. Those with very little differences to me, it doesn't make a big difference which way they go, and the way I perceive is the attitude in the area." Only one respondent (19) was unable to finish the sort, as he felt he didn't know enough about some of the statements to have an opinion one way or another. This respondent was asked

to pick the statements he most agreed and disagree with and those were recorded in order. The other statements he did not have an opinion on were placed in the neutral sections in no particular order. This sort is still valid as the statements the respondent most agreed and disagreed were recorded and therefore was included in the analysis. However, any conclusions made about this respondent can only be limited as the rest of the statements were not ranked. Following the sort, an open-ended interview was conducted to elicit the respondent's rationale and understanding why they placed certain statements in highest or lowest scoring categories.

Factor Analysis

Once the Q-sorts were entered into the PQMethod software and the initial factor analysis was complete, I decided how many factors would be appropriate. This aspect of Q-Method is frequently overlooked in the literature. One of the first statistics used to determine the appropriate amount of factors were the eigenvalues of each factor (APPENDIX I). Factor one accounted for 46 percent of variance with an eigenvalue of 9.7545, while Factor 2 accounts for only 12 percent of variance with eigenvalue of 2.5159. Retaining only Factor 1 would indicate that the study region has only one social perspective regarding socio-economic impacts of wind energy. Retaining only Factor 1 and Factor 2, based on eigenvalue and percent of variance explained, would have indicated that two perspectives exist, and would have omitted the variation obtained in the interviews. Therefore, to include the subtle yet significant variations, factors 3 through 5 were included for a 5-factor solution. I did not include factors 6-8 because the

eigenvalues were below 1, and did not add any substantive information. In addition, factors 6-8 only accounted for 9 percent of variation.

Another criterion in selecting the number of factors is the number of statistically significant or "distinguishing" statements for each factor. For example, with the three-factor scenario, Factors 1 and 2 had a positive correlation (0.3915), and Factor 3 had barely a positive correlation with Factor 1 (0.0089), and a negative correlation with Factor 2 (-0.2378). These correlations and the associated distinguishing factors resembled some of the variation of perceptions, but in a 2-factor solution, it would have been difficult to discern between Factor 1 and Factor 2 in terms of the qualitative description that Q-Method entails. In addition, the three-factor scenario would not account for 16 percent of variation that is accounted for in Factors 4 and 5. In the four-factor scenario, which would account for greater percent of variance, Factor 2 had no distinguishing statements to describe the perceptions of the loaders. For these reasons, I determined the five- factor scenario accounted for the breadth of perceptions depicted in the interviews, while accounting for 77 percent of variance, and the eigenvalues for all factors met the threshold of being greater than 1; in addition, each factor had at least two distinguishing statements.

In January 2010, after the factors were identified and tentatively described, this information was given back to the participants who loaded highly, and were asked to comment on their social perspective to determine if they felt the description is representative of their perceptions. This iteration phase is called for in the literature, but the means by which it is accomplished is frequently overlooked. The respondents were

asked to comment on their opinions of the other social perspectives and whether they believed the social perspectives were representative of other perceptions in the community. Six of the twenty-one participants were asked to participate in iteration phase, which lasted between ten to thirty minutes. Each participant was given a chart that listed each social perspective (APPENDIX G) and a select number of statements that would describe and differentiate each perspective. The respondents were asked which perspective they felt most represented their perceptions. Then the respondents were told to which social perspective Q-Method found them to be loaded. If the respondents chose another social perspective that they felt represented their perceptions, they were asked why they initially chose that perspective, and what needed to be changed or added to the descriptions to better represent their perceptions. The respondents were not only asked if the content in the descriptions were correct, but if the wording and the social perspective name was representative of their perceptions.

The first two respondents were given six of the Q-sort cards, which showed the statements their social perspective most agreed (+4, +3) or most disagreed (-4, -3). The rankings given by the other social perspectives were written on the card with a dry erase marker to show the respondent how the other perspectives ranked those statements. Despite the added information, the respondents were drawn to the chart, and found the Q-sort cards to be distracting. Therefore, the remaining respondents were not given the Q-sort cards, but were asked to focus on the social perspectives chart. Their comments and their suggested new names for the social perspectives were written down, and are discussed in Section 4. In addition, the respondents were asked to discuss the other social

perspectives listed on the chart, and were asked if they felt these perspectives could be representative of other views held by people in their community.

4. RESULTS

My analysis revealed five factors or empirically determined and statistically significant social perspectives (Appendix G). Factors were found be either positively correlated or slightly negative correlated with each other, indicating that large differences of meaning were not present (Appendix H). Distinguishing statements—that is, statements that for each factor were ranked statistically significantly—are listed in several tables for each factor (Appendix I, J, K, L, M). Consensus statements in which no significant differences were observed between factors are listed in Appendix N. The complete matrix of z-scores and rankings are listed in Appendix O. Rotated factor loadings are given in Appendix P.

In this section, I summarize each factor according to distinguishing statements and the rationale provided by respondents who sorted the statements. I point to areas of agreement and disagreement, following the call by Ellis and colleagues (2007) to understand how stakeholders find subtle meaning in benefits and drawbacks of wind-power development.

4.1 Iteration Phase

The iteration phase is the last step of Q-Method, essential to good practice of Q-Method allowing respondents to review the preliminary results and suggest any changes to the social perspective names or descriptions. The iteration phase was conducted in January 2010, after the preliminary findings were finished. The following social

perspectives have been updated because the iteration revealed some respondents suggested changes to the social perspective names and descriptions. Six of the previous twenty-one respondents took part in the iteration phase, and were chose because they loaded highly with a social perspective. Two respondents from Factor 1, two respondents from Factor 3, one respondent from Factor 4, and one respondent from Factor 5 were interviewed for the iteration phase. None of the loaders from Factor 2 were available for the iteration phase, but the other respondents who also felt they could have loaded in Factor 2, suggested changes for the social perspective.

Table 3 shows the progression of the names of the social perspectives through the different phases of Q-Method. Once the preliminary analysis was completed the factors were given names based on the qualitative information that was collected during the initial interviews and Q-sorts. The first factor was given the name “Wind Welcomers” and the second factor was given the name “Land-Based Wind Welcomers.” Factors three and four were given the names “Tormented About Tax Abatements” and “Favorable Towards Tax Abatements.” The final factor was given the name “Concerned About Community.”

Each respondent was given a chart (APPENDIX G) which listed each of the social perspectives and associated descriptions. The respondents were asked which perspective best represented their perceptions. Then each respondent was told the social perspective Q-Method found to be the one they highly loaded with. Most of the respondents felt they could identify with several of the social perspectives, and one respondent (07) specifically had difficulty with accepting one social perspective because

his perceptions varied due to whether he viewed the topic from a personal or professional point of view.

Table 3 Changes made to social perspective names throughout analysis.

Factor Analysis	Preliminary Phase	After Iteration Phase	Justification
Factor 1	Wind Welcomers	Wind Welcomers	No change
Factor 2	Ambivalent Landowners	Land-Based Wind Welcomers	Needed to account for Tenant Farmers
Factor 3	Tormented About Tax Abatements	Disenchanted About Tax Abatements	"Tormented" was too extreme
Factor 4	Favorable Towards Tax Abatements	Favorable Towards Tax Abatements	No change
Factor 5	Concerned About Community	Community Advocate	"Community Advocate" was more representative

He stated that it was difficult "trying to see all the different sides of something. You know, I look at things I have to think about…what [people in my office] think about things, what some citizen approves, and then what I think about it too, then kind of blend everything together and come up with a perception."

Then, the respondents were asked why they identified with those perspectives and then were asked what changes they would make to the social perspective on which they

loaded. Overall, most of the respondents agreed with the social perspective chart, but several had specific suggestions to change the wording of some of the descriptions and/or the name of the perspective. The reasons for the suggestions usually related to the strong connotations they felt were represented by the descriptions, which they did not believe accurately, described their perceptions. The respondents did not want to be seen as having the extreme perceptions they felt the chart suggested.

The changes suggested by the respondents were documented and the chart was updated, with changes in italics (APPENDIX H). Loaders in Factors 2, 3 and 5 felt the names of the social perspectives were unrepresentative of their perceptions and their suggested names were used. “Ambivalent Landowners” (F2) was changed to “Land-Based Wind Welcomers.” “Tormented About Tax Abatements” (F3) was changed to “Disenchanted About Tax Abatements” and “Concerned About Community” (F5) was changed to “Community Advocate.” Further discussion on the changes specific to each social perspective can be found in sections 4.3-4.7.

4.2 Social Networking

The social networking site, Facebook was also used as a means of keeping in contact with respondents and events taken place in Sweetwater. Two of the respondents from this study contacted me through Facebook after the iteration phase. From social networking, I have been able to gain additional information, keep in contact with respondents, and be updated of events that are currently taking place in Sweetwater even after the iteration phase. Confidentiality was not an issue in this case because the

respondents' first made contact, or were able to deny requests to be linked through Facebook.

4.3 General Interpretations

Overall Support for Wind Energy

Overall the key stakeholders from Nolan County thought the wind energy industry has had positive impacts on their economy and community. The support for wind energy is statistically evident through the positive correlations of Factors 2-5 with Factor 1, which represents stakeholders who have very strong support for the wind energy industry in Nolan County and believe there have not been any negative impacts due to the wind energy industry. For example, the correlation between Factor 1 and Factor 2 is 0.4310 (Appendix H). Therefore, Factor 1 and Factor 2 share similar perceptions on the overall positive impact the wind energy industry has had on the community. However, differences of opinion or more subtle ways of supporting wind development (Ellis et al. 2007), are captured through the discussion of the distinguishing statements for each factor (see below). Factors 4 and 5 also are positively correlated to Factor 1, which also reveals the loaders associated with these factors also generally believe the wind energy industry has had overall positive impacts. However, Factor 4 represents disagreement with the positive economic impacts, and Factor 5 represents disagreement with the positive impact on the community. Factor 3 had a slightly positive correlation (0.0512) with Factor 1, suggesting that Factor 3 represents the most skeptical

position on the overall positive impacts the wind energy industry has had on the local community and economy.

Consensus Statements

The general consensus statements (Appendix N), which have no statistically significant differences between any pair of factors, reveal that all five factors represent weak support for renewable energy. Statement 18 represents this view: “People from this area do not take the pledge of being green and only for renewable energy. You have to be for every type of energy source because gas pumps are not going away for decades.” In each factor, this statement was ranked between -1 and +2, which indicates this statement attracted neither extreme support nor disagreement. Stakeholders do not believe energy issues are significant and do not believe the main reason for supporting wind energy is because it is a renewable energy source. Statement 17 (“Farmers may have to plow around a wind turbine, and the cattle may feed up to it, but ultimately it has not taken anything of consequence when you compare it to the pollution of a coal plant or nuclear waste”) also indicates the idea that wind energy as a renewable energy source is insignificant compared to other topics such as tax abatements and economic impacts. Each factor gave statement a ranking of neutral to +1.

Further support for the weak support for wind as a renewable source of energy is seen in responses to statement 15: “Wind energy does not change your view on renewable energy sources. It is not really even green energy. Even though we are not burning coal to generate the electricity, inside the wind turbines are components that are going to be thrown into a landfill in a couple of years anyway.” In all factors, except

Factor 3, this statement was scored as -1 or neutral; in Factor 3, this statement was raked as -3. The slight negative tendency of the rankings reveals some stakeholders believe wind energy does change your view on renewable energy sources, but it has little significance to them.

The last consensus statement (7) describes the perception of wind energy dominating local politics, and the perceived separation between oil and gas stakeholders and the wind energy industry: “People that used to be the main oil and gas players do not like the wind industry because it is eating into their oil and gas stronghold. The wind industry has politicized the town between wind and oil. Currently in local politics, everything is about wind, and that has made the oil and gas people angry.” The ranking of this statement by all factors was either -1 or 0, which shows most people did not strongly agree or disagree with this statement and it had little importance to them.

4.4 Wind Welcomers (Factor 1)

The Wind Welcomers factor describes stakeholders who argue for overwhelming positive impacts of the wind energy industry on their community. These stakeholders witness positive impacts through their businesses, jobs with the local government, being a landowner, or through community events. The Wind Welcomers focus primarily on the positive economic impacts that benefit their community from the wind energy companies, and also strongly support tax abatements as a way to entice wind energy development. In addition, this group of stakeholders strongly supports wind energy development, as it has provided well paying jobs, additional income to landowners, and additional tax revenue

to the city and county. This group has not seen any negative impacts to the local community. Furthermore, Wind Welcomers believe negative impacts such as increase in rent, to be a result of a growing, changing economy, and improvement to the community as a result of wind energy industry. Negative impacts are seen as minor compared to the overwhelming positive impact the wind industry has had on the community.

Iteration Phase

During the iteration phase, loaders from the Wind Welcomers felt the name and description of the social perspective was representative of their perceptions. Respondent 21 felt the name "Wind Welcomers" represented those in the community that "strongly welcome" or strongly support wind energy development. In addition respondent 21 felt the study should have included people's perceptions of transmission lines and imminent domain because it is very relevant to current events in Nolan County and the rest of Texas. As he stated: "if you needed to add anything, I would have asked 'do you favor imminent domain for right of way for utility lines?'" Even though respondent 21 felt questions should have been asked about transmission lines, those questions were not asked because at the time of the initial interviews, the transmission line scenario had not become as big of a topic as it was during the iteration phase. Therefore, people's perceptions about transmission lines and imminent domain were not elicited, but it is useful information for the future. Respondent (25) also suggested some changes to the descriptions of the Wind Welcomers perspective (APPENDIX G). His main concern related to the statement "Strongly agrees there have not been any negative impacts due to

the wind energy efficiency." Respondent 25 believed Wind Welcomers recognize some negative impacts due to the wind energy, such as,

> the [lowered] efficiency of farming the land because of the roads and footprint of the windmills and I understand that in the ranch land that they won't have the opportunity to for areal application of herbicides, pesticides, whatever and I don't know how they're going to deal with that, but those are, there are negative impacts but they are relatively minor and certainly don't greatly affect the acceptance of the wind farms from the land owners (25).

Respondent 25 also commented on the description "Strongly supports the wind energy industry because the wind energy companies have provided jobs, use supplies, and buy gasoline from local businesses" (APPENDIX G), by stating that the description,

> emphasizes the jobs that are used, that are provided in the area and the supplies that are consumed, it also emphasizes the amount of gasoline that's sold. I know there's a tremendous fleet of automobiles, but those people that drive those automobiles also live somewhere and I think just as importantly is they rent, lease, apartments, homes, houses, whatever, and that sometimes they bring their families and kids enroll in school, but I would probably change that from buying gas, just gasoline, to something in the neighborhood of bringing the families to the community (25).

Therefore, the description was changed to "Strongly supports the wind energy industry because the wind energy companies have provided jobs, use supplies from local businesses, *and have brought in new families to the community,"* (italics show changes) to emphasize new families have been brought into the community.

Descriptive Statistics

Factor 1 (F1) had the highest eigenvalue (9.7545) compared to the four other factors and had the lowest standard error (0.137) (Appendix G). F1 accounted for the highest percent of variance (37 percent). The Wind Welcomers had the highest percent of variance and lowest standard error because F1 had the highest number of loaders (13) out

of 21 participants. This large group of participants was also evident in the interview process, as it seemed a large percentage of stakeholders had many of the same opinions on the socioeconomic impacts of wind energy. Those who loaded highly in this factor (Appendix P) included six local government officials, one prominent individual, three landowners, two government officials/landowners, and one business/landowner. F1 was positively correlated with the other factors, especially F2 (0.4310) and F4 (0.3491), but the least positively ranked factor with F3 (0.0512).

Distinguishing Statements

Factor 1 had two associated distinguishing statements ($P < 0.05$) (Appendix I). The first distinguishing statement was number 22, which is statistically significant ($P<0.01$) with a z-score of 1.42. The loaders in F1 ranked statement 22 with a (+2), which means these loaders agreed with this statement, but other statements ranked higher. Statement 22 ("Farmers used to cuss the wind because it killed crops, carried moisture away, and dried out the land. They now love the wind, because income from a windmill is more dependable than dry-land cotton farming, where drought and hail are constant threats") describes the idea that farmers changed their minds about wind, from the source of crop harm to energy production (income generation) on their land, has made farming less difficult. The second distinguishing statement of F1 was statement 6 ("There have not been any negative impacts due to the wind industry. People have not come into the community committing crimes, for example."). Loaders on F1 also agreed with this statement (rank = +1, z-score = 0.76), but found many other statements that they agreed with and found more significant. Statement 6 reveals that loaders on F1 believe there

have not been any negative impacts to the community, due to the wind industry. F1 loaders also agreed that wind energy employees and associated laborers have not come into their community and committed crimes.

Other Key Statements

Statement 26 ("The wind energy companies have provided jobs, use supplies, and buy gasoline from local businesses. The wind industry has been good for the merchants of Nolan County and has allowed for tax values to increase which leads to lower tax rates") was ranked +4 and therefore, overall, this statement was most important to many of the Wind Welcomers. The Wind Welcomers ranked Statement 19 ("'Turning wind into wealth' a slogan familiar to many people in this region because many landowners, businesses, school districts, and other taxing entities have seen extra wealth now that wind is being used as a resource") with +3. This suggests that most Wind Welcomers believe many people in the area see wind now as an economic resource and landowners, businesses, and taxing entities have received more wealth due to the wind energy industry. Statement 13 ("There are a minimum of 300 full-time wind energy employees located in Sweetwater that were not here eight years ago. If you do not count the employees that work for government agencies, the wind industry would be the second largest employer in Sweetwater") was also given a high idealized ranking (+3).

Wind Welcomers strongly disagreed (-3) with statement 25: "Nolan County, the community of Sweetwater or schools have not benefited from the wind farm tax revenue yet." This suggests that Wind Welcomers believe Nolan County, the community of Sweetwater and the schools have received benefits from wind farm tax revenue, as well

as many other benefits. Statement 2 ("We have to look at these wind towers dotting our west Texas skyline yet we don't reap any of the benefits from them. The people in West Texas should be compensated for these eye sores") was also given a low ranking (-3). The statement on which Wind Welcomers most disagreed (-4) was Statement 8: "The wind industry has negatively impacted the community. Several businesses are failing now because the wind industry has left. In addition, the wind industry has horribly impacted the local housing market, as it impossible to rent an apartment."

Respondent Rationale for Q-Sorts

Wind Welcomers agreed with statement 22 (+2), indicating the belief that farmers now love the wind from the added revenue the farmers receive from wind royalties. However, only a few loaders had additional comments as to why they agreed with statement 22, mainly because it was perceived as a true statement and everyone in the region would agree. A businessman who is also a landowner (24; F1 loading= 0.8326) and who has turbines on his property stated:

> That's a very true statement (22). It's anytime, farmers and ranchers can get added income, for the use of their land they are usually pretty all for that. Sometimes, that's what it takes to keep the land in the family.

A government official, who is also a landowner with turbines (09; F1 loading= 0.7621) also agreed with statement 22, as he believed the farmer's wind royalties "give them less stress, and do what they want to do…which is farm and ranch." Another landowner (19; F1 loading= 0.7846) also agreed with statement 22, as he believed "we always have cussed the wind, and we have learned to love it, but we still cuss at it…still

don't [always] love it. You know when you go out there and it freeze-dries your face. Most of us that work outside all the time have chicken fried skin…so wind is good, but we still don't love it."

Factors 3, 4, and 5 ranked statement 22 as a neutral statement (0), but the Land-Based Wind Welcomers (F2) disagreed with statement 22 (-2). Loaders felt farmers would still curse the wind, even if they were receiving wind royalties. A government official and landowner (30; F2= 0.9215) reveals the reason for the discrepancy between the Wind Welcomers and Land-Based Wind Welcomers:

> The wind mills have been good, they are still going to cuss the wind, they are farmers by heart. They could win the lotto and never have to work a day in his life; he's still going to farm. The turbines have helped subsidize their income to help them to keep farming, they are still gonna kill crops, and I don't think those guys are going to sit there…my crops are dying but those wind turbines are out there. They are still going to cuss the wind.

In addition, a prominent individual (17; F4 loading= 0.7299) that loaded as Favorable Towards Tax Abatements made a revealing comment about statement 22:

> We hear that occasionally, no one cusses the wind anymore, that's the joke…I guess the wind income can be more dependable because you have that every year, but you have crop insurance too. The minimum on the royalties is not much different than your crop insurance…other than the fact you don't have to pay for it to get it. We have heard farmers say that, so fairly neutral.

Statement 6 has a marginally positive ranking by the Wind Welcomers (+1), revealing a general consensus, but there is some variation in perceptions of the statement. Overall, the Wind Welcomers agree that the wind energy industry had positive impacts on the community. However, the reason the statement was not ranked higher may be due

to the statement strongly states there have not been *any* negative impacts due to the wind energy industry. A government official (01; F1 loading= 0.7651) stated: “I pretty much agree with that [statement]…but I think with any amount of influx of people you are going to have some negatives…but as a whole I do not think the wind industry has been negative on the community.” Another reason why statement 6 was not given a higher ranking may be due to the statement referring to people committing crimes as an example of a negative impact. Many loaders agreed with this statement as they associated negative impacts only with an increase in crime instead of including other possible negative impacts. For example, a governmental official (05; F1 loading= 0.8446) asserted: “I have not seen any indication in the news, that there are groups or individuals committing crimes. Now I have heard that there is some theft at the wind site because people are stealing their resources.” Another government official (14; F1 loading= 0.6529) stated, “I don’t know of any increased crime, so there have not been any negative impacts.” Conversely, a prominent individual (21; F1 loading= 0.6727) focused on their perception of positive impacts and acknowledged, “I don’t think there have been any negative impacts in the community … school enrollment is up … several new jobs have been created. I don’t know of any negative impacts.” A business owner and landowner (24; F1 loading= 0.8326) also focused on how the wind energy industry has positively impacted employment. He stated, “That’s true, the types of jobs that the wind mill companies are providing are higher paying jobs, I guess that’s the type of workers that come in. I have not heard anything of higher crime rate.”

In contrast, Land-Based Wind Welcomers (F2) mostly disagreed with statement 6 (-4), as the statement revealed an extreme perception that there have not been any negative impacts due to the wind energy industry. A government official/ landowner (29; F2 loading= 0.7502) stated, "Well I disagree…people came here to work….I may not be saying they came here and committed a crime, but what do people do when they start making money. They go out to eat and go out to party…and not all of them…they get a DWI or something…People get stopped for drugs… I think there are some problems but not that many…. Everything gots a negative and a positive." Another government official/landowner (30; F2 loading= 0.9215) stated, "There have been, and we have discussed them…there has been crime…we really had to sit down with wind turbine companies using local contractors. The impact on the environment and businesses…that's why I put it last. Anytime you put a big industry in, it's going to have an impact. It ripples and it gets bigger and bigger, not to say it's all negative" (30).

Disenchanted About Tax Abatements (F3) did not believe statement 6 was significant and gave it a neutral ranking (0), where Favorable Towards Tax Abatements (F4) strongly agreed (+3) there have not been any negative impacts due to the wind energy industry. Again, there was a focus on crime, as a prominent individual (17; F4 loading= 0.7299) stated, "I haven't seen a lot of people running around with wind turbine logos, shooting people up…maybe crime has gone up, I haven't seen [it]…maybe because there are more people and more money… more things to steal, but I haven't seen it."

4.5 Land-Based Wind Welcomers (Factor 2)

Land-Based Wind Welcomers represents a social perspective that holds that land-based practices such as hunting and farming are most important in relation to the socioeconomic impacts of the wind energy industry. The Land-Based Wind Welcomers and Wind Welcomers agreed on almost all perceived socioeconomic impacts due to the wind energy industry. The Land-Based Wind Welcomers are also strong supporters of wind energy development, using tax abatements, and believe the wind energy industry has positively impacted the community and local economy. Therefore to show the similar perceptions held by loaders in both groups, “Wind Welcomers” were kept as a part of the name. However, one major difference between these two social perspectives is the Land-Based Wind Welcomers are unsure of the notion there have not been any negative impacts due to the wind energy industry. The Land-Based Wind Welcomers strongly agree the wind energy industry has had a positive impact, but also perceive there may have been some negative impacts that mainly relate to land-based practices such as farming around turbines, hunting, and irrigation.

Iteration Phase

Even though none of the Land-Based Wind Welcomers were available for the iteration phase, one landowner who loaded highly with Wind Welcomers, but did not load highly with Land-Based Wind Welcomers, commented on both social perspectives. Respondent 25 felt he could identify with the F2 because he was a landowner and has seen the impacts the wind energy industry has had on land-based practices. Respondent

25 strongly agreed with the description under “Land-Based Wind Welcomers” which described how farming and ranching impacts due to the wind energy industry. However Respondent 25 commented on how the name of the preliminary social perspective “Ambivalent Landowners” did not account for tenant and absentee farmers and ranchers. He stated,

> I would, somehow or another I’d like to have, in the description some kind of [statement] allowing for the operator, how either the man in who actually farms the land but does not own it or the land (that actually leases and grazes the pasture land but does not own it) [are also] affected by the wind industry…[because] about a third of the land in the Roscoe wind farm is what we call absentee owned, so the land owners don’t actually farm the land (25).

In addition he believed “Ambivalent” to him meant “unconcerned or, uninvolved and we certainly are [involved]…I could see a better description of the land owners who are strongly in favor of it, but still recognize that there are a couple of negative impacts to the land and the operator” (25). Based on these comments during the iteration phase, the social perspective “Ambivalent Landowners” was subsequently changed to “Land-Based Wind Welcomers” to account for the subtle differences between the perspectives, focusing on impacts to land-based practices, but still reveal the strong correlation between the two perspectives as both strongly supporting wind developments (“Wind Welcomers”). The term “Landowner” was also changed to “Land-Based” to account for others who work on the land, but do not necessarily own the property.

Descriptive Statistics

Factor 2 (F2) had the second highest eigenvalue (2.5159) compared to the four other factors and the second lowest standard error (0.277) (Appendix G). F2 accounted

for 14 percent of variance. F2 had the second highest number of loaders (3) out of 21 participants (Appendix P). Two of the three loaders were government officials/landowners, and the third loader was a prominent individual. F2 and F1 held a strong positive correlation (0.4310), which means these two factors are similar and thus the loaders have similar but slightly different perceptions of the land-based impacts due to the wind energy industry. F2 and F5 were positively correlated (0.3452), but F2 and F4 were only slightly positively correlated (0.0512). F2 and F3 however, were negatively correlated (-0.2162) (Appendix H).

Distinguishing Statements

F2 is defined by three distinguishing statements ($P < 0.05$), two of which were more statistically significant ($P< 0.01$) are indicated with an asterisk (Appendix J). The first distinguishing statement, with a z-score of 1.4, was statement 20: “Hunters from other locations see wind turbines and hunting as incompatible. They are coming here for the experience of hunting in the wilderness, and the wind turbines are taking away from that. But hunters in Nolan County hunt deer, and they can deal with the turbines because it has become a part of the West Texas landscape.” This statement compares the perceived impact of wind turbines in relation to hunting atmosphere in locations other than Nolan County. The statement describes the notion of Nolan County hunters accepting the wind turbines as a part of the landscape and that the turbines have no negative impacts to hunting, or animal behavior. The loaders in F2 ranked statement 20 with a (+3), which reveals these loaders strongly agreed with this statement, and it is significant in Nolan County.

The second distinguishing statement (8) for F2 had a z-score of 1.12 and was ranked with a (+2). Statement 8 states: “The wind industry has negatively impacted the community. Several businesses are failing now because the wind industry has left. In addition, the wind industry has horribly impacted the local housing market, as it is impossible to rent an apartment, a storage building, or even a house. The average community member cannot afford it anymore because the majority of the people that live here have not seen their income increase.” This statement reveals that loaders F2 believe that there have been some negative impacts due to the wind energy industry. For example, businesses are failing, and rent has increased for various properties. F2 and F1 maintained a strong positive correlation; however, the two differ significantly on this statement. F2 ranked statement (8) with a (+2), and F1 ranked this same statement (-4). Therefore, these two factors completely disagree with whether the wind energy industry has had *any* negative impacts on the local community. This statement clearly shows a distinction between F1, who believes there have been no negative impacts, with F2 who believes there have been some negative impacts, yet overall the wind energy industry has had a positive impact on the local community.

The final distinguishing statement for F2 was statement 22, with a z-score of -1.12. Statement 22 described the “Farmers used to cuss the wind” idea highlighted earlier. This statement was also a distinguishing statement for F1 which had a ranking of (+2), as opposed to F2 which ranked the statement with a (-2). This shows a clear distinction between F1 and F2, where F2 disagree that farmers now love the wind because of wind turbines on their property. F2 loaders believe farmers still “cuss” at the

wind even if they have turbines on their property, because they are still farmers and become frustrated when the wind kills their crops and carry their moisture away.

Other Key Statements

Similar to the Wind Welcomers, the Land-Based Wind Welcomers ranked Statement 26 ("The wind energy companies have provided jobs, use supplies, and buy gasoline") highly (+4). Statement 24 ("Tax abatements are a great way to invite wind energy companies") was also given high (+3) ranking. Statement 20 ("Hunters from other locations see wind turbines and hunting as incompatible) was also ranked (+3). Negative rankings were given to statement 25 ("Nolan County, the community of Sweetwater or schools have not benefited from the wind farm tax revenue yet"), at -3, and also statement 27 ("Tax abatements and the economic development tax should be done away with all together") at -3. The Land-Based Wind Welcomers factor most disagreed with Statement 6: "There have not been any negative impacts due to the wind industry. People have not come into the community committing crimes, for example."

Respondent Rationale for Q-Sorts

A significant distinguishing statement for the Land-Based Wind Welcomers factor was statement 20, ranked +3, which focused mainly on how hunters from Nolan County do not believe the wind turbines have negatively impacted hunting practices. A government official and landowner (30; F2 loading= 0.9215) stated:

> One of biggest fights for putting turbines in the community was this right here…it's a big place for hunting, and I do a lot of guiding myself during season. I was skeptical about the wildlife,

> and I have seen the affects regarding the wildlife; I thought it would be a permanent deal…Within six month of construction...the wildlife is back, I guide right underneath these things…that's not going to affect…that does when any construction goes on, but nature adapts and it overcomes. I was really surprised it comes back…the land doesn't return where they put the gravel and stuff but the wildlife itself does.

In contrast, many other respondents did not believe the statement about hunting was significant. A government official (01) who loaded highly (0.7651) with Wind Welcomers acknowledged that "the reason I said that was neutral was because I don't deal with that personally. I would guess that some hunters don't like the wind turbines." Another Wind Welcomer (09; F1 loading= 0.7621) stated that "for hunters, that is a major competition for land; is high fenced hunting… then that's what is important to you, and anything else is an annoyance. So I mean I agree that is probably true, but I don't think it is significant, but it is true."

Respondents who loaded on the Disenchanted About Tax Abatements factor had similar perceptions as the Wind Welcomers. A business owner (26; F3= 0.7765) said, "The hunters I know really don't care, they don't contribute a whole lot in my estimation, because a lot of them are rural people, don't go to town and buy anything from me. I don't care about them too much." Another business owner (27; F3 loading= 0.8532) stated "The hunting…I took a neutral stand on…I don't hunt, my husband doesn't hunt, so it's kind of I don't know." A respondent who loaded on Community Advocate (03; F5 loading= 0.8228) stated, "[To] the hunters…it's no different than an oil derrick…it's a little unsightly at first, but the ranchers and farmers that I have spoken to says it sounds like money… The turbines sound like money."

Factors 1 and 2 represent similar perceptions about socio-economic impacts of wind-power development, but reveal subtle differences in opinion. The “ideal” sorts for Factors 1 and 2 ranked 12 of 27 statements exactly the same, for example. Indeed, three stakeholders who loaded on Factor 1 also loaded highly on Factor 2 (≥0.3275). The three distinguishing statements for Factor 2 reveal these subtle differences, which mainly relate to perceived negative impacts and landowner issues. For example, statements 8 and 6 reveal an important distinction between Factors 1 and 2. These statements describe two opposing perceptions about the wind energy industry and its affect on the local community. Statement 6 refuses any negative impact from wind energy, and was ranked +1 by Factor 1; however, Factor 2 however ranked this statement far lower, with -4, suggesting that there have been negative impacts due to the wind industry and these impacts are important. In statement 8 (“The wind industry has negatively impacted the community”), similar differences appear. Factor 2 ranked this statement as +2, agreeing with the idea that some negative impacts are associated with the wind energy industry. By contrast, Factor 1 ranked statement 8 with -4, which distinctly shows disagreement with this perception that businesses have failed and the housing market has been negatively impacted by the wind energy industry.

Statement 20 describes how hunters in Nolan County do not see hunting and wind turbines as incompatible. Hunting is an important source of additional income for landowners and was categorized as a landowner issue. In Factor 1, this statement was ranked with neutral score, which suggests the loaders put little importance on hunting issues. But, Factor 2 ranked statement 20 as +3, suggesting a strong emphasis on hunting

and that there was little to no impact to hunting from the wind turbines.

Statement 22 (“Farmers used to cuss the wind”), also describes a landowner perspective. Statement 22 is a distinguishing statement for both Factor 1 and 2. Factor 1 agreed with the statement and gave it a ranking of +2. Factor 2 disagreed with the statement and gave it a ranking of -2. These rankings also reveal the disparity between the two factors on landowner issues. Factor 1 again shows the wind energy has been a positive impact in many aspects of people’s lives, even in how farmers perceive the wind. However, Factor 2 loaders are unconvinced of the overall positive impacts wind energy has had, especially changing farmers opinion of the wind which still damages their crops and dries out their land.

Based on the statements and associated rankings by Factors 1 and 2, Factor 2 represents subtle but important differences in opinion. Factor 1 represents the perceptions of the stakeholders who believe the wind energy industry has been substantially beneficial to the community. However, Factor 2 represents those who are uncertain that the wind energy industry has not resulted in any negative impacts or has changed the perceptions of landowners. Consequently, Factor 2 was designated as Land-Based Wind Welcomers.

4.6 Disenchanted About Tax Abatements (Factor 3)

Factor 3 is the Disenchanted About Tax Abatements social perspective, which refers to the idea that tax abatements and economic development taxes should be eliminated. Out of all the social perspectives, Disenchanted About Tax Abatements is least supportive of wind-energy development. However, a key idea in Disenchanted

About Tax Abatements is that tax abatements should not be given to any business. This perspective do not target wind energy companies for special criticism. This may relate to the view that small businesses in Sweetwater do not receive any aid or tax relief from the city or county government. Furthermore, the Disenchanted About Tax Abatement view does not see that wind energy companies have contributed to the community in other ways besides tax revenue. Stakeholders loading on this factor believe the wind energy companies should donate directly into the community, and the wind employees should become more involved in local community events. However, the Disenchanted About Tax Abatements perspective also holds the view that wind energy employees have not been committing crimes, and increasing the amount of crime in the community, as another social perspective suggests.

Iteration Phase

During the iteration phase, Respondents (26) and (27) both felt the preliminary name, "Tormented About Tax Abatements" was not representative of their perceptions, and therefore the name was subsequently changed to "Disenchanted About Tax Abatements." Both respondents (26, 27) felt the name of the social perspective had an extreme negative connotation, than what they felt represented their perceptions. Respondent 26 stated, "I don't know if it's, probably maybe a little too much to say tormented about the tax abatements, you know, I'm not really torn up about them; I really just don't like the abatement system, just like I really don't like the economic development money." Therefore, both respondents claimed they were not necessarily "tormented" about tax abatements, but rather disappointed with or "disenchanted" (27)

about tax abatements. This main concern stems from the fact that these respondents owned small local businesses that do not receive any tax abatements or aid from the economic development tax. As respondent (27) described "I'm still not for tax abatements, I just think…I'm sure people would want to throw rocks at me for saying that, but, I'm sorry, if one has to pay, if the little people (local businesses) have to pay, the big people (large companies like wind energy companies) should have to pay too."

Respondent (26) mostly agreed with all of the statements that described "Disenchanted About Tax Abatements" perspective; he agreed with but also had several comments on the statement "Believes the Wind Energy Companies do not contribute to the community, and have not been involved in the community." His reaction to that statement was,

> I think we're at a point now, at a turning point where the wind energy companies haven't been involved in the community but on the other hand in their defense I don't think as a community we've come forward with ideas and projects and viable things for them to invest in, you know, it's hard to say they won't help if you don't ask and that's something that you go, would ya'll willing to put your name on [this]… each corporation is like each person, they all are: some are agreeable and good to work with and others are just [like] get away from me you jerk.

In addition, respondent (26) felt two more descriptions needed to be added to represent his perceptions: "Wind Energy should not have to depend on Tax credits from the Government" and "Wind energy development should not have been built before transmission lines." He believed these two issues will become even more important in the future. Respondent (26) felt in order for the wind energy industry to continue to be successful, the industry should not "have to depend upon stimulus money." He explained why the transmission issue has and will continue to be a problem because

> when I hear about how much electricity that they can produce and how much, you know, millions of homes, I sit and scratch my head wondering why the hell electricity is so expensive, especially out here, because it, you know, the wind is rarely not blowing, it seems kind of idiotic that they overbuilt these things to the point that they don't have any transmission lines (26).

Descriptive Statistics

Disenchanted About Tax Abatements accounted for 10 percent of variance with a standard error of (0.333), as there were only 2 loaders. The two loaders that comprised F3 were two business owners. F3 was slightly positively correlated with F1 (0.0512), and had negative correlations with all other factors (Appendix H).

Distinguishing Statements

Disenchanted About Tax Abatements is associated with five distinguishing statements ($P < 0.05$) with 4 of the 5 statements being more statistically significant ($P< 0.01$) which are indicated with an asterisk. Statement 27, with a z-score of 2.33, referred to tax abatements:

> Tax abatements and the economic development tax should be done away with all together. This land and this country were built without tax abatements and everyone paid on a level playing field. Tax abatements should be given to no one.

This statement was ranked +4, indicating that it was a very important statement to several respondents. Statement 11 (z-score = 1.53) was ranking with +3: "The wind energy companies do not contribute to the community and have not been involved in community events. The money is being invested in the community through the tax revenue, but it would be nice if the wind energy companies would contribute directly into

the community." Loaders on F3 perceive the wind energy companies have not contributed to the community, or have not been involved in community-based events. However, this statement acknowledges that the wind energy companies have benefited the community through tax revenue, even though those taxes are being abated. This social perspective may hold that additional tax revenue would benefit the community, if the taxes were not abated, and in addition, the wind energy companies should donate directly to the community, and be involved in community events.

The third distinguishing statement (25) had a z-score of 0.22 and a neutral ranking: "Nolan County, the community of Sweetwater or schools have not benefited from the wind farm tax revenue yet." Statement 25 reveals indifference or lack of knowledge that Factor 3 has on the tax revenue within Nolan County, community of Sweetwater and schools has or has not received. A strongly negative distinguishing statement for F3 (24) had a z-score of -1.53 and a ranking of -3, stating that: "Tax abatements are a great way to invite wind energy companies to build in your community." Factor 3 expresses a strong opinion against the use of tax abatements, holding that tax abatements are not appropriate for inviting wind energy companies to build in a community.

The final distinguishing statement for Disenchanted About Tax Abatements is statement 9 which has a z-score of -2.33 and a ranking of -4: "The security of the town has diminished since the wind industry began. Before, there were not a lot of transient populations, even with Interstate-20, or when there was a prison. Some of the wind

energy employees are leaving, but there are still a few people here and they continue to commit crimes."

Other Key Statements

Similar to the previous two factors, Disenchanted About Tax Abatements also ranked Statement 13 highly, with +3: "There are a minimum of 300 full-time wind energy employees located in Sweetwater that were not here 8 years ago. If you do not count the employees that work for government agencies, the wind industry would be the 2nd largest employer in Sweetwater." Two statements were important because of a low (-3) ranking. First, statement 15 referred to renewable energy: "Wind energy does not change your view on renewable energy sources. It is not really even green energy. Even though we are not burning coal to generate the electricity, inside the wind turbines are components that are going to be thrown into a landfill in a couple of years anyway." Second, Statement 24 referred to tax abatements: "Tax abatements are a great way to invite wind energy companies to build in your community."

Respondent Rationale for Q-Sorts

For the Disenchanted About Tax Abatements perspective, Statement 27, which states tax abatements and the economic development tax should be done away with, was the most significant. A business owner (26; F3 loading= 0.7765) stated:

> It was probably one I thought on…and I thought about for a long time…because a lot of the bickering statewide because of economic development tax and giving taxes away, it would be an easy problem to solve just do away with it, and all business would

> be on a level playing field again…that would make it real fair.

Another business owner (27; F4 loading= 0.8595) expressed a similar sentiment, arguing that statement 27:

> Just seemed to be the statement I agreed with the most, and it's regarding the tax abatements and economic development tax. I agree with the statement that everyone should be on a level playing field. I don't understand why big companies should get tax abatements and the little guys don't…especially being a business owner. It should just be a level playing field. I guess if no one gave tax abatements anywhere, then there wouldn't be oh we are going to offer this, to bring them here...but it shouldn't exist at all … Because if they didn't have the tax abatements, then they wouldn't be paying those landowners so much…there's people that are making a lot of money off of those things. Now if the companies had to pay taxes, the whole community would benefit, not just those people out there that are getting real wealthy.

By contrast, the Wind Welcomers perspective disagreed with statement 27, as the loaders believed tax abatements were important and should not be eliminated. A government official (01; F1 loading= 0.7651) argued that "I don't feel that tax abatement and economic development tax should be done away with, because those are the two things we use to help the community, so that is why I disagreed with that." The same participant stated that:

> We are lucky we don't have to make that decision…point blank, if we didn't have tax abatement in the state of Texas, and in Nolan County then I would be happy…but in the same sense if it's a tool that can be used then why not? And I think some kind of jargon is, well you gave away something that we could have got…well when you look at it truly, you're not giving away anything because you don't have it, all you're doing is giving away the potential to get 100% of future earnings. Instead of getting 100% of future earnings you can gamble, I'm not sure they'll come without it, so I am willing to give them a break on future earnings, just to make sure they will locate here. So at the end of the day, we still get tax

> money out of it, we still get more than what we started with before, we are getting jobs out of it, we are getting a lot of money being spent on second, third, and fourth tier positions. When you stop and think about all the things the jobs bring in, people forget about the hotel/motel that has to hire more people because of all the staff. The restaurants have to keep up, the printing companies, the cleaners… The list goes on and on. All these companies…construction and O&M people; they have to have services while they are here.

Many of the government officials interviewed agreed with using tax abatements because they were either a part of the decision-making process to implement the tax abatement process or they claim to have seen the direct positive impacts. For instance, another government official (05; F1 loading= 0.8446) stated that "These taxes would probably be similar if this hasn't come in. It doesn't save them a lot of money. Their thinking the wind companies are going to pay for everyone's taxes and it doesn't work that way. They still have to pick up their share." Another government official (09; F1 loading= 0.7621) disagreed with the part of the statement that refers to how the U.S. was not built on tax abatements; he stated:

> Saying the land and country were not built on tax abatements? Texas has private land, because the government thought our land was valueless, and our debt was extreme…so we were the only state that came in with no federal land basically…and so that's what started wind was that public land. The railroad that built Sweetwater and everything else, were a trade off…if you come build here, we will give you every other section. That's pretty much a full out tax abatement, so to say this whole region would be like Australia we would just have a whole uninhabited interior of the country."

Another reason why the Wind Welcomers were opposed to statement 27 was that some respondents see tax abatements as the only way to attract wind energy companies.

For instance, participant 11 (government official; F1 loading= 0.7651) argued that "I don't think we wouldn't have any wind turbines here if we didn't give tax abatements, because they are more expensive to construct and build and I don't think they would be economically feasible without tax abatements." Participant 16 (government official; F1 loading= 0.8152) made a similar argument:

> But quite honestly, that's the only reason those wind companies came in. So if we had to choose between giving them a short tax abatement in comparison to the long term life of that tower, I think it's a no brainer. We have all benefited from those agreements. On the school finance side, it's made up what we lose in property taxes, the state makes up in their funding. So locally we don't lose anything by those agreements. For schools it's a unique agree, buts its tax payers' dollars. So while we want to be thrifty with that…most of those towers have a 20 year life, and they are already retrofitting them with better equipment.

Other examples of the same sentiment was stated by a prominent individual (21; F1 loading= 0.6727) who argued that "We need tax abatements and economic development taxes; it is proved here and throughout the area. It does make it more attractive for the financing of the projects…very important." Participant 28, a government official and landowner (F1 loading= 0.7136), emphasized that without tax abatements, west Texas would not have any means of bringing businesses: "As far as the tax abatements that should be done away with…I disagree with totally because I feel like the county's, not only for wind turbines…but is a way for west Texas to get industries out here. Cities…they are doing it anyway. So out in west Texas, we are going have some incentives."

The Land-Based Wind Welcomers perspective agreed that tax abatements have enticed wind energy companies to Nolan County. Respondent 29 (F2 loading= 0.7502) argued that:

> Oh because without tax abatements we wouldn't get these things…I mean these big companies…if we weren't to give them any tax abatements…they would go somewhere else. So if we don't give tax abatements, we don't bring people into the community. I disagree with it all together, because without tax abatements you we just gave tax abatement to the cement we have out there, so you see…these people wouldn't grow anything…they would stay the same.

Respondent 30 (F2 loading= 0.7502) made a similar argument:

> Well like I said, you take the tax abatements away, the industry that might come to Sweetwater, and we do not give them a tax abatement, can go in four different directions to another county. I think the guys should pay their taxes, but when they have business paying that its worth that much and they are going to pay that many taxes…and let them get started. If this was a 100,000 business I would say no, but you know when you are talking millions and we can invite them here…it going to pay off in the end. Nothing from nothing is nothing. It's a no brainer. If the economics and the figures all work out. As a county, you really have to look at is a tax abatement is when we decide to give on purely economics. What is this industry, how much revenue is this going to generate in the end.

The Favorable Towards Tax Abatements perspective also believes tax abatements are a great way to invite wind energy companies. As one loader on this factor argued,

> We give tax abatements all the time. It's the only thing a town like Sweetwater has to entice people to come. We can't sell our thriving nightlife or vast cultural scene… Well what else do we have…we have a lot of land and that's about it. So if you can offer a company to come in by enticing them with tax abatements. The thing is that people do not understand is that they are going to end at some point. So if we had not offered them a tax abatement, then

> all the wind turbines would be in a different county. Our population stopped disappearing, so there is some benefits (17; F4 loading= 0.7299).

Another distinguishing statement for the Disenchanted About Tax Abatements factor was Statement 11, ranked +3, which describes the perception that wind energy companies do not contribute in the local community. Respondent 26 (business owner; F3 loading= 0.7765) argued that "wind energy companies do not contribute" and went on to argue that "it would good if they figured out ways to become more involved…you don't see them involved in civic organizations, you don't see them sponsorship banners on anything. I don't think they have made a big contribution to the community, and maybe too busy, and at some point they need to settle down and get the home office here, and if they are going to be here they should make those commitments." A similar response came from respondent 27 (business owner; F3 loading= 0.8595), who stated:

> I haven't seen the wind energy companies really investing in the community. I guess I can pick on the soap box derby, because its confidential…they haven't thrown any money our way…not at all…I think they could be well aware that it exists. I did it last year where I sent out letters for ads in our programs, and didn't get any response. Maybe they are in some places I am not aware of…like Little League. But I don't see a lot of involvement in the community.

Conversely, Wind Welcomers disagreed with statement 11, which received a ranking of (-2), and believed the wind energy companies have contributed to the community. Even so, there were slight variations in perceptions among the Wind Welcomers loaders. One respondent (01; government official) stated that "I am neutral about that because I think they do a lot of things but some people do sometimes miss...but

would I like to see more involvement and donations from them…yes, but why should we expect more out of them than we do anyone else?" Another government official argued that,

> A lot of the wind companies are so busy; we are pushing them to be more involved…one company we convinced to donate money to a golf tournament for the Sweetwater and Synder fire department. They gave $250,000 to Synder West Texas community college, and the economy went bad, well I am on their case to give to Sweetwater, but it's not going to be this year or next, but they sponsor little leagues (09; F1 loading= 0.7651).

Respondent 14 (F1 loading = 0.6529) stated that "I'm not sure where they have been involved in the community, because a lot of them are transient. Though we do have some accessory kinds of businesses that have started because of it, and that has been really nice."

Other Wind Welcomers have seen how wind energy companies have contributed to the community. One argued that the wind-energy firms had contributed, stating that "Probably 90 percent of the teams are sponsored by the wind energy companies. Any time there is a need for something…they step up to the plate. Some say they are not contributing directly, but that's not true at all" (04; F1 loading= 0.7651). Another respondent went further, suggesting that the geographic distribution of largesse from wind-energy firms was uneven:

> To say that they don't contribute to the community …. a lot of these comments may be from the city of Sweetwater. There maybe a little bit of contention between the smaller communities because they… I know some of the wind companies have contributed to their fire department to help them. But we don't see them every day in the newspaper handing out checks to people or and a lot of

> may be done behind the scenes and may never be publicized. So I don't think that it is necessarily true (05; F1 loading= 0.8446).

Similar to the Wind Welcomers, the Land-Based Wind Welcomers factor showed disagreement with statement 11, ranking it at -2. For example a prominent individual (32; F2 loading= 0.6147) stated:

> That's false. They are visible. They drive company trucks, and most are decent from the ones that I have met. They hold luncheons and they donate and sponsor and stuff. I think they have done a good job, not to mention the tax dollars that go into to building so many great schools that used to be in shambles (32).

By contrast, the government official who negatively loaded with Favorable Towards Tax Abatements agreed strongly with statement 11, arguing that,

> The wind energy companies have not contributed…I think that is pretty true. I haven't seen a whole lot of exposure of them. They haven't really stepped and done anything. It would be kind of nice to see them do some things in the community and charities. It doesn't mean it's not happening; I haven't seen it (07).

Statement 25 also helps distinguish the Favorable Towards Tax Abatements (+4) perspective from the Disenchanted About Tax Abatements (0). The other factors strongly disagreed with the statement, as they have perceived Nolan County and the city of Sweetwater have received many economic benefits. For example, the Wind Welcomers factor disagreed with this assertion (-3). One loader on the Wind Welcomers factor argued that the firms "are paying taxes also there are a lot of new things that the community has benefited from, besides the tax. And tax is a longer term…and our tax rates are lowering" (01). Another loader on Wind Welcomers argued that,

> Just to say nothing has benefited at all from wind is, just a typical head in the sand. I mean in 2004 … the turbines are on the mesas, and the town in the valley, and we keep going on this we won't see them and they won't see us. And that's that attitude. Go to Sweetwater High School and its completely gutted, I mean they are redoing the entire school. Highland is getting a new school, Trent, Blackwell. It supporting things like the hospital trauma unit, it wasn't built with wind money, but built with the confidence that they would be getting that money. The ranchers and farmers can keep ranching and farming because there is enough confidence that the underlying amount of income will be coming (09).

One reason that may account for the Wind Welcomers disagreement with statement 25 is that many of the loaders were government officials who worked closely with tax revenues or other decisions within the county, and would have seen the direct positive economic impacts. For instance, a government official admitted to be "surprised" at the statement, because:

> the revenue…collect[ed] for these entities has gone up exponentially every year. So I would say $10 million easily increase per year…Most people do not understand the tax system and they don't see those numbers or the benefit. Every school in Nolan County has built a new building or has made improvements to their school, and that is a benefit. New teachers hired, to say that there has been no benefit, or no tax revenue. They don't know of the tax revenue anyway, to understand the increase, and that is not something that we publicize. Other than the rates, we let them know how much revenue that there is going to be. Or how much the increase is going to be. But overall, how much property taxes, probably no one other than the people that work [directly with this issue] is aware of these numbers (05; F1 loading= 0.8446).

The disagreement surrounding statement 25 may have resulted from the geographical location of the wind farms, which was also implied in the Favorable Towards Tax Abatements factor. A Wind Welcomer stated that,

> Sweetwater ISD hasn't benefited the way some of the rural communities have directly through tax revenue because we have only one wind project that had a tax abatement, I believe that project came on at $63 million. Where a lot of the other rural school districts because they have more rural land around it, but Sweetwater has benefited, for seven years we have decreased in enrollment, and now our enrollment has been steady for four years and it has been due to the activity from the wind farms. That has been huge for us (16).

A temporal component was also a possible reason for divergent views on statement 25. Many respondents focused on the statement describing how Nolan County has not *yet* received any tax revenue. The statement implied Nolan County had not received tax revenue at the moment, but will in the future. Therefore, a business/land owner argued that "it's a long drawn out process; it's going to take some time. I would rather it take a long time, and be drawn out, rather than a boom or bust. That's not healthy for anybody" (24; F1 loading= 0.8326). Another landowner also shared a similar perception: "The County and the city schools haven't benefited yet. That may be true…because [of] the tax abatement agreements [the county] do not see any benefits until the third year, but we will be seeing benefits from those" (31).

Similar discrepancies in perception were also prevalent in the Land-Based Wind Welcomers perspective (idealized ranking= -3). For instance respondent 30, who strongly loaded on F2 (0.9215), argued "Yes we have, look at our schools, our tax base. So we are benefiting, from day one we started benefiting…not to 100% yet but we will." A prominent individual stated: "I disagree that Nolan county schools haven't benefited from the tax revenue. The city of Sweetwater or something happened, they did lose out on

direct dollars to their schools but I think every taxing entity has benefited from it one way or another. Indirectly at least they have benefited" (32; F2 loading= 0.6147).

The Favorable Towards Tax Abatements factor showed strong agreement with statement 25. One respondent, who loaded highly on F4, argued: "That's true, Sweetwater schools, haven't but that's their own fault… Sweetwater doesn't have any turbines in the district… Nolan county, I don't know what the tax abatement deal is… at some point we will. But they have increased property values" (17; F4 loading= 0.7299). Finally, the Community Advocate factor had statement 25 with a low ranking, and the only justification came from one respondent who stated: "That the schools from Nolan County have not benefited from the revenue…I believe that we are just now starting to benefit from that" (03; loading= 0.8228).

The final distinguishing statement for Factor 3 was statement 9, which referred how the growth of the wind industry had caused an increase in crime in the local community. Strongest disagreement to this statement was from the Disenchanted About Tax Abatements factor (-4), while modest disagreement was in the Wind Welcomers and Favorable Towards Tax Abatements (-2), and Land-Based Wind Welcomers gave a neutral ranking for this statement and Community Advocate gave a +2 ranking.

Disenchanted About Tax Abatements strongly disagreed with the statement because it was perceived that the wind employees were not to blame. Respondent 26 said:

> Well I don't think the wind employees are the ones committing crimes in the community … They came here either ambitious to want employment… It's the people here who are unemployed and underachievers, that are unemployable and need to get off their ass and work a little harder… I think those are the ones committing the

> crimes, and I think if we can increase the tax base and hire more police force to solve whatever criminal problem we have had" (business owner; F3 loading= 0.7765).

The other loader for Disenchanted About Tax Abatements said, "I don't think so, I don't know why anyone would think that... I don't see anything that crime is up or there are bad people in town, so that would be the most negative statement" (27; F3 loading= 0.8595).

Overall, Wind Welcomers disagreed with statement 9, but some loaders acknowledged that a crime increase could be possible. Respondent 01 disagreed with the statement, and added that "I don't really agree the security of the town has gone to hell like this one makes it sound like it has, I think it brings new challenges, but I don't see something that has been negative" (F1 loading= 0.7651). A government official believed that any increase in crime "has little to do with the wind industry, I think has more to do with drugs…I don't think that has anything to do with wind energy" (04; F1 loading= 0.6515). Another government official responded to the statement by arguing that "I am not aware of some vast crime wave when people are making over $100,000 a year" (09; F1 loading= 0.7621). A landowner respondent did not feel security was an important issue, as he had not heard of any increase in crimes, arguing "No real feelings on having to do with security, I'm just kind of in the middle of the road…these are good people, they are very considerate, they are in our churches, the kids are in our schools, they are contributing. I don't think the security of the town has diminished, but I am not going to disagree with it…I am not aware of it" (31; F1 loading= 0.7866).

In general Land-Based Wind Welcomers neither disagreed nor agreed with the perception that crime had increased due to the wind energy industry. Regarding statement 9, one respondent said:

> Anytime you bring that many people into town, not all of them are going to be good. I'm not saying it's the wind turbine guys…most of the laborers that come from out of state are probably not your top of line citizens. I don't know if our crime has really increased more…The drug traffic from I-20…this is really a stopping point, but I put this [statement] as neutral because there had to been a little increase due to the pure number of people coming in (29; F2 loading= 0.9215).

A prominent individual who recently moved to Sweetwater stated, "I don't see any correlation between wind crews and crime" (32; F2 loading= 0.6147).

A respondent who loaded on the Favorable Towards Tax Abatement factor disagreed with the assertion crime had increased, and made comparisons between types of workers attracted to the Sweetwater region:

> I can't imagine the security of the town has diminished, because there aren't that many issues. There were transient populations...there were a lot of immigrant workers coming through, especially during cotton picking time…there will always be transient populations coming through. And as far as transients go, it takes them 6 month to year to build a wind farm… and then they are gone. The people that are here now in Sweetwater live in Sweetwater. They work at GE, or various companies here…you occasionally see out-of-state trucks, but once the Roscoe wind farm is complete, there's not going to be a lot of people coming through. I have not seen a lot of problems with crime … We have our normal crime
> (17; F4 loading= 0.7299).

A respondent representing a negative loading on Favorable Towards Tax Abatements, agreed, but for a somewhat different reason: "There probably has been an

increase in transient populations, maybe some crime stuff that goes on. But it's not as big of a problem and I haven't heard any reports, most of our statistics…I just don't see, of course the nightlife in Sweetwater is not all exciting….so maybe they cause trouble in Abilene" (07, government official, F4 loading= -0.8532).

Only Factor 5 showed agreement with the claim that there has been an increase in crime, and their rationale suggested socioeconomic factors. The wind energy employees mostly rented apartments or houses, and therefore most of the participants in this study were the elites and owned their own homes and property and may be unaware of crime that has occurred in rental properties. A loader on the Community Advocate statement argued that:

> I don't know I could prove that they are directly related, but yes. There was an incident this weekend. Someone accidently shot their gun through an apartment wall…in the apartments that are predominately wind farm people. They are leaving, and most of them are gone. There are still a few people here that are the operations type people. You can check the daily newspaper and see that it is at least doubled….they aren't names we necessarily recognize...the DWI…and things like that. Some of them will show as out-of-town addresses. It has increased, but I can't prove…You can't help but wonder why they are here…you wonder why that many of them are from out of town, [and I may] unfairly deduce that's where they are coming from" (03; F5 loading= 0.8228).

4.7 Favorable Towards Tax Abatements (Factor 4)

The Favorable Towards Tax Abatements social perspective represents a group of stakeholders who view tax abatements as an important way to entice wind energy development into a specific county. This factor also represents strong support of wind

energy development and refuses to consider negative impacts due to the wind energy industry. Similarly to the Wind Welcomers, the Favorable Towards Tax Abatements perspective also represents the idea that any perceived negative impacts, such as increases in property tax, are evidence of community progress. The Favorable Towards Tax Abatements perspective also supports the idea that wind energy companies have contributed to the community. The main difference between the Favorable Towards Tax Abatements and Wind Welcomers is how much tax revenue Nolan County, the schools and the community of Sweetwater have received. Wind Welcomers perceive that Nolan County, the schools and Sweetwater have greatly benefited from wind farm tax revenue. However, the Favorable Towards Tax Abatements perspective strongly believe those entities have not benefited from tax revenue based on the location of the wind turbines--outside of school and city taxing boundary—precludes receipt of tax revenue.

Iteration Phase

For the iteration phase, a loader on this factor, respondent (07) was asked to comment on whether or not the preliminary social perspective, represented his perceptions, and if the other social perspectives may be representative of other people's perceptions in the community. Unlike the other respondents during the iteration phase, respondent (07) did not have suggestions for changing anything. This respondent negatively loaded on the Favorable Towards Tax Abatements social perspective because he does not support Tax Abatements. However, respondent (07) did not load highly with the Disenchanted About Tax Abatement social perspective, which does not support tax abatements. Disenchanted About Tax Abatements would seem like a valid option if

someone strongly disagreed with tax abatements. Therefore, the main objective during the iteration phase interview was to understand this discrepancy. As previously stated, respondent (07) had a difficult time placing himself in one social perspective according to the chart because he could see different aspects and perceptions because of his job and his personal opinion (APPENDIX G). Even though respondent (07) stated in the first interview "there's going to be a day of reckoning, when all this stuff hits, and if they haven't collected tax on. It easier to tax it along, then get it all at once, especially at a lower tax rate." This statement reveals a strong opposition to tax abatements, but he stated in the iteration phase interview:

> I don't like tax abatements but because they exist [but] I realize that you have to use them, if they didn't exist everything would be ok, but you know, it's kind of a real world answer I guess, I don't agree with tax abatements but you do have to use them because they are out there, but doesn't mean I have to like it (07).

Respondent (07) continued by saying:

> I'm tormented about tax abatements but because they exist [but] I'm favorable for doing them because they exist and if it's the difference between getting a project and not getting it. That's the theory of abatement is, if you abate it you get half, you don't abate it you get zero, so half of something is a lot better than nothing. But I'm tormented about abatements because I don't think they should be a factor in anything… but they are, so I mean there's my dilemma, I think in theory they shouldn't even exist but because they do I've got to be in favor of them to get the job done (07).

In addition respondent (07) also commented on statement 23 which was one of the distinguishing statements for Factor 4 ("The County should not lower the tax rate by 2 cents and save me 70 dollars while saving the wind farm companies millions of dollars."), which he strongly disagreed with but stated:

> As a tax payer yeah I probably should be happy taxes went down two cents, but you know they need to build a jail, they are going to have to take care of these roads that the wind farms have torn up out in the county at some point in time. Saving me two cents, or seventy dollars a whole year, is not the way to do that, and yeah I really don't appreciate it, but if you ask Joe blow out on the street you know they saved you two cents, oh yeah I'm happy, that's seventy dollars, that's what two cases of beer or something, you know, yeah I think it could have been done a little bit better (07).

As a result of this interview for the iteration phase, nothing was changed to the "Favorable Towards Tax Abatements" perspective, but the respondent's (07) perceptions and rationale were ameliorated because personally he strongly disagreed with tax abatements, but realized they must be utilized because they exist as a means to encourage economic development.

Descriptive Statistics

Factor 4 (F4) accounted for 9 percent of variance, and an eigenvalue of 1.3359 (Appendix G). Two loaders were associated with F4, which resulted in a standard error of 0.333. The first loader was a government official who negatively loaded (-0.8532), or disagreed strongly with the other loader in F4 (Appendix P). The second loader was a prominent individual. F4 is positively correlated with F1 (0.3491) and F2 (0.0512), and negatively correlated with Community Advocate (-0.0656) and F3 (-0.1406) (Appendix H).

Distinguishing Statements

F4 is comprised of four distinguishing factors ($P < 0.05$), two of which are statistically more significant ($P < 0.01$) (Appendix L). Statements with a significance

level of ($P < 0.01$) are indicated with an asterisk. Overall, the four statements mainly relate to the economic impacts of wind energy. The first distinguishing statement was also a distinguishing statement for F3. Statement 25 ("Nolan County, the community of Sweetwater or schools have not benefited from the wind farm tax revenue yet") was ranked by F4 with a +4 (z-score = 1.77). In comparison, F3 had the same statement with a neutral ranking, which may have been to indifference or unsure of the validity, shows a difference in perception of tax revenue benefits and the significance of the statement as compared to other statements.

Statement 6 was the second distinguishing statement for F4, ranked at +3, the same ranking as for F1. Statement 19 ("Turning wind into wealth") was given a ranking of (-1) and a z-score of -0.79. The final distinguishing statement for F4 was statement 23 which has a z-score of -1.96 and a ranking of -4: "The county is going to need major work on the roads because of wind turbine trucking. The county should be collecting taxes, as the infrastructure is degrading, and all the turbines are falling on a fast depreciation schedule. The tax revenue will not be available in the future to replace all of the damaged roads."

Other Key Statements

The Favorable Towards Tax Abatements factor is also described by rankings of other statements. Statement 6 ("There have not been any negative impacts due to the wind industry") and statement 24 ("Tax abatements are a great way to invite wind energy companies to build in your community") were given a ranking of +3. By contrast, statement 11 ("The wind energy companies do not contribute to the community") was

given a -3 ranking. Statement 27 ("Tax abatements and the economic development tax should be done away with all together") was also given a low ranking (-3).

Respondent Rationale for Q-Sorts

Statement 23 (-4), a distinguishing statement criticizing the tax-abatement policy of the county, attracted many comments from respondents. In response, a loader on the Favorable Towards Tax Abatements factor stated:

> I guess my disagreement with that is the tax abatements run out in ten years… and knowing that were getting a substantial benefit…like property values and population are stabilizing. Giving money is one thing, but cutting taxes to allow them to operate . . . that's all we have to offer" (17; F4 loading = 0.7299).

Conversely, the government official who loaded negatively with Favorable Towards Tax Abatements agreed strongly with statement 23:

> I think that's true, the county needs to build a jail; they need to fix the roads that have been damaged by the wind farms. I think, of all these things I would consider to be the most important. Tax abatement should be done away with. I just totally disagree with tax abatements for there to be an even playing field. If a project can go it can go, if it can't, it can't. They must figure it out how for it to work. I think just giving that away, is not the right thing to do (07; F4 loading= -0.8532).

In comparison, the Wind Welcomers factor only slightly disagreed with statement 23. Some loaders suggested that tax abatements are a controversial topic, and if the tax abatements were not implemented throughout the state, they would not have supported using tax abatements. For instance, a government official stated:

> One of the reasons I am neutral on that I think tax abatements is still a controversial issue…anything you give away, you're giving away. I still believe if you look back, would you be guaranteed all this stuff if you didn't give tax abatements, and I don't think I could be the gambler on that (01; F1 loading= 0.7651).

Another government official defended lowering the tax rate, arguing that "We can lower our tax rate and still have more tax revenue than we ever thought possible before the wind industry came here" (11; F1 loading = 0.6516). Respondent 16 also agreed with lowering tax revenue, believing that wind turbines will be retrofitted, and therefore the value of the turbine will not depreciate as quickly, adding that,

> The county has been able to lower their tax rate because their tax base went up so much, and they were receiving money from the tax payment agreements. They are on a fast depreciation schedule… the value drops in about half, but if they retrofit them it goes right back up. Whenever they do that, I haven't seen abatements on that, but doesn't mean it wouldn't happen. So I wouldn't agree with that (F1 loading= 0.8152).

A prominent individual also disagreed with the statement, but recognized there could be problems with tax revenue in the future. This respondent said, "The county needs to lower tax rate with an increase of valuation…it certainty needs to be studied. That money now that we aren't going to get…they are doing it slowly…they are cautious" (21; F1 loading = 0.6727). One landowner focused on the part of the statement which described how the roads and infrastructure will need to be fixed in the future, arguing that even though the wind energy companies "have created a lot of problems with the roads because there so much traffic, … the benefits far outweigh the damage" (19).

The Land-Based Wind Welcomers factor showed slight disagreement (-1) with statement 23, and loaders and did not believe it was as significant as other statements. One government official/landowner stated:

> I could agree and disagree. It could really be… especially because it says the tax revenue will be in able to fix the roads in the future… I could disagree…before the turbines the roads were being fixed anyways…and so, they are still going to be…things change…I don't think it's that big of a deal (29).

Another loader on the Land-Based Wind Welcomers factor introduced the idea of competing forms of energy generation, arguing that:

> Sure we all want a tax break, but if we want this green energy to take hold we are going to need big incentives, especially when turbines are competing with coal plants. Economically they are outmatched right now, but hopefully that will change…and many of those companies operate both wind and coal (32; F2 loading= 0.6147).

The Disenchanted About Tax Abatements factor ranked statement 23 as +1. One loader on this factor, a business owner, disagreed with the statement and said: "it's saving them millions of dollars but until they get a return on their investment, they are still million dollars away from profits" (26).

The Community Advocate factor gave statement 23 a neutral ranking (0). The loader on this factor proclaimed neutrality "because it's talking about what's going to be happening to the roads down the road, part of that I could have disagreed with, and part of that I am neutral on. As far as the roads, the wind turbine companies are restoring them to their prior condition or better, so that part I do not agree with" (03; F5 loading= 0.8228).

4.8 Community Advocate (Factor 5)

The fifth factor, Community Advocate, is a social perspective different from the others because it represents the idea that there have been significant negative impacts to the community. However, similar to the other perspectives, the Community Advocate perspective still supports wind energy development and tax abatements as a way of enticing wind energy companies. The main concerns relate to how the town "turned to pure greed" during wind turbine construction because of increasing property values and tripling of rent. The Community Advocate perspective recognizes that residents, of low socioeconomic status, have been neglected prior to and after the arrival of wind energy industry. This social perspective sees people who are not receiving benefits from wind energy employment, tax breaks, or wind royalties as the same people whose rent has tripled, making it more it difficult to live in Sweetwater. Community Advocate perspective also would hold that the other social perspectives may not acknowledge or know of these negative impacts to the community because they represent the landowners who receive tax breaks and/or wind royalties. In addition, this social perspective strongly believes crime has increased in Sweetwater, mainly from wind turbine construction workers who resided in apartment complexes. Overall, this social perspective represents the perceptions of negative impacts to the community, but still supports wind energy development because of what it has provided for some but not all members of the community, and has positively impacted the local economy.

Iteration Phase

During the iteration phase, respondent 3 felt many of the descriptions seemed too negative, and was not representative of her perceptions. The respondent felt "Community Advocate" would be a better name to represent her perceptions as opposed to "Concerned About Community." More specifically, the respondent disagreed with some of the statements on the chart (APPENDIX G) under "Concerned About Community." She felt the description "Believes there have been *many* negative impacts to the community due to the wind energy industry" inaccurately emphasized "many negative impacts", but the respondent (03) suggested changing the wording to "some negative impacts" and adding there have also been positive impacts due to the wind energy industry. Respondent (03) stated "there's just nothing in these that allows me to be somewhat supportive. I mean they are all the way supportive [pointed to Wind Welcomers perspective] or not at all [Concerned About Community]." In addition, respondent (03) commented on the description "*Strongly* supports tax abatements" by saying "I do strongly support tax abatement but there may be some who are very concerned about the community that really doesn't want tax abatements." Another statement which respondent (03) felt needed to be changed was "The town as a whole turned to pure greed during wind turbine construction." Again she felt this statement was too negative by saying the "whole town as a whole turned to pure greed"; therefore she suggested the statement be changed to "strongly agrees some *business owners* turned to pure greed during wind turbine construction."

Respondent (03) was also asked whether or not they believed the chart of social perspectives represented all the different perspectives that may be found in the community, or if there was something missing. She responded by saying, “the wind industry employees [need to be added], because they are going to have to have their own column, or they are going to skew the thing, cause they all are going to say they support it, [but] they may still be concerned about the community, [and] they may be in favor of tax abatements, and they may Wind Welcomers, but if they are employees and there are very many of them, they may change it, that would be the only other column that I would think of as those that are directly related to the wind industry by employment.”

Descriptive Statistics

Factor 5 (F5) accounts for 7 percent of variance, and has an eigenvalue of 1.0279 (Appendix G). Community Advocate only has one loader (government official) and therefore, the standard error is higher than the other factors (0.447); however the eigenvalue and associated qualitative data justified for retaining this factor. Community Advocate is positively correlated with F2 (0.3452) and F1 (0.2284), but slightly negatively correlated with F4 and F3 (-0.0656 and -0.3351, respectively) (Appendix H).

Distinguishing Statements

Community Advocate has only two distinguishing statements, but both are statistically significant at $P< 0.01$ (Appendix M). Statement 10, ranked with the highest value (+4), states: “The town as a whole turned to pure greed during wind turbine construction. Rent tripled in price because the wind energy employees are able to afford

higher rent prices, while other members of the community could not afford the new rent prices." The second distinguishing statement (5) was ranked +3: "The people who have been neglected are the people who have been in the community before the wind industry arrived and those that are going to be here when the wind industry leaves.

Other Key Statements

Besides the distinguishing statements, which better define the Community Advocate views on "pure greed" and the "neglected," other statements indicate the characteristics of this social perspective. Statement 26 ("The wind energy companies have provided jobs, use supplies, and buy gasoline from local businesses") was ranked highly +3, revealing that the Community Advocate view acknowledges the wind energy industry has had positive economic impacts on the community. Rankings of -3 were given to a statement unfavorable to tax abatements (Statement 27: "Tax abatements and the economic development tax should be done away with all together") and a statement critical of wind-energy firms (Statement 11: "The wind energy companies do not contribute to the community and have not been involved in community events"). The Community Advocate factor still recognizes the economic benefits of wind-energy development, as it gave the lowest ranking (-4) to a statement highly critical of the new wind economy (Statement 8: "The wind industry has negatively impacted the community").

Respondent Rationale for Q-Sorts

The Community Advocate factor is further characterized by the rationale provided by the loader. For example, statement 10, given a +4 ranking, was justified as follows:

> There are so many people who are unemployed and cannot afford rent. Probably 6 months ago, this would have not been the primary focus. But right now it's all the unemployment and people are trying to find a place and can't afford it that would be the one I strongly agree with, because it's most relevant today … [The housing market is horrible…I wish they [wind energy employees] would go somewhere else. I know someone was kicked out of a house that she was renting, and had three days to get out. Her landowner literally came and told her, "I have a wind farm person who has $1000 in his hand and your $500 is not helping me. So you have three days to get out." As far as HUD, there are no HUD houses in Sweetwater. I have people looking to move to Abilene, because nobody will rent their house to HUD now. We [the community] are at the point now, where we have gone long enough where the wind farm employees have left our community…or a lot…because there's no construction going. They are still holding out…these home owners are still holding out, and they are letting them [houses] sit empty. The think they are still going to get $1000 a month. They will not rent to somebody else in Sweetwater. It's impossible to rent an apartment, a storage building, a house. Forget it. You can't afford it. It's very much negatively impacted the community….They are coming in and bringing in these new companies and building new houses. That doesn't help your average Joe. There are jillions of houses for sale. I have newspapers from 3-4 years ago. The price to buy a house has tripled" (03; F5 loading= 0.8228).

By contrast, the Wind Welcomers factor only slight disagreed (-1) with the perception the wind energy industry has negatively impacted the housing market (statement 10). Many Wind Welcomers were neutral towards this statement. Loaders perceived that some members of the city were greedy by dramatically increasing rent prices, but the actual effect of rent increases had a direct impact to most of the Wind Welcomers because they own their own homes and do not rent apartments, or they are landlords of rental properties and received economic benefits. Respondent 01 stated that he was "neutral" on statement 10 "because I don't deal with that … but I do see some

greed but again I don't think that it is tied to the wind industry. Any new industry that comes in that hires a lot people, greed can be involved. But there is also some really good benefits that have come our way" (government official; F1 loading= 0.7651).

Another government official disagreed with statement 9, while acknowledging that "there are some people that are jacking up rents and people outside the industry cannot afford" to rent properties, but he denied that "the town turned to pure greed. We never had a whole lot, so I think it's just a smaller factor" (04). Respondent 05 made a similar argument while strongly disagreeing with the perception the wind energy industry had negatively impacted the community, suggesting that rent increases are natural process that comes with economic growth: "It's like with any type of progress when it comes in, if you are in the position to reap the benefits of that income…knowing that they will decline at some point. People expecting that to continue forever is wishful thinking" (05; F1 loading= 0.8446).

Respondent 9 acknowledged the housing situation, but argued that housing quality had improved in some areas of Sweetwater because of a real estate boom:

> The houses were just falling down, but you could rent for 150 bucks…and now you have Elm, Oak, Locust Street, you can go down there and it was 80 percent bad and 20 percent good, it's kind of like 50-50 now, or even 80 percent good, because someone is trying to sell their house…or their rent house. The wind industry has saved some people some money. Some of them have gone up…and it's the underclass that has gone and retired teachers, that deserve a good place, or there are people who don't work and don't want to work…using meth isn't paying like it used to" (government official; F1 loading= 0.7621).

Another government official acknowledged an increase in rent but also saw it in a positive light, similar to respondent 9: “in some cases that was to fix up their rental properties” (11; F1 loading= 0.6516). Finally, a loader on F1 noted that the Sweetwater real estate boom was modest compared to other areas:

> Most of the direct benefit has been those landowners…most of them were farmers that were going out of business and they have seen their property values have gone up. Compared to the State of Texas, our property values are still less than everyone else…to say it was a negative thing, and motivated out of greed. I can’t see most people living out here in West Texas is motivated by greed. They could make a lot more money elsewhere (16).

Land-Based Wind Welcomers gave statement 10 a neutral ranking, and may because the loaders own their own property and were not affected by increasing rent prices. One government official/landowner stated:

> I don’t think anyone has gotten greedy. Now sure there are some have benefited from that, most of your landowners have really, I think that it’s paid debts that they have owed to keep the ranch or farm going. Though I have seen maybe people in town as price gouging…for rent, I have seen that. But as a whole I kind of put that as a neutral. Those that needed it, as far as the landowners…I haven’t seen them go really greedy, but I have seen rent prices and stuff, like that get out of hand” (30).

The Favorable Towards Tax Abatements factor slightly agreed with the perception the wind energy industry had negatively impacted the local housing market. As one business owner said, “I agree with that some, I think all of a sudden it seemed like that some people were rather exploitative…but on the other hand, it’s still market driven, some of those people need to work a little harder, or move over the whole standard of

living" (26; F3 loading= 0.7765). The second Favorable Towards Tax Abatements loader also agreed and said:

> Absolutely…and I know a three bedroom house should for rent for $600 a month, but it could probably be get a lot more because of the wind employees. I have seen a lot of people who have invested in a lot of real estate, and charging high prices…and I think it is based on greed. And every one just wanted a piece of the pie…That's why I guess...and I don't know sometimes we get greedy and we should rent that house for more. There's people that can't afford it. Comparable house to what we rent is probably 1200. I think people did get greedy (27; F3 loading= 0.8595).

The negative loader for the Favorable Towards Tax Abatements agreed with statement 10, and believed lower income people were most affected. Respondent 07 stated: "it is exactly what happened. It's higher on my list of importance. I think it impacted a lot of families and a lot of people. Particularly low income people, who pushed out of a renting a house" (government official, F4 loading = -0.8532). The positive loader for the Favorable Towards Tax Abatements situated statement 10 in terms of a supply-demand cycle: "you can charge what you want because there were people here… supply and demand… but the same thing, they leave and then the rent goes down" (17; F4 loading= 0.7299).

The positive loader for the Favorable Towards Tax Abatements factor disagreed with the statement 10 saying,

> When the wind industry leaves they are going to be really old, because the leases [extend] for 30-40 years. So, it's the same sort of deal, that's how you kill a community. I don't know how it's negatively impacted the community. Their property taxes may have went up a couple hundred [dollars] a year… but that's about it. We have growing community then…They have a distrust of people because it's been 50 years since the community grew…so the people that has been here hasn't seen new people.

> I just don't see wind is hurting them… I guess because their rent went up, but that's not a bad thing, because the apartments are full now. Because if you go drive around town, a lot of houses are for sale, because people think they can still sell their house, but the market has kind of dried up. But rent and things went up, but that's part of people being the community (17; F4 loading= 0.7299).

In contrast, the negative loader for Favorable Towards Tax Abatements factor agreed saying, "The people that have been neglected….I think that could be a pretty true statement. Maybe the average Joe doesn't get any benefits from it. They were here before the turbines and will be afterwards" (07).

Statement 5 was also a distinguishing statement for the Community Advocate perspective. Statement 5 describes the perception that there was a population in the city that have been neglected before the wind industry had arrived and will continue to be neglected after the wind industry has left. The loader on this factor justified the +3 ranking by describing how the wind energy industry may have promised more jobs than what was actually created:

> that's the way people perceive it. That's the way they hear it…It's kind of tacky but I saw a poster a while ago, [indicating that] "there's gold in those wind turbines, come on down" …it just like the gold rush in California. These are people that are starving to death. They hear some people on TV, that's showing them all this promises, and how wonderful, and all the money is generating, and how gung hoe it is here. They are coming. They are going to take a change…I just think it's not realistic…I don't think they are realistic… or to elaborate…are you a certified electrician? Do you have a history of this or that…and to specify, that it's not just labor jobs available. Just take care of your own…that's who have been neglected…they people that have been here, and those are the people that are going to be here when the wind farm people are gone" (03; F5 loading= 0.8228).

The Wind Welcomers gave statement 5 a neutral ranking (0), which loaders defended in various ways. One government official argued that "[We have] worked hard in making sure that those in the community benefit…and that the old industries still feel important rather than just the new industries that have come into town" (01). Respondent 09, slightly agreed with statement, but was unsure of who the statement was implying was neglected. He stated: "That may mean that citizens that may need things, but I don't know, I'm not sure, or we don't appreciate the railroad or the gypsum as much as we should, I am always pushing on that…we need to not ignore the industries that have been here. I don't know that is really people or industries that they are talking about" (09; F1 loading= 0.7621).

Another government official disagreed with statement 5 and said "I don't feel they have been neglected at all because their tax rates decreased, and they have seen a boom in the community…if they are in a business of any kind they would see the results" (11; F1 loading= 0.6516). Respondent 16 also did not agree and described the statement as "one of those sentimental things that we will be here afterwards… We hope the wind industry is here for a long time. I don't agree with that. As big of an investment they have here, they are going to be here for a long time" (government official; F1 loading= 0.8152). A prominent individual did not see how anyone in the community has been neglected, and provided various examples:

> Indirectly, we are all benefiting. Brookshires has better produce, and better meats, because they have an increase in volume. We all benefit. I don't think people have been neglected. The tax rates have declined… I don't think that there has been a neglected part of our population. If one part of the community benefits….like in my neighborhood, homes have gone up about, 40 percent...and if

> somebody wants to sell, they are going to benefit, whether or not they have a wind royalty (21).

A Land-Based Wind Welcomers also disagreed with statement 5, arguing that all individuals have "gained a little from the wind farms. Some of us, not directly but indirectly yes we have because some of them don't have to pay as much taxes as we used to. A bunch of them will still here and will keep complaining. I'm not leaving this town even if I wasn't the commissioner and I had some complaints" (29; F2 loading= 0.7502).

The Favorable Towards Tax Abatements factor placed statement 5 in slightly negative ranking (-1). One loader on this factor, a business owner, stated "I don't know if they have been neglected, I don't agree with that. I don't know what they expected to get if they were going to be…and handout money…If you are no worse off when they came and went, then it made you no difference at all" (26; F3 loading= 0.7765). Another business owner also agreed with respondent 26 and said, "Well I don't know if we have been neglected, but we just go about what we did before, and will continue to do that…and not get impacted by it a whole lot" (27; F3 loading= 0.8596).

5. DISCUSSION

Previous literature on the socioeconomic impacts of wind energy has focused on two themes: opposition because of aesthetics, and support because it is a renewable energy source. Previous studies have found one of the main reasons wind energy development is opposed is due to the perceived negative impact to the landscape (Pasqualetti 2000; Pasqualetti 2001). Previous studies have also shown reasons for supporting wind energy development is because wind energy is a renewable energy source and is better for the environment than other energy sources (Ellis et al. 2007; Fisher & Brown 2009). However, this study found that neither aesthetics nor renewable energy were important factors in the respondents' perceptions of wind energy development in Nolan County. The results of this study indicate that the impacts on the local community were important to some of the respondents. Q-Method did not indicate these issues, apart from community, as significant social perspectives. However, the practice of Q-Method generated lengthy transcripts that when coded, suggest aesthetics and renewables should be discussed in light of the geographical literature on energy. Therefore, the following section gives more information on respondents' perceptions on aesthetics, renewable energy, and impacts to the community. This section concludes with a discussion of how this study has added to the previous literature on Q-Methodology and the socioeconomic impacts of wind energy development.

5.1 Aesthetics

Previous literature on the perceptions of wind energy suggests that aesthetics are the fundamental reason why people are opposed to wind energy (Pasqualetti 2000; Pasqualetti 2001). However, in this case study, aesthetics was shown not to be important. In addition, previous literature suggests that there is a consensus among the general population that wind energy turbines negatively impact the landscape. In this study, some respondents believed the wind turbines have negatively impacted the landscape, but others felt it improved the landscape. In addition, many respondents who felt the wind turbines negatively impacted the landscape qualified their responses by saying that the aesthetic impacts are acceptable/tolerable with because of the overall positive impacts to their community. Respondents voiced several issues related to aesthetics: improvement of the landscape, turbines are seen as positive economic impacts, aesthetic impacts can be overcome, opposition to wind power results from not hosting turbines, positive/favorable comparison to oil derricks, deterioration of the aesthetic view of the landscape, and too many turbines in a single area.

Several respondents argued that wind turbines have improved the landscape because the previous landscape was not very scenic and the turbines are seen as fascinating. Respondent (05) argued:

> In other places people complain about how the wind turbines ruin the scenery, but people here see there are just shrubs and cacti. The fact that there are so many turbines, it's almost like going to a garden and looking at something growing and it actually improves the landscape.

This claim formed the basis for statement (3). A government official made a case

for wind turbines as appearing to be natural. In response to this statement, a government official stated "I think as a whole, people kind have liked the looks of them, there are still people that don't like it…and there are some people who don't like the cactus or mesquite…but I think it as whole people see it as just a part of the landscape" (01). Another government official made direct comparison between wind turbines and nature: "the turbines seem like wildflowers, because they seem like they hit a road, and then next year it's across the road" (01). Another respondent also stated, "It's kind of fascinating to drive down the road to have turbines on both sides of the road. It actually improves the landscape and I know quite a few people that feel the same way" (11). Others described the wind turbines as "interesting" (03), "majestic" (21), and "fascinating machines, like a teletubbies landscape" (26). Respondent (16) described how the turbines have become a part of the culture, "most of every office, or public building, the are pictures of turbines. Most people don't think of them as eyesores." Respondent (01) emphasized how they felt people's perceptions had changed:

> I think then people saw them as a novelty more than anything else. Like that's kind of cute…but they will never expand and then some three years then it really started to hit. I think some local people that were concerned…not so much what it does to the area, other than what some people termed 'eye pollution'. They were concerned about the big turbines. I think they've embraced the opportunity and you when you have over 1200 turbines in your county you better like them because they are there for a long time. As a whole most people have enjoyed them (01).

Another way people described how the turbines were viewed aesthetically was in relation to the positive economic benefits the wind energy industry has provided for the community. A government official stated, "They see the green money [spinning]. It's not

ugly anymore. They are even more attractive because of what they are providing for the community." (29). Other government officials also emphasized, "we are getting compensated, we are getting new schools, jobs pay twice as much…dozens of new businesses" (09) and "there are jobs for our citizens and in terms of tax revenue, and revenue for the businesses" (11).

A prominent individual strongly disagreed with statement 2, ("We have to look at these wind towers dotting our west Texas skyline yet we don't reap any of the benefits from them. The people in West Texas should be compensated for these eye sores") by stating,

> I mean just fundamentality it is untrue; it's not the way the property system works in Texas. You can do what you want to do with your property…and we have received benefits from it. I mean you can drive through Sweetwater and all of our vacant buildings are filled with wind service companies. The population was nose diving…I mean I wouldn't be here, and this building that we are in now, wouldn't be renovated. So I mean we do get benefits from it. More than that, you shouldn't be compensated for what someone else does on their land. And the Texas courts said that too when a landowner tried to sue his neighbor and they said no dice…you should be able to do what you want to do with your own property and shouldn't expect compensation for it. It's not like we have scenic landscapes in West Texas anyway (17).

The other way respondents argued their positions is that the possible negative impacts to the landscape were overwhelmed by the positive economic impact wind has had and will continue to have on the community. Many respondents stated their aesthetic perceptions have changed over time. One respondent said, "we have just gotten used to them, I don't think people think they are a negative thing anymore…you don't even pay attention to them being there" (16). Another argued, "people have learned to deal with

them, because of the impact on the economy" (32) and "now they kind of blend in" (30). Another individual said, "I wouldn't call them beautiful, but you learn to live with them because of the advantages they have brought" (31).

Respondents argued that the key reason people who believed the wind turbines were aesthetically destructive were: "The people that think the turbines are unattractive are the same people who do not own any turbines or will never own one" (Statement 4). Many of the respondents felt this statement was humorous but found it to be true. Respondent (14) stated "the people don't have them complain about them, and the people who do have them think that they are great" (14). Also respondent (23) said, "I think a lot of the people that complain are the people that the wind companies won't look at their property" (32). Respondent 16, also believed this statement was accurate, "[just like] when you are a pig farmer, it smells like money, and when you are the next door neighbor it smells like something else" (16). Other individuals felt the statement was accurate but not very common. For example, "This just sounds like sour grapes people but, I agree with it, some people that hate them just because they don't have one. Oh it's a horrible thing… but I don't think anyone that has them on their land thinks they are ugly" (27). Another individual said "people that we know, that don't like them, we just try to stay away from them" (19).

Many respondents compared the wind turbines to California wind turbines, oil derricks and other energy resources. Overall the respondents agreed the wind turbines are more aesthetically pleasing or are no different than oil derricks that are found across the West Texas landscape. A government official argued that, "I don't think the turbines are

particularly trashy looking to begin with, especially compared to the California turbines that are all broken. Not all oil wells look good, but it 'looks' good. We like oil wells just fine" (09). Respondent (03) said, "There were a few [people] that thought they were unattractive, but those were the same people that didn't like the oil wells." Respondent (01) felt "you have telephone poles, oil derricks...so eye sores have been dotting our skylines for numerous years. I personally like the looks of the wind towers" (01). Another individual also did not feel the turbines "are an eyesore, to me a turbine is a whole lot prettier than a pump jack, and they don't smell as much…and I have oil production on my land" (24). Another individual said, "personally I do think they are attractive….I would rather see that than a coal plant any day" (32). Another individual would rather have wind turbines than "a prison, or nuclear sludge," but also noted that "the worst thing would be for sale signs and all the ranches gone… that would have been the worst scenery" (09).

Few respondents felt the wind turbines negatively impacted the environment, but other factors were more important, such as the positive impact on the economy or tax abatements. One government official said,

> At first, to be frank and truthful, I really didn't like the impact it had on the environment…look of things, it really changed [it]. You are used to seeing the nice mesas up there and you drive through the ranch land and it's all nice and seeing the cedars… [the wind turbines] really changed it. Especially at night you can see the lights up there…you know it reminds of you of being in a sci-fi type of movie. I guess you kind of get used to it. It doesn't have that much aesthetic impact anymore, and now you can take pride in it as people drive down the highway and see it, it doesn't bother me as much.

Other individuals "thought [the wind turbines] were obscene" (19), "kind of ruin the scenery" or the wind turbines "kind of trashed up the landscape" (28). In addition,

respondent (07) felt “the citizens aren’t reaping any of the benefits, other than the peripheral stuff, but now we are going to live with those views from now on” (07). However, all these respondents felt the aesthetic impacts were not as important to them as other impacts, and most people have overcome their initial negative reaction to the impact on the landscape.

Some respondents felt the negative impact to the landscape was due to the number of wind turbines in a location, “now its overkill…There are too many… But I don’t think they are trashy looking…just unsightly. They will be trashy in 25 years if they aren’t maintained, but right now…they are still clean…they are still maintaining them. There are just too many of them in one spot” (03). Another government official also felt “the more that are built, the more unattractive they are” (07). Many respondents stated similar responses, “it’s nice they [the wind turbines] help with the economy, but the more they get built the uglier they are because they just glare things up, but they do help with economy, and it’s not like it’s the prettiest place to begin with” (17).

5.2 Perceptions of Energy

The only topic of consensus in the Q-Method analysis was on the perceptions of energy; that even though wind energy is a renewable energy source, it is not the reason why wind energy is strongly supported in West Texas. The analysis indicated consensus on statements 15 (“Wind energy does not change your view on renewable energy sources. It is not really even green energy. Even though we are not burning coal to generate the electricity, inside the wind turbines are components that are going to be thrown into a

landfill in a couple of years anyway") and statement 18 ("People from this area do not take the pledge of being green and only for renewable energy. You have to be for every type of energy source because gas pumps are not going away for decades"). These statements suggest wind energy is not strongly supported because it is a "green" renewable energy source and that support for wind is unrelated to broader positions on energy-environment issues. In other words, wind energy has not "greened" Sweetwater. Rather conventional views toward energy now accommodate wind power. The results revealed that this issue was not as important to the respondents as other topics, such as tax abatements. However, the process of carrying out the Q-study revealed several themes which respondents characterized themselves, ideas of environmentalism and renewable energy.

The five prominent energy themes included denial of linkages between wind power and environmentalism, lack of interest in environmental aspects, denial of wind power as a renewable energy source, expectations of lower energy costs, and relations between wind and hydrocarbons. Many respondents denied any connection between strong support to wind energy and environmentalism. A government official stated, "The wind was not brought here because someone 'green' said hey, 'let us do this for the environment'. I don't think that was the intention of bringing it in here. The fact that it is working to help those things, that is a benefit, but it is not the purpose for bringing it here" (05). Another individual felt people are accepting of wind energy because of additional revenue, but do not support wind energy because it is environmentally friendly. Respondent 17 said,

> People are more accepting of it (wind energy) I guess, but are not very environmentally conscious per say. I don't think they view them (wind turbines) as a clean power source, but just additional revenue… because oil has made our living out here, I don't see it as an ideological thing for why we have turbines. It's a nice thing that we will add, but if they were spitting smoke into the air, they would probably still be there.

Some of the respondents revealed a strong aversion to being seen as a 'community of environmentalists'. For example one respondent stated,

> We don't take the pledge out here… (For green and renewable energy)… the media wants us to take the pledge. Nothing that Texas is doing counts because we don't say we are doing it to save the planet. If we say if it makes good business sense…they don't understand that you aren't going to do it here just because its green, that's the practicability of it…you have to be for everything…the gas pumps aren't going away for decades…you get to this purest type of thing…it's kind of taking the pledge…it's like you are back in California. (09)

Another example of someone who did not want to be seen as "green" was made in the context of an editorial in the *Sweetwater Reporter*, "I don't want people to think that I am rabid environmentalist with an agenda" (McCormack 2009). Overall respondents have denied any claims that there is a link between strong support for wind energy and environmentalism.

Even though some of the respondents did not believe wind energy as a renewable energy source was an important factor for supporting development, some discrepancies were observed on whether wind energy would now change people's views or actions in relation to energy. One respondent (03) in her early 50's perceived most people in the area who are in their same age group only support wind energy because of the economic

benefits. She also believed that it has not affected her (or other people in her age group) thoughts about the environment,

> "Nobody cares about green. Not my age group. They don't. I'm serious, 20 years down do. But as far as a whole, anyone that is over 20 years old could care less. Any of it…recycling, emissions out of my car…and as far as the green part of it, I never thought about it."

Another example is a city government official (03) who strongly supported wind energy development was not interested in statements "that talk about the green stuff because I just have not gotten into that personally."

One government official also perceived that wind energy has not changed people's views or energy usage: "not everyone is going to be driving a praying mantis car… and swear green and start walking 200 miles a day" (09). Another individual believed the wind energy has some changed views or actions about the environment, but believed the city could do much more. They said,

> I look around, and I think some people are trying to do our part. We are Americans, we are spoiled, we are not going to go without our big vehicles…and I'm not saying people aren't trying to do a small part I think we were trying to pledge to be green, and then Sweetwater as a whole could do a lot more. I have seen towns that have done a great job…we have the recycling…but the oil production spiked, and if we were going green, then why are we putting more money into oil. In a small way we have, but I don't think we have taken the step of going green (30).

One government official felt the wind energy around their community will change people's perceptions about renewable energy: "I think it just takes time for people to change what they do every day. I think the wind towers will make a difference. We started looking at better gas mileage, and better ways to save….part of is probably

because of renewable energy, and part of it is to save money" (01). One farmer had a different interpretation of people's perceptions about being green:

> Because this is a farming and ranching community… these are the original people of the green movement. I know there are some people in the cities…that are not directly in the farming community, that are just now coming to light that this is a green industry and that with all the national and local publicity, without global warming and pollution and all that (25).

Therefore, this farmer believed his community has always been a "green" or environmentally friendly community because the farmers and ranchers depend on the environment for their livelihoods. However, several people have interestingly characterized how others should perceive them not as "green" environmentalists, but support wind energy because it makes smart business sense, and it brings additional revenue to rural areas.

Despite the debate between various perceptions on whether or not wind energy changes people's perception of energy usage, another debate is whether wind energy is a 'true' renewable energy source. In response to Statement 15, ("Wind energy does not change your view on renewable energy sources. It is not really even green energy. Even though we are not burning coal to generate the electricity, inside the wind turbines are components that are going to be thrown into a landfill in a couple of years anyway") was made by respondent (03). In the sorting phase, some respondents slightly agreed. As respondent (21) stated, "No it's not truly green, because we have to spend so much fossil fuel during the construction phase, and even the manufacturing phase. They are using natural gas, fossil fuel, and it really didn't change the 'tree huggers'. 'Green' is a buzz word everyone is trying to use." However, some respondents disagreed, and believe wind

energy is a “green” energy source. Such as one individual (24) described wind energy as “the ultimate green energy”, and respondent (17) stated in response to statement 15, “that’s just kind of ridiculous statement because that precludes any energy source as being renewable… and the life of a turbine is 20-25 years, which is pretty good…their bases can last a very long time. The main dislike with that statement is that you preclude any renewable energy source and since there’s no finite fuel source, it makes it different than fossil fuels.”

The fourth theme related to energy was the expectation of lower local electricity costs. Some respondents perceived that their electricity bill would be lowered because of the wind energy turbines located around their community, and were confused as to why they were not benefiting from reduced electricity prices. One respondent said,

> (People in the community) thought their electric bill would go down. That’s what I thought, that’s what most of us thought…People that own them, may benefit from them. But us, receiving the power, we don’t. It’s frustrating, because I know they can’t preserve that energy, they can only use what they produced for the day. So to be sitting right here, with electric bills with what we are seeing…which are higher than before the turbines…I know they are in the process of building new grids and transmission lines…they say we will be able to benefit from that, but I don’t see that in the next 5-7 years, before we actually see it on our electric bill (03).

Another individual had similar thoughts: “Why don’t we get electricity dirt cheap here? Why don’t we have two or three turbines that generate electricity for the town, and subsides people’s electricity bill. Then it would be an economic incentive for other businesses to come here” (26).

The final energy theme that was prevalent throughout the interviews was linking

wind energy, hydrocarbons and other energy sources. Despite a lack of interest in environmental aspects, some respondents believed wind energy should be utilized in addition to oil and gas and other energy sources. For instance, a city official (01) stated, "I think it (wind energy) is a part of renewable energy, and green energy, and it may not be the only part, but pieces of the puzzle." In addition, respondent (01) emphasized,

> I think it's much more than that it's just that one of those first steps in trying to have energy independence. We are a long way from that and wind is not the only thing , you have solar and biomass and a lot of other things, but you know wind is an opportunity to get in there quick, and we have plenty of wind so you should use that natural resource…Are we as bad as some people think? I don't know. I'm not a scientist, I don't know if global warming is really hitting us as hard as some people think. But it does make a lot of sense when all the money we are spending in foreign areas, to buy the oil that they are using to buy guns and do all this other stuff. At some point in time you may not stop it but you can sure slow it down. And if we had the chance to produce energy by U.S. people why not do that? Wind is just one of them.

Another individual shared the same sentiment, "The fact that we can have another source other than oil, and because this is the oil and gas capital…it's just another source. I believe we have to get off this oil addiction we have and anything we can do to free ourselves from foreign oil is a step headed in the right direction" (04). Another individual said, "That one is personal for me. I just know that there is not one simple solution. Everything has an impact on the environment some way or another. If we diversify more, I think it lessens that impact" (16). In comparison a individual felt wind energy is a better alternative to other sources of energy, "I think that it (wind energy) is a much better alternative to coal. I am not anti nuclear, but I would rather have wind turbines by me than a nuclear power plant" (32).

One topic that did not reveal a consensus among the respondents was whether the main oil and gas interests in Nolan County support the wind energy industry, a claim represented in statement 7 ("People that used to be the main oil and gas players do not like the wind industry because it is eating into their oil and gas stronghold. The wind industry has politicized the town between wind and oil. Currently in local politics, everything is about wind, and that has made the oil and gas people angry.") Some felt the oil and gas players are dissatisfied with wind energy development. "Nolan County has not been a major oil gas area for a long time, but I can also see how other industries have not liked the fact that someone else came in" (01). Respondent (05) could understand why there may be an issue between the oil and gas industry and the wind energy industry because of the legalities of the royalties. She said:

> I do see a little bit of an issue between oil and gas industry and the wind. Mainly because the oil and gas has specific way on how they are to be treated and appraised and those same codes and guidelines don't apply to the wind. So possibly, the legislation needs to be passed…to regulate how these properties are assessed, so that they feel an equity of treatment and that's probably why that is a negative contribution (05).

Other respondents have not seen an issue between the oil, gas, and wind energy interests. A government official does not believe the oil and gas players have an issue with the wind energy industry, "Of course the oil and gas people are upset because of oil prices, but it doesn't have anything to do with the wind turbines" (03). A local business owner also believed the oil and gas players are angry due to oil prices, and not due to the wind energy industry. He said:

> I don't see any negative reaction from the oil and gas industry. At first, when oil prices were over 120 dollars a barrel. There was competition for labor. But when

> oil prices dropped, a lot of those people went to work for the wind industry. So it was a benefit for the workers. As far as the owners…the major players…if there is any negativism it's just envy or something pretty shallow (25).

Another individual (16) believed the oil and gas players like the wind energy industry because the roads have been improved: "We had one of the major drilling companies that has tried to increase their production… I don't think there was any…in fact I think they kind of like it, because a lot of the roads were improved." A government official (09) believed the issue between oil, gas and wind is in state or national politics, "The whole oil and gas thing…my thinking of it is in Washington where its oil versus wind. Out here, I see oil companies that want to get involved in wind." He continues by stating that a few people believe local politics is all about wind, "There's an old guy here, that thinks everything is about wind in politics, and other people didn't want to talk about wind not because they didn't want to talk about wind before…but because it goes back to local politics from 1950s dealing with [high school] football," which he later described as the "Friday night problem" (09). However, a local business owner disagreed and believed the debate between oil, gas, and wind is being played out in local politics. He stated

> That debate goes even larger with environmental attitudes, and it seems to be playing out here politically, because we have a pro wind mayor and older oil and gas players who do not share in the same energy landscape (26).

5.3 Community Impacts

Key stakeholders in a town perceived the recent history of community in similar ways, but differed in views of how their community has changed since the arrival of the

wind energy industry. During the initial ten interviews, the first question asked of the key stakeholders was "what was the community of Sweetwater like before the wind energy industry?" Most respondents began their description of Sweetwater as a west Texas small-town rural community. Many respondents continued their description of their community as a small rural town but based on the local economy, number of jobs, and population trends. These two factors (rural and economy) were a reoccurring theme throughout all the answers from the respondents. They also perceived a declining local economic base, higher unemployment, and declining population as very important to the community of Sweetwater. Many respondents emphasized the dismal future for the community had if the wind energy industry had not come into the region. For example, respondent 24 emphasized,

> Sweetwater was struggling. We have several diverse businesses but, one of the biggest ones was the oil industry and over the last 10-15 years, the oil production has basically dropped to not a whole lot in the county. So we were starting to lose population, we were seeing a large decline in our enrollment in our schools and as soon as the windmills blew into town, nobody knew what to expect.

Another respondent (07) also shared the same sentiment, and believed that Sweetwater, similar to many other small Texas towns, was diminishing, arguing that the city was "on a downward spiral…we were a typical small town Texas…if not a slump but a leveling off economic activity, until wind energy." This quotation exemplifies what many respondents argued: the wind energy industry has allowed the community of Sweetwater to not only continue as a viable place but has allowed the community to become economically prosperous. For example, "each year it continues to grow. We [the

community] assist in making wind industry as a whole as Sweetwater is the center of it [the wind energy industry]… [and] also trying to promote our community" (01).

An additional question the respondents were asked during the initial interviews was "has the wind energy industry affected the sense of community?" There were many different responses to this question. Some stakeholders argued that the wind energy industry has improved the sense of community, while other stakeholders did not perceive the wind energy had changed the sense of community. A county government official stated, "I definitely do. Just the general attitude…more hopeful about the future…people can get pretty pessimistic if there are not any jobs." Some of the respondents believed the best impacts the wind energy industry had on the community was that the added tax revenue and job opportunities has allowed many people to stay in the community. A business owner (24) said, "so many people that grew up in Sweetwater, have to leave because there simply weren't good paying jobs. I'm starting to see people coming back because there are jobs here, their parents still live here, and they appreciate the quality of life. I would think overall, people are saying our kids can stay here, we can stay in touch." He continued by stating, "before the windmills, I think they thought we would dry up and blow away, and so dying in a sense, and [now] things look a little bit rosier. This is good because, charities benefit, more high paying jobs [are created], and more houses are full. So people are saying we can make this work, and that's what the sense of community is, that knowing things are going to be as good as tomorrow if not better than they were before."

Other interviewees did not believe the wind energy industry has impacted the sense of community, as they perceived the community of Sweetwater has always had strong relationships. The community "has always been centered around school, football, and things like that… [and] the wind energy has not had any impact on that kind of scenario" (07). As respondent (07) explains in the previous statement, some respondents felt the rural community of Sweetwater has always consisted of many strong personal relationships and sense of community due to other reasons, and the wind energy industry has not brought the community as a whole stronger together. This may be due to the small variations in perceptions in the impacts of the wind energy industry, which is indicated by this study.

However, in some cases the wind energy industry has allowed the sense of community to continue, as it has allowed people to keep the farm in the family for future generations. This premise was important to several people, especially those who were ranchers and farmers, because the wind royalties revenue has allowed future generations able and willing to stay or come back to live in the community. For example, one respondent stated, "Anytime farmers and ranchers can get added income, for the use of their land they are usually pretty all for that. Sometimes, that's what it takes to keep the land in the family" (24). A famer (25) felt one of the most important impacts the wind energy industry has had on his community, was "seeing the best and brightest return with the opportunity with big company jobs, or close to this area. That's a long term benefit. One of the things I'd like to see if the valedictorians come back. Valedictorians and

salutatorians don't come back to small towns. If they come back, then we are doing something."

Even though all respondents supported wind energy, some perceived the wind energy has had some negative impacts on the community, an argument captured in "Community Advocate." For example, one occurring perceived negative impact was the how the wind energy industry impacted the housing market. As an influx of people moved into the town, the new workers began to rent houses and apartments throughout the small town. This influx of new residents had a positive economic impact to those who were owners of rental properties, but wind energy employees were receiving per diem to rent houses and apartments. According to the respondents, the per diem rates allowed for paying double or triple the original rent. Therefore, landlords and individuals benefited from renting out to the wind energy employees at much higher rates. Even though it was a positive to many members of the community, it was also a negative to many other members of the community whose rent increased but their pay remained the same. Many residents were forced to pay double or triple their original rent, or were forced to move to another location. One individual (03) referred to this phenomenon when stating that "the town as a whole turned to pure greed during wind turbine construction" and was concerned about the people who were negatively impacted by the new industry. Many other individuals agreed with this statement, but felt that the impact of the housing market was not as significant. For example, a business owner (26) agreed with the "pure greed claim but adding that, "all of a sudden it seemed like that some people were rather exploitative…but on the other hand, it's still market driven, some of those people need to

work a little harder, or move over the whole standard of living." Therefore, many of the respondents who did not see the increases in rent as a negative impact, saw it as a positive impact because it brought up the standard of living, the abandoned houses were fixed up and filled with wind energy employees. For other respondents, any criticism of rent increases indicated an unwillingness to change. One individual (17) that had recently moved to Sweetwater said,

> I think that's emblematic of what is wrong with these communities out here is that they don't want to change at all. I guess it has negatively impacted, because of the construction crews have left, but the businesses are still open…But the part on housing prices and market, if that doesn't happen, then the town is dying. I mean if your home prices are going down and population is going down, the town is dying, and that's how we got here in the first place…If you are not having property values going up, that means there is no market…nobody is coming in…you are just filling up the cemetery.

However it is important to emphasize the respondents were the elites in the community, and were landowners, landlords, or property owners; therefore, the respondents were not personally affected by rent increases. This may have resulted in different perceptions of the wind energy industry, if the respondents were directly impacted by rent increases.

Another issue relating to community is crime. One perception is that there has been an increase in crime due to the wind energy industry. Some individuals felt that there has been an increase in crime because of the increase of construction workers who built the wind turbines were staying in Sweetwater, and were committing crimes. A government official stated "there probably has been an increase in transient populations, maybe some crime stuff that goes on. But it's not as big of a problem and I haven't heard any reports, most of our statistics…I just don't see, of course the nightlife in Sweetwater

is not all exciting….so maybe they cause trouble in Abilene." Another government official stated "you can check the daily newspaper and see that it is at least doubled….they aren't names we necessarily recognize...the DWI…and things like that. Some of them will show as out of town addresses."

However many other respondents disagreed with perception that there has been an increase in crime due to an increase of wind energy employees. A business owner stated (27) that, "I don't think so, and I don't know why anyone would think that. I don't see anything that crime is up or there are bad people in town." A government official (01) stated that, "I don't really agree the security of the town has gone to hell. I think it brings new challenges, but I don't see something that has been negative"

Another important perception among some respondents was that the wind energy companies do not contribute to the community, in ways besides tax revenue or employment. A business owner and prominent individual felt the wind energy employees should be involved in donating to community events, but also attending and participating in community organizations to contribute to the community. He stated,

> it would good if they [wind energy companies] figured out ways to become more involved…you don't see them involved in civic organizations, you don't see them sponsorship banners on anything. I don't think they have made a big contribution to the community, and maybe they are too busy, and at some point they need to settle down and get the home office here, and if they are going to be here they should make those commitments.

However, some individuals perceived the wind energy companies have contributed to the community and have participated in community organizations. For instance, a local government official (16) stated, "You know, most of the wind mill

companies…have been corporate citizens… [they] have donated to various organizations, athletics events. Going to church, you see them. They are here, they are involved." Some respondents have seen the full-time wind energy employees participate in community events through church and other organizations. Unlike respondent (16), some respondents stated they have not seen the wind energy companies contribute in any way, but the respondents qualify that statement by stating that the wind energy companies may in fact contribute, but are unaware because nothing has been publicized through newspaper articles or other venues. For example, a local government official (07) stated, "I haven't seen a whole lot of exposure of them. They haven't really stepped up and done anything. It would be nice to see them do some things in the community and charities. It doesn't mean it's not happening. I haven't seen it."

Even if the respondents identified positive economic impacts due to the wind energy, it is unclear whether the influx of tax revenue has allowed for community development (both infrastructure and relationships). The key issues were rent, crime, and firm involvement in community events. Q-Method did not elucidate well this aspect, but it appeared in interviews conducted as a part of Q-Method. Positive interpretations may relate mainly to the individual economic impacts they receive, either from having turbines on their properties (wind royalties), or from lowered county taxes. Due to the nature of Q-Method, only elites were interviewed; this may have underplayed the impacts other individuals have encountered. For instance, many of the perceived impacts from stakeholders were related to the impact on the rental property market and to crime increases which mainly relate to relatively poorer residents. These impacts were

discussed among the key stakeholders, but many found the positive economic impacts were more significant than the ancillary impacts such as the lack of involvement in the community from wind energy employees, the housing market and crime. This could relate to different perceptions of community, and could reveal other perspectives that were missed during this research study. Overall this study reveals that people's perceptions of community and the impacts to their community can vary and are difficult to determine, but this information is useful to understand how large industries such as the wind energy industry can affect small local communities and how more positive impacts and fewer negative impacts could occur.

5.4 Wind Energy Literature in Human Geography

Over the past decade wind energy installments have dramatically increased in the U.S., from 2,539 MW total wind energy capacity (Department of Energy 2009) in 2000 to 35,159 MW in 2009 (AWEA 2010a). This trend may continue if "America's Wind Corridor" is used to generate electricity for the country. Yet very few scholarly articles have been written on wind energy development in the U.S., and fewer consider potential positive and negative socioeconomic affects that may occur in these communities dotting the Great Plains. Bohn & Lant (2009) is the most recent article that has studied how permitting processes relate to limited or expanding wind energy installments. Political and permitting processes across the U.S. because it can greatly affect the success or disintegration of other projects. However, Bohn & Lant's regression model does not take into account why certain areas have seen clusters of new wind energy development, and

how social factors can contribute to the success of wind energy development. This thesis has filled in some of these unknowns for Nolan County, Texas which is an epicenter of wind energy installments in the U.S. Furthermore, this study has determined why key stakeholders support wind energy development in their community, but has also shown the subtle differences in support. Moreover, the perceived positive impacts and negative impacts which could be possible topics resulting in opposition to wind energy in Nolan County over time. In addition, this research suggests possible topics that may result in opposition in other locations. Since wind energy development is relatively new in the U.S., the amount of scholarly literature on the impacts of wind energy has been limited in comparison to European literature. In addition, European countries have a different planning and permitting process than what is found in states like Texas; thus, there have been more studies on how people's perceptions of wind energy development can impact the installation of wind energy projects through these planning and permitting processes. Several studies have shown that it is important to consider perceptions of wind energy, and why particular regions strongly support wind energy development. Prior to this study, explanations in support of wind energy development in an area like Texas, with little or no planning and permitting processes, were limited to the PIMBY concept.

Insufficient knowledge exists on perceptions of wind energy in regions that strongly support wind energy development in the U.S. Therefore, this study drew inspiration from other studies (Ellis et al. 2007; Fisher & Brown 2009) which focused on perceptions of potential socioeconomic impacts of wind energy. These two studies revealed many different ways people support or oppose wind energy development. This

study not only provided additional information on perceptions of wind energy development in a region which has been understudied by scholars, but it also looked at people's perceptions of socioeconomic impacts and how those perceptions may have changed after the wind energy development existed for a few years.

Since Q-Method was a useful tool in understanding perceptions of wind energy development in Europe (Ellis et al. 2007; Fisher & Brown 2009), it was assumed that it would also be a useful in understanding why strong support exists in West Texas. Despite the limited time frame for this study and the multiple steps for Q-Method, it proved to be a useful means to understand the various perceptions in opinion within Nolan County, especially since the perceptions had very subtle differences. If Q-Method had not been used, it would have been difficult to extrapolate the slight differences in opinion on the perceived socioeconomic impacts of wind energy, given that all factors and all respondents stated they supported wind energy development. Q-Method, however conveyed how and why some respondents supported wind energy development more than their peers, depending on what the respondents perceived as negative impacts. Some statements based on particular topics were more important to some of the respondents than others. For example, two of the factors felt tax abatements were an important aspect to wind energy development (Disenchanted About Tax Abatements or Favorable Towards Tax Abatements). Tax abatements have and could be implemented elsewhere in order to entice wind energy development to that specific county. However, tax abatements could also be a cause of contention or opposition of future wind energy development.

Another area of possible contention for future wind energy developments are the impacts to land-based practices. Depending on the landowners' perceptions and the possible negative impacts to their land, such as aerial application of pesticides, or irrigation may lead to less support or opposition to wind energy development.

The final factor that perceived some negative impact due to the wind energy industry, focused on secondary impacts to the community such as increases in rent and crime. In addition, some respondents felt that even though it was perceived by some to be beneficial to the entire community, they felt only some of the population, such as property and business owners benefited from wind energy development, while the lower socioeconomic class did not receive any benefits. In some instances, respondents (Community Advocate perspective) felt the lower socioeconomic class was negatively impacted by wind energy development because of increases in rent, and increasing crime around rental properties. Potential negative impacts to the community could be perceived in other locations where wind energy employees would reside during construction. Again, these perceptions could result in future problems for other small communities. However, it is important to note, that while using Q-Method in this study, the elite were the only participants in the study. The reason behind that premise is to understand the perceptions of those who make decisions in relation to wind energy development. However, Q-Method was not useful to understanding the perceptions and impacts of lower socioeconomic classes. This study has not only shown possible areas of contention which could result in opposition to wind energy development, but it shows both the

positive and negative impacts that could possibly impact hundreds of small communities across the Great Plains.

6. SUMMARY AND CONCLUSIONS

With the rise in land-based wind energy development in the U.S., many more communities have seen the positive and negative socioeconomic impacts associated with wind energy development. The trend of wind energy installments is predicted to continue to increase, along with more communities to experience these impacts. Previous studies have addressed reasons for social acceptance of wind farms, suggesting that positions both favorable and unfavorable to wind power are subtle, complex, and rooted in place-specific issues. In the case of Texas, Bohn & Lant (2009) have reported that the minimal permitting process is the dominant variable that explains the rapid rise of wind power in the state's western region. However, scholars have not yet studied the place-based local or regional factors that structure and inform acceptance of wind energy by key actors.

Between January and December 2009 I conducted research regarding socioeconomic impacts of wind-power development in West Texas, focusing on Nolan County and emphasizing the perceived impacts held among stakeholders. I identified five significant clusters of opinion by using Q-Methodology. Q-Method has identified the breadth of perceptions about social perspectives on the socioeconomic impacts of wind energy in Nolan County, but not how widely or deeply the local population ascribes to these social perspectives. Two perspectives, Wind Welcomers and Land-Based Wind Welcomers shared strong support for wind energy on the basis of perceived positive economic impacts. The subtle difference between these two perspectives was that the Land-Based Wind Welcomers believed the impacts to land-based practices such as farming and hunting were very important. The three clusters of opinion that were less

favorable to wind energy included: Tormented About Tax Abatements, Favorable Towards Tax Abatements, and Community Advocate perspective. These perspectives represented three different arguments: opposition to tax abatements, support of tax abatements, and concerns over negative socio-economic impacts on the community. The only topic of consensus was over the idea that positive views toward wind-energy development were unrelated to broader commitments to renewable energy. The support of key actors in Nolan County favored wind energy development because of perceived positive economic impacts to the community, direct financial benefits from wind-energy royalties, political views on tax abatements, notions of landscape aesthetics, and socioeconomic impacts to the community.

The implications of European studies where Q-Method has been used not only identify what were social perspectives stakeholders had on wind farm proposals, but also to alleviate future wind farm disputes (Ellis et al. 2007; Fisher and Brown 2009). Ellis et al. (2007) used Q-Method to investigate the discourses around supporting and opposing an offshore wind farm proposal in Northern Ireland. It was found that the motivations for either supporting or opposing the wind farm were complex and "[defy] simple explanation" (540). Ellis et al. (2007) claim their findings can help in planning responses that may result in settling differences in similar disputes. Similarly, Fisher and Brown (2009) used Q-Method to identify social perspectives surrounding the Isle of Lewis wind farm in Scotland. Fisher and Brown's (2009) intent was to identify social perspectives that were strongly contested and had the greatest consensus among stakeholders. The implications of their study can be used as a starting point for constructive deliberation to

resolve the differences between parties. Both articles are examples of how Q-Method can be used to identify the breadth of social perspectives surrounding a wind farm dispute, although they are vague in how their results can be used, in policy reform and helping to resolve future wind farm disputes.

This thesis has indicated that a variety of social perspectives exist in area which has rapid and extensive wind energy development over several years, with seemingly overall strong support for wind energy development. The reasons for support of wind energy development are not monolithic; in fact, different perceived socioeconomic impacts inform support for wind power. The different perspectives are based on perceived positive economic impacts, land-based practices, tax abatements, and community impacts. Perceptions of these issues are important in formulating perspectives and extent of support of wind energy development. It is likely that others in the region would identify with these social perspectives on wind energy development because discourses are shared and communicated beyond the stakeholders that were interviewed. However, the results of this study cannot determine what percentage of the population would identify with each of the social perspectives.

The social perspectives could indicate reasons for changing perspectives or declining support of wind energy development over time in Nolan County. For example, perceived negative impacts due to increased to rent increases, land-based practices, or tax abatements may result in some individuals opposing the wind energy development over time. The results of this thesis could be used to inform the possible socioeconomic impacts that could occur in other regions if wind energy development was implemented.

These perspectives may also indicate areas of contention in other regions faced with wind energy development, such as increases in rent, which could result in opposition to wind energy development.

Furthermore, the results of this study could be used to inform wind energy companies on how wind energy development is perceived in this region. The most important specific finding is that some individuals perceived that wind energy companies do not contribute to the community. This could be significant information to wind energy companies because it reveals that some individuals are dissatisfied with the lack of involvement the wind energy companies have in the community. The social perspectives also indicated that individuals expect more from the wind energy companies than increased tax revenue and job creation; individuals indicated the wind energy companies should contribute to and be involved in local community events. The results may also be useful because examples of when wind companies have contributed to community events may not be reaching many individuals in the community. As a result, this could negatively impact the image or representation of wind energy companies in the region.

Another significant finding from this thesis is that wind energy development may have positive impacts to a region (i.e. increased tax revenue and wind royalties), but may also cause some negative socioeconomic impacts (i.e. increase in rent and crime). Two of the social perspectives (Land-Based Wind Welcomers and Community Advocate) in this thesis reveal that some individuals perceived that there have been some negative impacts on land-based practices and some community members. For example, the Land-Based Wind Welcomers perspective indicated that there have been some negative impacts on

farming and ranching practices due to wind turbines. For example, cultivation practices have been changed to go around wind turbines and roads, could affect the farmers' efficiency and oil use. In addition, wind turbines may inhibit the use of irrigation or aerial application of pesticides. It was found in this region these impacts were not very significant because farmers did not rely on aerial application, and most irrigation obstructions could avoided. However, these factors may result in opposition to wind farms in other locations that rely heavily on irrigation and aerial application, or could indicate factors that could impact wind royalty contracts with landowners.

In addition, the Community Advocate perspective has indicated that some individuals perceive that populations within the community have been negatively impacted by wind energy development. For instance, the population that resided in rental properties was negatively impacted by perceived dramatic increases in rent, and crime due to the influx of wind energy employees. Therefore, this perspective has indicated some negative socioeconomic impacts due to wind energy that has not been indentified clearly before. Therefore, the results of this thesis could indicate in the future, that other communities may experience similar negative socioeconomic impacts. It could also indicate possible policy changes which may occur as a result of these perceived socioeconomic impacts.

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APPENDIX A

Information Sheet for Institutional Review Board Compliance

INFORMATION SHEET: Socio-Economic Impacts of Wind Energy

Introduction
The purpose of this form is to provide you (as a prospective research study participant) information that may affect your decision as to whether or not to participate in this research.

You have been asked to participate in a research study on the social and economic impacts of wind energy development in Texas. The purpose of this study is to understand how wind energy affects landowners, local governments, and workers. You were selected to be a possible participant because of your position with local government, or because you have wind turbine(s) on your property.

Our study is funded by NextEra Energy Resources (formerly known as FPL Energy).through a sub-award from Texas Christian University [link to: http://www.wind.tcu.edu/default.asp]. We aim to publish the results of our research in peer-reviewed scholarly journals; in addition, our interim and final reports will be shared with NextEra Energy Resources.

What will I be asked to do?
If you agree to participate in this study, you will be asked to answer four questions in a semi-structured interview format. This study will take between 30 and 60 minutes. Your participation may be audio recorded.

What are the risks involved in this study?
The risks associated with this study are minimal, and are not greater than risks ordinarily encountered in daily life.

What are the possible benefits of this study?
You will receive no direct benefit from participating in this study; however, potential benefits to society include greater knowledge and understanding about social and economic benefits and drawbacks of wind energy development.

Do I have to participate?
No. Your participation is voluntary. You may decide not to participate or to withdraw at any time without your current or future relations with Texas A&M University being affected.

Who will know about my participation in this research study?
Your identity as a participant in this study is confidential. The records of this study will be kept private. No identifiers linking you to this study will be included in any sort of report that might be published. We will not share these data with NextEra Energy Resources or with Texas Christian University. These data, and the identity of the respondents who participate in our study, remain exclusively with Christian Brannstrom, Wendy Jepson, and graduate assistants employed on this project at Texas A&M University. The protocols we have submitted, and all future amendments, to the Texas A&M University Institutional Review Board stipulate that any audio recordings and transcripts arising from interviews with respondents are stored securely at Texas A&M University.

If you choose to participate in this study, you may choose to be audio recorded. Any audio recordings will be stored securely and only Christian Brannstrom and Wendy Jepson will have access to the recordings. Any recordings will be kept for five years and then erased.

Whom do I contact with questions about the research?
If you have questions regarding this study, you may contact Christian Brannstrom (979 845 5923; cbrannst@geog.tamu.edu) or Wendy Jepson (979 458 2224; wjepson@geog.tamu.edu).

Whom do I contact about my rights as a research participant?
This research study has been reviewed by the Human Subjects' Protection Program and/or the Institutional Review Board at Texas A&M University. For research-related problems or questions regarding your rights as a research participant, you can contact these offices at (979)458-4067 or irb@tamu.edu.

Participation
Please be sure you have read the above information, asked questions and received answers to your satisfaction. If you would like to be in the study, we will proceed when you are ready.

APPENDIX B

Original Interview Schedule

Information Sheet

Date: _____ Time: _____ Code Number_____ Audio Recording File Number_____

General

1. How long have you lived in Sweetwater?
2. What was Sweetwater like the before the wind industry?
3. Why do you support wind energy? (Climate change or local economy?)
4. Has the wind farm impacted the sense of community?
5. Would you support more wind turbines?
6. When did you start to use wind turbine images on your website?
7. When did the phrase, "Wind Energy Capital" start being used?
8. What would you suggest to a new community to do if faced with the wind industry constructing turbines?
9. Do you think the wind industry has improved the community? And if so, in what ways?
10. What improvements or involvement would you like to see from the wind industry?
11. Has your view of energy changed since the wind industry?

Planning Process

1. Were there any community meetings about the wind farms?
2. Were you involved in any community planning activities for the wind farm? If so, what was your opinion of this activity?
3. What is your main source of information about the wind farms?
4. Were you involved in any negotiations with wind energy companies? If so, what was your opinion of the negotiation process of the wind royalties?

Attitudes toward Wind Turbines (U-Shape, Aesthetics)

5. What was your attitude toward the wind turbines before, during, and after construction?
6. Do you find the wind farms unattractive or appealing?
7. In the beginning stages, what was your attitude towards having a wind turbine around your community or on your property? (NIMBY or PIMBY)
8. Do turbines allow for multiple uses of the land?
9. Have you changed the use of your land because of the wind turbines?
10. When are you mostly likely to see the wind turbines?

Environmental

1. Do you believe there have been any impacts on the environment due to the wind farms?

2. Do you believe there have been any negative impacts on wildlife due to the wind farms?
3. Do you or know of anyone that hunts around Sweetwater? Has the wind turbines affected hunting season?

Energy

1. How would you compare wind energy to other sources of energy? (Oil, solar, coal)
2. Would you be willing to pay more for wind energy than other energy sources?
3. Do you know of the Tenaska Trailblazer energy center? If so, what is your opinion of the Tenaska Trailblazer energy center plant versus the wind farms?
4. Do you know of any state or federal policies in relation to wind energy? If so, what is your opinion of state or federal policies towards wind energy?
5. Would you support for more wind energy (in your community, elsewhere)? And Why?
6. Do you know where the wind energy produced in Sweetwater, goes?
    a. What do you think of the wind energy being transported to major cities (Dallas-Ft Worth, Austin)

Public Infrastructures

1. Were there any problems relating to the construction of roads or power lines?
2. Have you noticed any wear and tear on streets, due to increased traffic for the wind farms?
3. Have you noticed an increase in traffic or traffic accidents since wind farm construction?
4. Do you know of any contributions wind energy companies have made to the local community? (schools, local programs)
5. In your opinion, do you think there has been an increase of crime since the wind farm construction?
6. Is water usage a factor in supporting wind energy?
7. Do you know if there has there been an increase of enrollment in the school system?
8. Did you know TSTC offered courses for wind energy? What is your opinion of these courses being offered, and do you know when did TSTC (Sweetwater) begin their wind turbine technology degrees and certificate programs?
9. Have there been any new businesses that have developed since the wind farm projects?
10. Do you know of any improvements to schools through wind farm taxes?
11. Have there been any renovations or construction to the local community because of wind energy tax revenue (new businesses, newly paved roads)?
12. Do you know of any plans for constructing new wind energy transmission lines?
    a. Were there any local decisions made in relation to the new wind energy transmission lines?

Labor

1. Do you know if wind employees reside in the community, or commute from other locations?
2. Did the increase of wind jobs, create a deficit of other jobs in the community as people changed professions?
3. Has there been an increase in job creation in the local community?
4. Has there been a reduction of jobs relating to wind energy due to the recent economy?
5. Do you think the wind industry has job security?
6. Do you know what type of work is associated with the wind energy? If so, are the jobs associated with the wind industry of good quality?

Taxes

1. Do you know if the wind turbines and wind turbine production is being taxed?
2. Do you know how the tax abatement process works? If so, do you believe the tax abatement process is fair?
3. Do you believe the production of the wind turbine should be taxed?
4. Do you know of the Texas Robin Hood act?
    a. If yes, do you think there has been a decrease of tax revenue for schools, because of higher tax incomes because of the wind farm?

Wind Royalties on Land Owners/ Community Members

1. Do you know if landowners with wind turbines invested any money into the community? (Buying restaurants or starting businesses).
2. Has the wind power royalties influenced any decisions that you have or might make?
3. Has the wind royalties affected any of your relationships with others in the community?
4. **Has the wind industry affected the housing market in Sweetwater?**

APPENDIX C

Revised Interview Schedule

Information Sheet

Date: _____ Time: _____ Code Number_____ Audio Recording File Number_____

General

1. How long have you lived in Sweetwater?
2. What was Sweetwater like the before the wind industry?
3. Why do you support wind energy? Is climate change or the local economy more important?
4. What would you suggest to a new community to if faced with the wind industry constructing turbines?

Attitudes toward Wind Turbines (U-Shape, Aesthetics)

1. What was your attitude toward the wind turbines before, during, and after construction?
2. Do you find the wind farms unattractive or appealing? Has your view changed? Has your view changed?

Environmental

1. Do you believe there have been any positive or negative impacts on the environment due to the wind farms?
2. Do you know if the wind turbines affected hunting season? Do you have hunting permits on your property?

Energy

1. Since the wind turbines have been installed, have they changed your view on energy?
2. Do you think the average person in Sweetwater knows where the wind energy produced goes?
3. What is your opinion of the Tenaska Trailblazer energy center plant? Do you think the Tenaska plant compliments wind energy, or takes away from Sweetwater's image of being the Wind Energy Capital?
4. Do you think more would be opposed if it was a conventional coal burning plant?

Public Infrastructure

1. Have you noticed any wear and tear on streets due to increased traffic for the wind farms?
2. Do you know if there has there been an increase of enrollment in the school system?
3. Have there been any new businesses that have developed because of the wind farm projects?

4. Do you know of any improvements to schools funded through wind farm taxes?
5. Do you know of any plans for constructing new wind energy transmission lines?

Labor

1. Do you know if wind employees reside in the community, or commute from other locations?
2. Did the increase of wind jobs create a deficit of other jobs in the community as people changed professions?
3. Has there been an increase in job creation in the local community?
4. Has there been a reduction of jobs relating to wind energy due to the recent economy?

Taxes

1. Do you know think the wind turbines and wind turbine production is being taxed? Do you believe the production of the wind turbine should be taxed?
2. Do you believe the tax abatement process is fair?

Land Owners/ Community Members

1. Do turbines allow for multiple uses of the land?
2. Have you changed the use of your land because of the wind turbines?
3. Do you know if landowners with wind turbines invested any money into the community?
4. Have the wind power royalties influenced any decisions that you have or might make?
5. Have the wind royalties affected any of your relationships with others in the community?
6. Do you know of any contributions wind energy companies may have made to the local community? (schools, local programs)
7. Has the wind industry affected the housing market in Sweetwater?

APPENDIX D

Rating Criteria for Statements

5	Highest ranking; statement excellent considering the domain; clear idea is conveyed; most respondents should have an opinion about this statement
4	Good ranking: statement conveys a clear idea, but is lesser in some way than highest ranking
3	Moderate ranking: some ambiguity in meaning or weakly appropriate to domain
2	Low ranking: significant opaque or unclear meaning, or not appropriate to domain
1	Poor ranking: statement is not appropriate considering the domain because of opaque or unclear meaning

APPENDIX E

List of final 27 statements for Q-Sort

#	Statement	Source	Category
1	At first the wind turbines were trashy looking but as more the turbines are built, the more they become beautiful because of what they're going to provide for the economy around here.	Winds of Change Blow into Roscoe, Texas NPR John Burnett 4/02/09	Aesthetics
2	We have to look at these wind towers dotting our west Texas skyline yet we don't reap any of the benefits from them. The people in West Texas should be compensated for these eye sores.	Comments Transmission lines needed, firms say Jerry Daniel Reed Abilene Reporter 3/01/09	Aesthetics
3	In other places people complain about how the wind turbines ruin the scenery, but people here see there are just shrubs and cacti. The fact that there are so many turbines, it's almost like going to a garden and looking at something growing and it actually improves the landscape.	05_1_24Apr09	Aesthetics
4	The people that think the turbines are unattractive are the same people who do not own any turbines or will never own one.	03_1_26May09	Aesthetics
5	The people who have been neglected are the people who have been in the community before the wind industry arrived and those that are going to be here when the wind industry leaves.	03_1_26May09	Community
6	There have not been any negative impacts due to the wind industry. People have not come into the community committing crimes, for example.	11_1_24Apr09	Community
7	People that used to be the main oil and gas players do not like the wind industry because it is eating into their oil and gas stronghold. The wind industry has politicized the town between wind and oil. Currently in local politics, everything is about wind, and that has made the oil and gas people angry.	26_1_27May09	Community
8	The wind industry has negatively impacted the community. Several businesses are failing now because the wind industry has left. In addition, the wind industry has horribly impacted the local housing market, as it impossible to rent an apartment.	03_1_26May09	Community
9	The security of the town has diminished since the wind industry began. Before, there were not a lot of transient populations, even with Interstate-20, or when there was a prison. Some of the wind energy employees are leaving, but there are still a few people here and they continue to commit crimes.	03_1_26May09	Community
10	The town as a whole turned to pure greed during wind turbine construction. Rent tripled in price because the wind energy employees are able to afford higher rent prices, while other members of the community could not afford the new rent prices	03_1_26May09	Community
11	The wind energy companies do not contribute to the community and have not been involved in community events. The money is being invested in the community through the tax revenue, but it would be nice if the wind energy companies would contribute directly into the community.	26_1_27May09	Community

12	When wind energy construction booms, it booms and when wind energy construction busts, it busts. The pay was great for the wind employees and construction workers but now there is nothing.	07_01_23Apr09	Community
13	There are a minimum of 300 full-time wind energy employees located in Sweetwater that were not here 8 years ago. If you do not count the employees that work for government agencies, the wind industry would be the 2nd largest employer in Sweetwater.	01_1_19May09	Community
14	People here are not spending a lot of time thinking about how they're saving the planet. In fact, a lot of them are dubious of the whole concept of global warming.	Winds of Change Blow into Roscoe, Texas NPR John Burnett 4/2/09	Energy
15	Wind energy does not change your view on renewable energy sources. It is not really even green energy. Even though we are not burning coal to generate the electricity, inside the wind turbines are components that are going to be thrown into a landfill ...	03_1_26May09	Energy
16	People from here are more aware of renewable energy, but are not very environmentally conscious. Wind energy is not viewed as a clean power source, but just as additional revenue	17_1_20 May09	Energy
17	Farmers may have to plow around a wind turbine, and the cattle may feed up to it, but ultimately it has not taken anything of consequence when you compare it to the pollution of a coal plant or nuclear waste.	26_1_27May09	Energy
18	People from this area do not take the pledge of being green and only for renewable energy. You have to be for every type of energy source because gas pumps are not going away for decades.	09_1_23Apr09	Energy
19	'Turning wind into wealth' is a slogan familiar to many people in this region because many landowners, businesses, school districts and other taxing entities have seen extra wealth now that wind is being used as a resource.	Subsidizing your wind even Further, Kimberly Gray Sweetwater Reporter 3/13/09	Landowners
20	Hunters from other locations see wind turbines and hunting as incompatible. They are coming here for the experience of hunting in the wilderness, and the wind turbines are taking away from that. But hunters in Nolan County hunt deer, and they can deal with the turbines because it has become a part of the West Texas Landscape.	17_1_20 May09	Landowners
21	The difference between ranchers and farmers with wind turbines on their property is about two or three decimal places. Some ranchers have turbines producing over 100 Megawatts on their property, whereas most farmers have turbines producing 3 Megawatts. Some ranchers are already in good financial position; however, every farmer needs more money.	25_1_26May09	Landowners
22	Farmers used to cuss the wind because it killed crops, carried moisture away, and dried out land. They now love the wind, because income from a windmill is more dependable than dry-land cotton farming, where drought and hail are constant threats.	Winds of Change Blow into Roscoe, Texas NPR John Burnett 4/2/09	Landowners
23	The county should not lower the tax rate by 2 cents and save me 70 dollars while saving the wind farm companies millions of dollars. The county is giving away money that the county will need to fix roads some day or build a jail. The county should be collecting taxes, as the infrastructure is degrading, and all the turbines are falling on a fast depreciation schedule. The tax revenue will not be available in the future to replace all of the damaged roads.	07_01_23Apr09	Taxes/ Public Infrastructure
24	Tax abatements are a great way to invite wind energy companies to build in your community.	11_01_24Apr09	Taxes/ Public Infrastructure
25	Nolan County, the community of Sweetwater or schools have not benefited from the wind farm tax revenue yet.	03_1_26May09	Taxes/Public Infrastructure

26	The wind energy companies have provided jobs, use supplies, and buy gasoline from local businesses. The wind industry has been good for the merchants of Nolan County and has allowed for tax values to increase which leads to lower tax rates.	11_1_24Apr09	Taxes/ Public Infrastructure
27	Tax abatements and the economic development tax should be done away with all together. This land and this country were built without tax abatements and everyone paid on a level playing field. Tax abatements should be given to no one.	26_1_27May09	Taxes/ Public Infrastructure

APPENDIX F

Q-Sort Respondents

ID	Sex	General Descriptor
25	Male	Landowner
5	Female	Government Official
27	Female	Business Owner
7	Male	Government Official
3	Female	Government Official
9	Male	Government Official/Landowner
24	Male	Business Owner/Landowner
1	Male	Government Official
19	Male	Landowner
31	Male	Landowner
11	Male	Government Official
14	Female	Government Official
26	Male	Business Owner
28	Male	Government Official/Landowner
29	Male	Government Official/Landowner
30	Male	Government Official/Landowner
16	Male	Government Official
32	Male	Prominent Individual
21	Male	Prominent Individual
17	Male	Prominent Individual
4	Male	Government Official

APPENDIX G

Iteration Phase Social Perspective Chart (Initial)

Social Perspectives

Wind Welcomers	Ambivalent Landowners	Tormented About Tax Abatements	Favorable Towards Tax Abatements	Concerned About Community
Strongly supports wind energy development	Supports wind energy development	**Marginally** supports wind energy development	Supports wind energy development	Supports wind energy development
Believes there have **not** been any negative impacts due to the wind energy industry.	Believes there have been some negative impacts due to the wind energy industry, but overall it has been positive.	Believes there have been some negative impacts due to the wind energy industry	Believes there have **not** been any negative impacts due to the wind energy industry.	Believes there have been many negative impacts **to the community** due to the wind energy industry
Strongly supports tax abatements	Strongly supports tax abatements	Believes tax abatements and economic development tax should be **done away** with all together	Strongly supports tax abatements	Strongly supports tax abatements
Strongly supports the wind energy industry because the wind energy companies have provided jobs, use supplies, and buy gasoline from local businesses.	Landowner issues are important (such as hunting and farming)	Believes the Wind Energy Companies **do not** contribute to the community, and have not been involved in the community.	Believes the Wind Energy Companies do contribute to the community, and have been involved in the community.	Strongly Agrees the town as a whole turned to pure greed during wind turbine construction.
Strongly **agrees** that Nolan County, the community of Sweetwater or schools have benefited from the wind farm tax revenue.	Believes farmers will continue to hate the wind despite having wind royalties, because the wind will continue to kill crops, and they will always be farmers at heart.	Strongly **disagrees** there has been an increase in crime since the wind energy industry.	Strongly **disagrees** that Nolan County, the community of Sweetwater or schools have benefited from the wind farm tax revenue.	Strongly agrees that there have been people who have been neglected before the wind industry arrived, and those people will be neglected when the wind industry leaves.

APPENDIX H

Wind Welcomers	**Land-Based Wind Welcomers**	***Disenchanted About Tax Abatements***	**Favorable Towards Tax Abatements**	***Community Advocate***
Strongly supports wind energy development	Supports wind energy development	**Marginally** supports wind energy development	Supports wind energy development	Supports wind energy development
Believes there have **not** been *many* negative impacts due to the wind energy industry.	Believes there have been some negative impacts due to the wind energy industry, but overall it has been positive.	Believes there have been some negative impacts due to the wind energy industry	Believes there have **not** been any negative impacts due to the wind energy industry.	Believes there have been *some* negative impacts **to the community** due to the wind energy industry, *but has had some positive impacts.*
Strongly supports tax abatements	Strongly supports tax abatements	Believes tax abatements and economic development tax should be **done away** with all together	Strongly supports tax abatements	Supports tax abatements
Strongly supports the wind energy industry because the wind energy companies have provided jobs, use supplies from local businesses, *and have brought in new families to the community.*	Landowner issues are important (such as hunting and farming)	Believes the Wind Energy Companies **do not** contribute to the community, and have not been involved in the community.	Believes the Wind Energy Companies do contribute to the community, and have been involved in the community.	Strongly Agrees some *business owners* turned to pure greed during wind turbine construction.
Strongly **agrees** that Nolan County, the community of Sweetwater or schools have benefited from the wind farm tax revenue.	Believes farmers will continue to hate the wind despite having wind royalties, because the wind will continue to kill crops, and they will always be farmers at heart.	Strongly **disagrees** there has been an increase in crime since the wind energy industry.	Strongly **disagrees** that Nolan County, the community of Sweetwater or schools have benefited from the wind farm tax revenue.	Strongly agrees that there have been people who have been neglected before the wind industry arrived, and those people will be neglected when the wind industry leaves.
	Believes there have been some negative impacts for the land operator (not just the landowner)	*Wind Energy should not have to depend on Tax credits from the Government.*		*Believes there is nothing going on with wind energy in region, after construction.*

Wind Welcomers	Land-Based Wind Welcomers	*Disenchanted About Tax Abatements*	
Transmission lines could become an important issue.		*Wind energy development should not have been built before transmission lines*	**Italics refer to changes made after validation phase*

APPENDIX I

General Statistics on five factors

Factor Characteristics	Factors				
	1	2	3	4	5
No. of Defining Variables (Loaders)	13	3	2	2	1
Eigenvalue	9.7545	2.5159	1.8308	1.3359	1.0279
Composite Reliability	0.981	0.923	0.889	0.889	0.800
Standard Error of Factor Scores	0.137	0.277	0.333	0.333	0.447

APPENDIX J

Correlations Between Factor Scores

	1	2	3	4	5
1	1.0000	0.4310±0.1567	0.0512±0.1919	0.3491±0.1689	0.2284±0.1823
2	0.4310±0.1567	1.0000	-0.2162±0.1834	0.0512±0.1919	0.3452±0.1695
3	0.0512±0.1919	-0.2162±0.1834	1.0000	-0.1406±0.1886	-0.3351±0.1708
4	0.3491±0.1689	0.0512±0.1919	-0.1406±0.1886	1.0000	-0.0656±0.1916
5	0.2284±0.1823	0.3452±0.1695	-0.3351±0.1708	-0.0656±0.1916	1.0000

APPENDIX K

Distinguishing Statements for Factor 1

		Factors									
		1		2		3		4		5	
No.	Statement	RNK	SCORE	RNK	SCORE	RNK	SCORE	RNK	SCORE	RNK	SCORE
22	Farmers used to cuss the wind because it killed crops, carried moisture away, and dried out land. They now love the wind, because income from a windmill is more dependable than dry-land cotton farming…	2	1.42*	-2	-1.12	0	0.22	0	0.00	0	0.00
6	There have not been any negative impacts due to the wind industry. People have not come into the community committing crimes, for example…	1	0.76	-4	-1.97	0	0.00	3	1.57	-2	-1.02

(P < .05 ; * Indicates Significance at P < .01) Both the Factor Q-Sort Value and the Normalized Score are Shown.

APPENDIX L

Distinguishing Statements for Factor 2

		Factors									
		1		2		3		4		5	
No.	Statement	RNK	SCORE	RNK	SCORE	RNK	SCORE	RNK	SCORE	RNK	SCORE
20	Hunters from other locations see wind turbines and hunting as incompatible. They are coming here for the experience of hunting in the wilderness, and the wind turbines are taking away from that.	0	0.07	3	1.4*	0	0	0	0.19	-1	-0.51
8	The wind industry has negatively impacted the community. Several businesses are failing now because the wind industry has left. In addition, the wind industry has horribly impacted the local housing market…	-4	-1.43	2	1.12*	-1	-0.58	-1	-0.59	-4	-2.04
22	Farmers used to cuss the wind because it killed crops, carried moisture away, and dried out land. They now love the wind, because income from a windmill is more dependable than dry-land cotton farming…	2	1.42	-2	-1.12	0	0.22	0	0	0	0

(P < .05 ; * Indicates Significance at P < .01) Both the Factor Q-Sort Value and the Normalized Score are Shown.

APPENDIX M

Distinguishing Statements for Factor 3

		Factors									
		1		2		3		4		5	
No.	Statement	RNK	SCORE	RNK	SCORE	RNK	SCORE	RNK	SCORE	RNK	SCORE
27	Tax abatements and the economic development tax should be done away with all together.	-2	-1.22	-3	-1.49	4	2.33*	-3	-1.57	-3	-1.53
11	The wind energy companies do not contribute to the community and have not been involved in community events.	-2	-1.04	-2	-1.18	3	1.53*	-3	-1.18	-3	-1.53
25	Nolan County, the community of Sweetwater or schools have not benefited from the wind farm tax revenue yet.	-3	-1.26	-3	-1.42	0	0.22	4	1.77	-2	-1.02
24	Tax abatements are a great way to invite wind energy companies to build in your community.	2	1.15	3	1.53	-3	-1.53*	3	1.57	2	1.02
9	The security of the town has diminished since the wind industry began. Before, there were not a lot of transient populations, even with Interstate-20, or when there was a prison.	-2	-1.12	0	0.05	-4	-2.33*	-2	-0.98	2	1.02

(P < .05 ; * Indicates Significance at P < .01) Both the Factor Q-Sort Value and the Normalized Score are Shown.

APPENDIX N

Distinguishing Statements for Factor 4

		Factors									
		1		2		3		4		5	
No.	Statement	RNK	SCORE	RNK	SCORE	RNK	SCORE	RNK	SCORE	RNK	SCORE
25	Nolan County, the community of Sweetwater or schools have not benefited from the wind farm tax revenue yet.	-3	-1.26	-3	-1.42	0	0.22	4	1.77*	-2	-1.02
6	There have not been any negative impacts due to the wind industry. People have not come into the community committing crimes, for example.	1	.76	-4	-1.97	0	0	3	1.57	-2	-1.02
19	'Turning wind into wealth' is a slogan familiar to many people in this region because many landowners, businesses, school districts and other taxing entities…	3	1.49	2	1.36	1	0.58	-1	-0.79	1	0.51
23	The county should not lower the tax rate by 2 cents and save me 70 dollars while saving the wind farm companies millions of dollars.	-1	-0.47	-1	-0.52	1	0.66	-4	-1.96*	0	0

(P < .05 ; * Indicates Significance at P < .01) Both the Factor Q-Sort Value and the Normalized Score are Shown.

APPENDIX O

Distinguishing Statements for Factor 5

		Factors									
		1		2		3		4		5	
No.	Statement	RNK	SCORE	RNK	SCORE	RNK	SCORE	RNK	SCORE	RNK	SCORE
10	The town as a whole turned to pure greed during wind turbine construction. Rent tripled in price because the wind energy employees are able to afford higher rent prices…	-1	-1.02	1	0.33	1	0.58	-1	-0.79	4	2.04*
5	The people who have been neglected are the people who have been in the community before the wind industry arrived and those that are going to be here when the wind industry leaves.	0	-0.4	-2	-0.81	-1	-0.65	-1	-0.20	3	1.53*

(P < .05 ; * Indicates Significance at P < .01) Both the Factor Q-Sort Value and the Normalized Score are Shown.

APPENDIX P

Consensus Statements That Do Not Distinguish Between any Pair of Factors

		Factors									
		1		2		3		4		5	
No.	Statement	RNK	SCORE	RNK	SCORE	RNK	SCORE	RNK	SCORE	RNK	SCORE
7*	People that used to be the main oil and gas players do not like the wind industry because it is eating into their oil and gas stronghold. The wind industry has politicized the town between wind and oil.	0	-0.11	0	-0.22	0	0.29	-1	-0.2	-1	-0.51
15	Wind energy does not change your view on renewable energy sources. It is not really even green energy. Even though we are not burning coal to generate the electricity, inside the wind turbines are components that are going…	-1	-0.97	-1	-0.68	-3	-1.38	0	-0.19	0	0
17*	Farmers may have to plow around a wind turbine, and the cattle may feed up to it, but ultimately it has not taken anything of consequence when you compare it to the pollution of a coal plant or nuclear waste.	1	0.82	1	0.74	0	0.29	1	0.20	0	0
18	People from this area do not take the pledge of being green and only for renewable energy. You have to be for every type of energy source because gas pumps are not going away for decades.	1	0.51	1	0.46	-1	-0.22	2	0.98	1	0.51

All Listed Statements are Non-Significant at P>.01, and Those Flagged * are also Non-Significant at P>.05.

APPENDIX Q

Z-scores and rank of each statement by Factor; BOLD indicates significance at P < .05 and <u>BOLD</u> identifies significance at P < .01

No.	Statement	Factors									
		1		2		3		4		5	
		z-score	rank	z-score	rank	z-score	rank	z-score	rank	z-score	rank
1	At first the wind turbines were trashy looking but as more the turbines are built, the more they become beautiful because of what they're going to provide for the economy around here.	0.27	0	0.31	0	-0.95	-2	0.79	1	-0.51	-1
2	We have to look at these wind towers dotting our west Texas skyline yet we don't reap any of the benefits from them. The people in West Texas should be compensated for these eye sores.	-1.41	-3	-0.51	-1	-1.31	-2	-1.17	-2	0.51	1
3	In other places people complain about how the wind turbines ruin the scenery, but people here see there are just shrubs and cacti. The fact that there are so many turbines, it's almost like going to a garden and looking at something growing …	0.66	1	-0.11	0	-0.73	-2	0.79	1	-0.51	-1
4	The people that think the turbines are unattractive are the same people who do not own any turbines or will never own one.	0.87	2	-0.33	0	0.73	2	0	0	0	0
5	The people who have been neglected are the people who have been in the community before the wind industry arrived and those that are going to be here when the wind industry leaves.	-0.4	0	-0.81	-2	-0.65	-1	-0.2	-1	**<u>1.53</u>**	3
6	There have not been any negative impacts due to the wind industry. People have not come into the community committing crimes, for example.	**0.76**	1	-1.97	-4	0	0	**1.57**	3	-1.02	-2
7	People that used to be the main oil and gas players do not like the wind industry because it is eating into their oil and gas stronghold. The wind industry has politicized the town between wind and oil. Currently in local politics, everything is about wind…	-0.11	0	-0.22	0	0.29	0	-0.2	-1	-0.51	-1
8	The wind industry has negatively impacted the community. Several businesses are failing now because the wind industry has left. In addition, the wind industry has horribly impacted the local housing market, as it impossible to rent an apartment.	-1.43	-4	**<u>1.12</u>**	2	-0.58	-1	-0.59	-1	-2.04	-4

No.	Statement	Factors									
		1		2		3		4		5	
		z-score	rank	z-score	rank	z-score	rank	z-score	rank	z-score	rank
9	The security of the town has diminished since the wind industry began. Before, there were not a lot of transient populations, even with Interstate-20, or when there was a prison. Some of the wind energy employees are leaving, but there are still a few people…	-1.12	-2	0.05	0	**-2.33**	-4	-0.98	-2	1.02	2
10	The town as a whole turned to pure greed during wind turbine construction. Rent tripled in price because the wind energy employees are able to afford higher rent prices, while other members of the community could not afford the new rent prices	-1.02	-1	0.33	1	0.58	1	-0.79	-1	**2.04**	4
11	The wind energy companies do not contribute to the community and have not been involved in community events. The money is being invested in the community through the tax revenue, but it would be nice if the wind energy companies would contribute …	-1.04	-2	-1.18	-2	**1.53**	3	-1.18	-3	-1.53	-3
12	When wind energy construction booms, it booms and when wind energy construction busts, it busts. The pay was great for the wind employees and construction workers but now there is nothing.	-0.55	-1	-0.41	-1	-0.07	0	-0.2	-1	1.02	2
13	There are a minimum of 300 full-time wind energy employees located in Sweetwater that were not here 8 years ago. If you do not count the employees that work for government agencies, the wind industry would be the 2nd largest employer in Sweetwater.	1.44	3	1.04	2	1.17	3	0.98	2	0	0
14	People here are not spending a lot of time thinking about how they're saving the planet. In fact, a lot of them are dubious of the whole concept of global warming.	-0.09	0	0.47	1	0.73	2	1.17	2	0.51	1
15	Wind energy does not change your view on renewable energy sources. It is not really even green energy. Even though we are not burning coal to generate the electricity, inside the wind turbines are components that are going to be thrown into a landfill…	-0.97	-1	-0.68	-1	-1.38	-3	-0.19	0	0	0
16	People from here are more aware of renewable energy, but are not very environmentally conscious. Wind energy is not viewed as a clean power source, but just as additional revenue	-0.42	0	0.06	0	0.8	2	0.78	1	0	0
17	Farmers may have to plow around a wind turbine, and the cattle may feed up to it, but ultimately it has not taken anything of consequence when you compare it to the pollution of a coal plant or nuclear waste.	0.82	1	0.74	1	0.29	0	0.2	1	0	0

No.	Statement	Factors									
		1		2		3		4		5	
		z-score	rank	z-score	rank	z-score	rank	z-score	rank	z-score	rank
18	People from this area do not take the pledge of being green and only for renewable energy. You have to be for every type of energy source because gas pumps are not going away for decades.	0.51	1	0.46	1	-0.22	-1	0.98	2	0.51	1
19	'Turning wind into wealth' is a slogan familiar to many people in this region because many landowners, businesses, school districts and other taxing entities have seen extra wealth now that wind is being used as a resource.	1.49	3	1.36	2	0.58	1	**-0.79**	-1	0.51	1
20	Hunters from other locations see wind turbines and hunting as incompatible. They are coming here for the experience of hunting in the wilderness, and the wind turbines are taking away from that.	0.07	0	**1.4**	3	0	0	0.19	0	-0.51	-1
21	The difference between ranchers and farmers with wind turbines on their property is about two or three decimal places. Some ranchers have turbines producing over 100 Megawatts on their property, whereas most farmers have turbines producing 3 Megawatts.	0.26	0	0	0	0	0	0	0	-1.02	-2
22	Farmers used to cuss the wind because it killed crops, carried moisture away, and dried out land. They now love the wind, because income from a windmill is more dependable than dry-land cotton farming, where drought and hail are constant threats.	**1.42**	2	**-1.12**	-2	0.22	0	0	0	0	0
23	The county should not lower the tax rate by 2 cents and save me 70 dollars while saving the wind farm companies millions of dollars. The county is giving away money that the county will need to fix roads some day or build a jail.	-0.47	-1	-0.52	-1	0.66	1	**-1.96**	-4	0	0
24	Tax abatements are a great way to invite wind energy companies to build in your community.	1.15	2	1.53	3	**-1.53**	-3	1.57	3	1.02	2
25	Nolan County, the community of Sweetwater or schools have not benefited from the wind farm tax revenue yet.	-1.26	-3	-1.42	-3	**0.22**	0	**1.77**	4	-1.02	-2
26	The wind energy companies have provided jobs, use supplies, and buy gasoline from local businesses. The wind industry has been good for the merchants of Nolan County and has allowed for tax values to increase which leads to lower tax rates.	1.79	4	1.88	4	-0.37	-1	-0.98	-2	1.53	3
27	Tax abatements and the economic development tax should be done away with all together. This land and this country were built without tax abatements and everyone paid on a level playing field. Tax abatements should be given to no one.	-1.22	-2	-1.49	-3	**2.33**	4	-1.57	-3	-1.53	-3

APPENDIX R

Rotated factor loadings; * indicates defining sort.

ID	Respondent	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
25	Landowner	0.8223*	0.0068	0.1360	0.2223	-0.1130
03	Government Official	0.0992	0.2805	-0.2872	-0.0578	0.8228*
07	Government Official	-0.1239	0.1784	0.3119	-0.8532*	0.1242
05	Government Official	0.8446*	-0.0201	-0.1814	0.2133	-0.1145
27	Business Owner	-0.0134	-0.2137	0.8595*	-0.1003	0.0478
24	Business/Land Owner	0.8326*	0.1075	-0.2647	0.2080	-0.0655
29	Government Official/Landowner	0.1077	0.7502*	-0.1748	-0.0811	0.2094
30	Government Official/Landowner	0.1718	0.9215*	-0.0895	-0.0046	-0.0158
9	Government Official/Landowner	0.7621*	0.3684	0.2630	0.2911	-0.0882
26	Business Owner	0.1647	0.0140	0.7765*	0.0542	-0.3339
11	Government Official	0.6516*	0.4807	-0.0219	0.2923	0.3004
28	Government Official/Landowner	0.7136*	0.4482	-0.0891	0.1271	0.2670
19	Landowner	0.7846*	0.1729	0.2453	0.1428	0.3058
1	Government Official	0.7651*	0.1706	0.2084	0.1655	0.0287
31	Landowner	0.7866*	0.4604	0.0093	-0.0777	0.0413
14	Government Official	0.6529*	0.0364	0.2383	-0.2129	0.3303
16	Government Official	0.8152*	0.2183	-0.0962	-0.0232	0.1414
32	Prominent Individual	0.4570	0.6147*	0.1531	0.2922	0.1690
21	Prominent Individual	0.6727*	0.0010	0.1918	0.4075	0.4451
17	Prominent Individual	0.3122	0.3275	0.3060	0.7299*	0.1010
4	Government Official	0.6515*	0.2877	0.2279	-0.0137	0.1954

VITA

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