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OKLAHOMA! WHERE THE WIND COMES SWEEPING DOWN THE PLAIN: A QUALITATIVE ANALYSIS OF WIND ENERGY DEVELOPMENT IN OKLAHOMA, USA

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OKLAHOMA! WHERE THE WIND COMES SWEEPING DOWN THE PLAIN: A QUALITATIVE ANALYSIS OF WIND ENERGY DEVELOPMENT IN OKLAHOMA, USA

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ABSTRACT

Renewable energy development is key to mitigating the impacts of global climate change and creating a future based on a more sustainable energy production system. Wind energy is a popular form of renewable energy, and its development is increasing around the world as part of many different countries' comprehensive energy plans. However, in some places where wind energy projects are being proposed and promoted, there is pushback at the regional and local scale. Such opposition comes from grassroots coalitions and individual landowners. These barriers to successful wind energy development must be better understood if a broader transition to renewable energy sources is to take place. Current literature has explored a number of facets of wind energy development opposition centered mostly on major patterns of opposition and deconstructing NIMBY (Not-In My-Back-Yard) as a framing tool. This dissertation examines wind energy opposition in the state of Oklahoma through the lens of qualitative analysis of three different types of data. First is analysis of the narratives surrounding wind energy development using the Narrative Policy Framework. Second is an analysis of public comments in the court dockets associated with the failed Wind Catcher wind farm project using a Socio-Ecological System framework. Third is an analysis of interviews with people living or working next to existent wind farms using a Multi-Level Perspective framework. Results indicate that in all cases place-based communication between wind energy developers and local individuals and communities is key. Understanding place-based values provides both evidence of the positive impacts of living near wind installations as well as evidence that can be used to counter barriers imposed by opposition forces.

Chapter 1: INTRODUCTION

1 Background

On Sunday, August 18, 2019, environmental activists from around the world gathered in Iceland to hold a solemn "funeral" for Okjökull, a glacier that once covered over 38 km^2 but is now gone, completely melted away due to rising global temperatures. The glacier's memorial plaque includes the number 415 ppm, the concentration of atmospheric CO_2 on the day Okjökull disappeared. Burning fossil fuels to generate electricity and transport vehicles is the primary source of atmospheric CO_2, and Okjökull's demise is a very real, very visible result of global climate change and a warning of things to come. Transitioning from fossil fuels to alternative or renewable energy sources that are either carbon-free or have much lower carbon emissions will help mitigate the effects of climate change, but change is always hard. Fortunately, there is widespread support for the idea of increasing use of renewable energy sources as part of a global energy portfolio. Unfortunately, this general support for the idea is not matched with local support for actual renewable energy installations such as wind- or solar-farms. Finding a way to increase local support in those communities actually affected by on-the-ground renewable energy development projects is one important step toward slowing global climate change.

Globally, the three main contributors to atmospheric CO_2 loading are energy production, transportation, and agriculture. Energy production alone is responsible for roughly 70% of the total (Energy Information Agency (EIA), 2019; World Resources Institute, 2020). Hence, developing and adopting non-carbon-emitting energy sources is necessary to mitigate and manage regional, national, and global climate change (Shafer et al, 2014). Wind, solar, hydropower, geothermal, and tidal energy are among the best known forms of renewable,

alternative, or sustainable energy sources. Currently, renewable energy sources provide 24% of global energy needs and are projected to be the majority of new energy development in the future (International Energy Agency (IEA), 2018). Making a transition to renewables seems feasible because there is significant public support for increased renewable energy development, which could influence public policy. A global survey of 26,000 people from 13 different countries found that 82% of them support renewable energy development (Orsted, 2017). Similar surveys in the USA found roughly 85% of the respondents supported more wind farm development (Pew Research Center, 2019). Wind is one of the top three renewable energy sources along with hydropower and solar energy, and wind's increasing affordability and minimal environmental impacts (Panwar, Kaushik, & Kothari, 2011) are key factors in its proliferation both in the US and around the world (IEA, 2019). Further, generating electricity from wind is carbon-free with the exception of the life cycle greenhouse gas emissions during the manufacturing process, while wind energy has little impact on water resources and only minimal impact on land use activities such as agriculture (Jaber, 2013; Manikandan & Umayal, 2015).

Much has been made of the fact that wind turbine blades pose a threat to birds and bats. Now, however, the siting of new wind farms takes the location of flyways and other avian factors into consideration. The number of bird deaths due to wind turbines has been greatly exaggerated – especially when compared to bird deaths due to coal-burning power plants, windows and walls, cats, and other causes – and new wind technology and wildlife studies are mitigating this problem (Jaber, 2013). As a result, that wind energy is becoming an important component of many regional and national plans to cut carbon emissions.

1.2 Study Area

Since its first oil well was drilled in 1885, Oklahoma developed a close association with energy production, particularly oil production. The cultural impact of a long history of oil

production in Oklahoma is readily apparent: sports teams bear the names of oil workers, commercial and city signage contains oil production imagery, and a working oil derrick located on the lawn of the state capital building. Oklahoma's energy economy is becoming more diverse ever since wind energy development expanded rapidly in the mid-2000s. Currently, Oklahoma is ranked 6th in the USA for crude oil production and 4th for wind energy production (EIA, 2019). Oklahoma's wind farms are in the western half of the state, in the "wind corridor" of the Great Plains. This region is largely rural, and local economies are based around agriculture and oil. Oklahoma's wind energy boom has begun to slow, however, as a result of a recent economic slowdown that has complicated the political landscape. When decreased oil prices led to a statewide recession in 2016, larger state budget discussions targeted tax incentives for wind energy including a 85% ad valorum tax credit hat was ended prematurely in 2018. This allowed wind energy companies taxes to be reimbursed by the state government. This contentious and unstable support for wind energy has led a number of wind energy development companies to slow or pull out completely of project development in Oklahoma (Handy, 2018).

1.3 Research Questions

This dissertation investigates the wind energy debate in Oklahoma, USA through qualitative analysis of different types of data – narratives, comments in court dockets, and interviews – using different methodological frameworks to analyze the data. The dissertation addresses three main areas of research questions:

1. Narratives: What are the functional elements in pro- and anti-wind organizations' narratives, what is the role of these elements, and are some narrative elements more effective than others? How do pro- and anti-wind narratives differ?
2. Public perceptions, values, and concerns: How do narratives influence individuals' perceptions of the value or harm of wind energy development? What are specific

responses to proposed wind farm projects? How does the public contextualize and personalize what they learn from narratives and does that translate into action?

3. Interviews: Do individuals involved directly in specific windfarm projects in Oklahoma have different responses than what is promulgated by anti-wind narratives as part of a broader campaign? In other words, does proximity and personal experience matter? If so, can positive hyper-local narratives be used to create effective counter-narratives and ease the transition to local acceptance of wind energy projects?

In this chapter, I discuss the role of narratives in Oklahoma's energy debate and review the literature. Despite broad support for wind energy production generally, there are often significant barriers to successful wind farm development (Reddy & Painuly, 2004; Toke, Breukers, & Wolsink, 2008; Wolsink, 2000, 2007), and this is particularly true in Oklahoma. Some such barriers are physical site limitations, cost, and land use restrictions. Even when all these factors are favorable, however, the support of local communities is often missing. One example is the 16-year battle for the off-shore Cape Wind project on Nantucket Sound in Cape Cod, Massachusetts that ended in defeat in 2017. Local landowners, many of whom were outspoken environmentalists generally, brought lawsuits and funded anti-Cape Wind campaigns to such an extent that the wind development company gave up and walked away (Seelye, 2017). Similarly, an attempt to place a series of wind turbines on the Isle of Lewis in Scotland's Outer Hebrides archipelago failed due to local concerns that the turbines would diminish the cultural and physical landscape (Carrell, 2008; Pasqualetti, 2011a). In both cases, it was local pushback and not regional or national concern that led to the projects' failures. This is not unusual in wind energy opposition. Local support is critical; the most effective opposition movements against

wind farm development are local (Bell, Gray, Haggett, & Swaffield, 2013; Wolsink, 2007). In order for wind energy to expand as a means of sustainably-produced electricity, there must be an understanding of the factors that stymie local support (Van der Horst, 2007; Wolsink, 2007).

Chapter Two is an examination of the narrative as analytical tool and an analysis of the functional elements embedded in the narratives of seven organizations' websites. A Narrative Policy Framework is used to compare anti-wind and pro-wind narratives and draw conclusions regarding the effectiveness of each. In Chapter Three, narratives associated with the failed Wind Catcher Project in Oklahoma's Panhandle are analyzed. Early in the development phase of this large-scale project, public and private concerns were solicited in four states, but most debate and discussion occurred in Oklahoma.

Chapter Three uses Ostrom's (2009) Socio-Ecological Systems (SES) framework to capture and describe the environmental and social variables evident in discourse surrounding the project. Some narratives were more popular and powerful in bringing about the project's demise**.**

Chapter Four is an investigation of the narratives of fifteen individuals connected directly with Oklahoma's wind industry. Although the literature on wind energy is broad, actual experiences – those of landowners, facility managers, and communities -- near wind installations have not been analyzed to any significant degree.

Chapters Two, Three, and Four, together, provide an in-depth analysis of the importance of understanding narratives at varying scales in wind energy project development. Chapter Five is a summary and conclusion. Each of the next three chapters connects to the others as a sequence of case studies addressing different scales and methods through which to understand wind energy opposition in Oklahoma.

1.4 Narratives

In social science research, narratives are defined as stories that describe a problem, its consequences, and, in some cases, a solution to the problem (Drummond & Grubert, 2017; Roe, 1994). Narratives differ from "statements" or "messages" in that they address a question or issue, frame it in a particular way, and provide a pathway to action (Paschen & Ison, 2014). Narratives can contain information on the temporal or spatial change that occurs in their pursuit of a larger persuasive goal (McComas & Shanahan, 1999). They include story-like elements in order to encourage an action from the audience (McBeth, Shanahan & Jones, 2005). This ability of narratives to move people and the use of story-elements such as temporal changes, characters and morals to act is what sets them apart from other forms of discourse (Jones & McBeth, 2010). It attempts to create in the audience a cause-effect understanding of a specific policy or situation that their action could help stop. Effective narratives create a sense of trust and legitimacy within and among individuals and groups using them, because they reflect the values and commonly-held beliefs (Veland et al., 2018). Narratives contain consistent and repeated statements often attributed to individual members of the group, organization, or community. Thus, studying narratives provides a glimpse into how people not only perceive an issue but how they plan to act on it. Because narratives can call people to action (Curran, 2012; Miller, O'Leary, Graffy, Stechela, & Dirks, 2015; Paschen & Ison 2014), and because narratives can change over time, narratives can be used/manipulated to ease transition to a society less dependent on fossil fuels.

The narratives and other qualitative data used in this dissertation come from areas in Oklahoma where wind energy development projects were planned or are underway. More detailed explanations of the methods used in each of three case studies is provided within each chapter, but, overall, there are three types of data: (1) Information contained in websites of

seven organizations associated with either anti-wind or pro-wind agendas (Chapter Two); (2) Public comments from the docket filings for four different large-scale wind projects (Chapter Three); and (3) Interviews with fifteen individuals (Chapter Four).

1.5 NIMBY

In the early days of wind energy development, local opposition to wind farms was not expected, and developers were surprised (Wolsink, 2012). Now, pushback from local communities is well-documented and is interpreted as yet another example of a NIMBY, Not-In-My-Back-Yard, situation (Devine-Wright, 2011; Van der Horst, 2007; Wolsink, 2006). The term was first used in the 1980s to describe those situations where people support a concept (such as weekly trash pick-up or municipal electricity generation and distribution, for example), but those same people object to the reality of it if it is situated close to where they live (a landfill or power plant in this example). In other words, NIMBY is a pejorative term that describes how people or communities support a thing generally until it occurs to them or near them. In the case of wind energy production, people generally approve of the renewable, carbon-free electricity, but they do not want turbines in their backyards, communities, or viewsheds. NIMBY has been applied to many different types of renewable energy projects (Borell & Westermark, 2016), and NIMBYism appeared as soon as wind energy development attracted interest (Bosely & Bosely, 1988; Throgmorton, 1987; Wolsink, 1989). By the 1990s, some researchers began critiquing the use of NIMBYism as an explanation, because of the potential for it to oversimplify what might actually be a much more complex social phenomenon (Bowen, 1996; Elliott, 1984; Gipe, 1993; Krohn & Damborg, 1999; Wexler, 1996; Wolsink, 1994).

Current research suggests that using NIMBY to frame wind opposition is too simplistic. Rather than being a one-size-fits-all situation, opposition to wind energy development is actually a complex fabric of social and cultural factors (Bell et al., 2013; Bidwell, 2013). These factors

include place-attachment, incomplete knowledge (of wind energy development), misinformation, and concerns for unknown impacts to the community (Bell, Gray, & Haggett, 2005; Devine-Wright, 2013). There is evidence that energy developers often discount community concerns as merely NIMBYism rather than trying to understand what is really going on in terms of more complicated social processes (Burningham, Barnett, & Walker, 2014; Devine-Wright, 2011). To this end, a new and better understanding of local opposition to wind energy development is needed (Burningham et al., 2014; Devine-Wright, 2005, 2009; Petrova, 2013; Wolsink, 2000, 2006, 2007).

Local opposition refers to individuals, groups of individuals, or whole communities affected by a specific wind energy development project. Local opposition typically begins with the wind farm siting process and continues until post-construction. Where windfarm development is successful, local opposition tends to fade over time (Devine-Wright, 2005, 2011; Johansson & Laike, 2007; Wolsink, 2007). Often, the local opposition benefits from having powerful individuals who bring to the table money, authority, notoriety, and/or access to the media beyond the communities' own public resources. Hence, "local" should not be misconstrued as marginalized, weak, or localized (Barnett, Burningham, Walker, & Cass, 2012). In this dissertation, "local opposition" is the phrase used to differentiate between state- or national-level approval of wind energy development and the individual- and community-level pushback (Jones & Eiser, 2010).

Perpetuation of using NIMBY to characterize local opposition is due in part to a lack of research into what motivates community members to become active opponents of wind energy development (Burningham et al., 2014; Devine-Wright, 2009; Petrova, 2013). It has been easier to simply blame NIMBY than to dissect local opposition in search of more complicated and,

perhaps, more relevant and useful explanations for human behavior. In addition, evidence for NIMBY has relied on opinion polls measuring responses to hypothetical wind energy projects, thus leading research even farther afield from understanding what is going on in actual communities (Devine-Wright, 2005**;** Smith & Klick, 2007). These opinion polls almost always focus on identifying people's perception of barriers to wind development instead of exploring how and why people mentally frame the arguments for or against wind projects. This leaves a gap in our understanding of wind opposition (Bidwell, 2013; Devine-Wright, 2005) that should be addressed through qualitative analysis (Aitken, 2010). This dissertation seeks to address this need by using analytical methods to study social factors and local opposition narratives.

2 Literature Review: Energy Geographies and Sustainable Transitions

Literature specific to understanding and analyzing local opposition to wind energy development first appeared in the late 1980s and focused on people's opinions on the advantages and disadvantages of wind turbines and associated infrastructure (Bosely & Bosely, 1988; Clarke, 1989; Wolsink, 1987, 1988). From there, literature expanded into identifying major themes or repeated messages in how people described their support or opposition to wind energy. Among these themes were things like concerns that the turbines presented a nuisance that the costs to the community and individual property owners would outweigh any financial benefits, and that fond and familiar landscapes would change. Over time, the literature on wind energy development seems to have settled into two overlapping fields: Energy Geographies and Sustainability Transitions.

The term "Energy Geographies" includes all forms of energy: traditional/fossil fuels and alternative/renewable energy sources. And, because access to all forms of energy harnessed for human use are limited by environmental conditions (such as those places where fossil fuels are

found or those places where the average annual number of days of sunshine makes building a solar farm viable), Energy Geographies literature comes from research in both environmental (physical) and human (social) geography. Zimmerer (2010) suggests that, as a field of inquiry and body of literature, Energy Geographies lies at the intersection of the four major geographic sub-fields of GIScience, Physical Geography, Nature-Society, and Human Geography. And, like much of geography generally, research in Energy Geographies is supported by work done in other academic disciplines, some of which provide theoretical frameworks and methodologies (Calvert, 2016). This multi-disciplinary approach is due to the complex interrelatedness of what is being studied. There are hierarchies in energy production and use; there are spatial variations in access to and impacts of energy production, distribution, and use; and there are variety of scales at which social impacts of long-term economic dependence on certain energies can be addressed (Akella, Saini, $ Sharma, 2009; Huber, 2015; McEwan, 2017; Solomon & Krishna, 2011). Until recently, Energy Geography literature using qualitative methods focused on questions of access and power (McEwan, 2017). Such studies analyze the spatial extent of social processes associated with energy development and use/consumption. However, there has been little work done on placing this information in some sort of theoretical framework (Bridge, 2018).

A related but different body of work, Sustainability Transition literature, is concerned with renewable energy, since fossil fuels are (1) considered a finite resource and not sustainable in the long-term; and (2) the major contributor to global climate change. Sustainability Transition literature examines some environmental and social processes similar to those in Energy Geographies, but Sustainability Transition literature's emphasis is on market and political actors often from a socio-technical perspective. The socio-technical perspective is one that recognizes

that society and the technology it creates are linked together, most visibly through infrastructure. This is particularly true when considering energy.

Sustainability Transition literature, however, tends to underplay or even ignore important social processes (Hargreaves, Haxeltine, Longhurst, & Seyfang, 2011; Lawhon & Murphy, 2012). For the world to transition to greater dependence on renewable energy sources, there must be a better understanding of the social processes causing resistance to change. Some Sustainable Transitions literature addresses this change (Breyer et al., 2017; Meadowcroft, 2009; Solomon & Krishna, 2011). At varying scales, current Sustainability Transition literature has looked at historical patterns of how some societies are moving from one energy-based system to another, and most such studies use Europe as a whole or individual European countries as examples (Bosman & Rotmans, 2014; Essletzbichler, 2012; Kern & Howlett, 2009; Pegels & Lütkenhorst, 2014).

There are a number of frameworks for understanding the societal transitions or transformations needed to prioritize renewable energy sources, and the literature to date focuses on how the transitions occur (Li, Trutnevyte, & Strachan, 2015; Markard, Raven, & Truffer, 2012). The multi-level perspective framework is the one used most often. It views the transition from a socio-technical system context (Geels, 2010; Smith & Raven, 2012; Verbong & Geels, 2007) and characterizes transitions as occurring between different levels. Levels are not the same as geographic scales, but there are some similarities. In the multi-level perspective, some levels are niche, regime, and landscape, for example. The multi-level perspective pays special attention to factors that manage the transition, and these factors are derived from historical data, something that may or may not provide a full and holistic retelling of the transition process (Genus & Coles, 2008). In addition, the role of space and place is not usually discussed (Smith, Voß, & Grin,

2010). This may lead to assumptions about why certain processes result in success without including information about the unique local variables responsible for that success (Genus and Coles, 2008; Smith et al., 2010). As a result, without a framework that includes attention to geographic "place," the field of Sustainability Transitions lacks a framework for research that provides insight into the uniqueness of social processes in specific communities. Such a framework could provide real world data that can be adapted to, and adopted by, other communities facing similar challenges to proposed renewable energy projects.

As a combined body of literature, Energy Geographies and Sustainability Transitions are only just beginning to contribute to each other's research (Hansen & Coenen, 2013; Huber, 2015; Lawhon & Murphy, 2012; Solomon, Pasqualetti, & Lüchsinger, 2003), especially in the area of understanding barriers. Both bodies of literature rely heavily on identifying and then investigating barriers to the implementation of renewable energy, and both have come to similar conclusions. Most pervasive is that broad levels of support for renewable energy does not translate into local support for actual, on-the-ground projects (Boon & Dieperink, 2014; Fraune & Knodt, 2018; Murphy & Smith, 2013; Pasqualetti, 2000, 2011a); Van der Schoor & Scholtens, 2015; Wolsink, 2000, 2007, 2012). Energy Geographies literature has focused on the spatial extent and distribution of renewable energy and the socio-cultural factors involved with renewable energy development (Fairhead, Leach, & Scoones, 2012; Huber, 2015; Van der Horst & Evans, 2010). For wind energy development in particular, Energy Geographies literature examines the imagery used by opposition groups and why different perceptions of the value of wind energy arise in different areas (Avila, 2018; Bohn & Lant, 2009; Kempton, Firestone, Lilley, Rouleau, & Whitaker, 2005; Pasqualetti, 2011b). Sustainability Transition literature has used a socio-technical framework to understand factors affecting how a transition might actually

come about but without paying attention to how location or place-attachment might affect development (Hess, Malilay, & Parkinson, 2008). Hence, Energy Geographies examines where and why renewable energy development occurs, while Sustainability Transition literature explains how it develops. Each field brings something to the table, but each ignores an integral component of understanding how to bring about change in real places in real time.

Despite their differences, both bodies of literature have stated that there is a need for increased qualitative assessment of renewable energy development targeted at understanding the social factors and processes involved in impeding development (Devine-Wright 2005, 2011; Huber, 2015; Pasqualetti 2001, 2011b; Wolsink, 2000, 2007). Some research even shows how the two bodies of literature could complement one another by calling attention to the concept and role of geographic "place" within sustainability studies (Binz, Coenen, Murphy, & Truffer, 2020; Horlings, Nieto-Romero, & Soini, 2020). This is particularly important to understanding how communities and their broader regions perceive the fairness or social equity of wind energy development. That is, understanding how people perceive who is benefitting from and who is being hurt by wind energy development projects (Mueller & Brooks, 2020; NREL, 2020). A sense of injustice or unequal sharing of the costs may underlie many of the local barriers underlying local pushback or resentment felt toward new wind energy development. Existent research in the Sustainability Transitions field has looked into the power of narratives in the successful implementation of renewable energy projects (Miller et al, 2015; Milojević & Inayatullah, 2015; Veland et al., 2018), but work remains in understanding how place-attachment affects the effectiveness of opposition narratives. Better and more qualitative analysis is needed that includes data revealing the motivation behind support or opposition and how communities and individuals *perceive* windfarms, that is, how they conceptualize and contextualize their

situation relative to local wind projects. Aitken (2010) suggests that including more qualitative assessment of wind energy opposition would provide a better, broader, and deeper understanding of local opposition processes.

3 Conclusion

In the past, wind energy opposition has been studied primarily through surveys that ask participants from different places how they feel about a hypothetical wind farm being built near them (Bell et al., 2013; Devine-Wright, 2005, 2011; Smith & Klick, 2007). Some, but not many, such surveys include interviews with individuals living in communities where windfarms are actually being considered or have been built (Burningham et al., 2014). These surveys were not developed by researchers who engaged actively with communities affected by wind energy development (Devine-Wright, 2005). Instead, these surveys focused on identifying and listing barriers and political actors rather than attempting to understand the local conceptual framing of anti-wind development arguments. Little attention has been drawn to other, localized factors such as place-based narratives and how they are constructed and disseminated as well as their impact on final decision-making for specific wind projects (Brannstrom, Jepsons, & Persons, 2011; Devine-Wright, 2005, 2011; Huber, 2015). This dissertation seeks to do just that through the analysis of narratives associated with wind energy development.

CHAPTER TWO: RUNNING AGAINST THE WIND: AN ANALYSIS OF STAKEHOLDER GROUPS' WIND ENERGY NARRATIVES

Abstract

Wind energy is a renewable energy source that has high levels of public support in global, national and statewide surveys. However, as the number of proposals for new wind energy projects increases, there is often a corresponding increase in local opposition to specific wind farm construction proposals. Oklahoma, USA, is one of the USA's most important states in terms of wind energy production. In recent years, local and regional opposition to wind energy projects in Oklahoma has led to a slowing down of wind energy development in the state. This opposition is characterized as an example of the Not-In-My-Back-Yard (NIMBY) phenomenon. This chapter describes an analysis of the narratives found in website content of seven organizations who either oppose or support Oklahoma wind energy projects. Using the Narrative Policy Framework, the structure of both anti- and pro-wind development narratives is analyzed to understand how these narratives function and how they characterize different aspects of wind advocacy. The "nesting" of narratives describes how one broadly-based narrative supporting wind energy may contain increasingly smaller scale narratives with negative messages. Differences in narrative structure, including explicit identification of problems (Villains), affected populations (Victims), and solutions (Heroes) are key factors in the organizations' abilities to claim to support wind energy while still mounting opposition at the local level. Thus, this chapter suggests that the NIMBY explanation is too simplistic and ignores important complexities of nested narratives which may contain competing or contradictory messages.

1 Introduction

1.1 Introduction

Around the world, wind energy is growing in popularity as a form of renewable energy (EIA, 2019). As suggested by the International Panel on Climate Change (IPCC), the motivation for discovering and developing renewable energy sources comes from ever-increasing concern for global climate change (IPCC, 2018). Currently, energy production is responsible for 71% of global greenhouse gas emissions (EIA, 2019). Without a significant reduction in greenhouse gas emissions, the negative impacts of climate change are likely to increase in severity and extent (IPCC, 2018). A global transition to renewable energy sources that are carbon-free or that produce lower carbon emissions than fossil fuels is an integral step toward mitigating the impacts of climate change (IEA, 2019a). Support for renewable energy development is high in general, indicating that the transition to renewables should be relatively easy. However, local support for renewable energy development, particularly wind energy development, is mixed due to a series of complex social and place-based experiential factors (Devine-Wright, 2005, 2011).

Oklahoma, USA is a self-described "energy state" with a long history of economic reliance on energy production. Historically, oil production has been a staple of the state's economy since the first oil well was drilled in 1885 in Atoka County, Choctaw Nation. Roughly 20% of the state's economy comes from oil and natural gas production (Oklahoma Energy Resources Board, 2019). However, over the past 20 years, renewable energy sources, particularly wind, have begun changing both the state's economy and its energy production landscape. That is, more and more, wind farms are encroaching on an energy landscape once dominated almost exclusively by oil derricks and natural gas pipelines. As the number of proposals for wind energy development increases across the state, so has local pushback to specific wind farm projects, some of which have been stalled or stopped altogether. Hence, in order to increase wind energy development, a

better understanding of opposition forces and factors is needed. Also needed is an understanding of how to make pro-wind arguments more effective.

This study examines how local and regional organizations craft narratives to support their position in the Oklahoma wind energy development debate. Narratives are analyzed by identifying and coding elements within the narrative and then comparing the elements between anti- and pro-wind narratives to see which are most effective and why. Narratives are actionable statements that encourage or incite action from individuals or groups (Roe, 1994). Narratives are based on commonly held values or beliefs, and analysis of narratives can reveal how individuals or communities perceive an event or phenomena (Drummond & Grubert, 2017; Gupta, Ripberger, & Wehde, 2018; Miller et al., 2015). How a narrative is constructed can affect its ability to persuade, and comparing different narratives can reveal different sets of values (Curran, 2012; Miller et al., 2015). To this end, seven groups' narratives around wind energy development in Oklahoma were coded and analyzed to understand their construction and functionality the coding process is elaborated on in the methods sections.

1.2 Background

Since 2003, when Oklahoma's first wind farms were built at Blue Canyon in Lawton and the Oklahoma Wind Energy Center in Cordell, the number of wind projects in Oklahoma has grown (Ferrell & Conaway, 2015). The American Wind Energy Association (AWEA) points out that over one third of the state is powered by wind energy with over 8000 MWs of installed capacity from over 50 active wind farms (AWEA, 2019). These installations have added between 8000 and 9000 jobs and $20 to $25 million annually to the state's economy through land lease royalties (AWEA, 2020). Beyond the economic contribution of jobs, taxes, and royalties by large-scale wind projects themselves, Oklahoma wind farms are important revenue producers in

many rural counties due to *ad valorum* taxes (taxes on transactions or land transfers). Increases in property tax revenue from wind farms has allowed rural towns and school districts to invest in infrastructure they could otherwise not afford (Castleberry & Greene, 2017; Dean & Evans, 2014).

Oklahoma's broad support for wind and other renewable energy development should not come as much of a surprise. A 2018 statewide poll found that 78% of Oklahomans support wind energy production and other renewable energy development (Shapard, 2018). Beyond polls, there is other evidence that wind is viewed favorably within the state. For example, Weatherford, a city located in the middle of Oklahoma's so-called "Wind Corridor," has constructed an outdoor public park where visitors can walk, picnic, and examine wind turbine components through educational signs (Weatherford, 2015). Nevertheless, a series of local and regional anti-wind energy movements led to several stopped and stalled wind energy projects across the state (Handy, 2018; Monies, 2016). Two proposed wind farms were canceled as a result of community-led protests, and in Hinton, two law suits against a wind energy project resulted in new legislation creating ordinances on wind turbines (Money, 2018a, 2018b).

In 2017, AEP, a private electric utility company, canceled plans to build the largest wind farm in the world in Oklahoma. Named Wind Catcher, the project was scrapped due to regional concerns over long-term infrastructure costs and widespread opposition from communities affected directly by the installation (Bostian, 2018a, 2018b, 2018c). A different wind project was eventually built, but there have been problems elsewhere. Construction was stalled in Kingfisher County due to a nuisance lawsuit filed by property owners (Monies, 2017). In some areas, local opposition began even before wind farm siting negotiations were finalized. In rural western Oklahoma, some property owners have registered their land for private airport designation.

Known as “shamports,” this designation prevents wind farm development within 1.5 nautical miles due to Federal Aviation Administration (Monies, 2016; Wertz 2016).

2 Literature Review: NIMBY, Re-thinking NIMBY, and Moving beyond NIMBY

High levels of general public support coupled with local opposition in a variety of scenarios is explained by the Not-In-My-Back-Yard, or NIMBY, phenomenon. The literature examining opposition to wind energy includes many studies where NIMBYism is used to explain the situation (Devine-Wright, 2005). Blaming all opposition on NIMBY alone is often an oversimplification that ignores complex social dynamics (Devine-Wright, 2005; Petrova, 2013; Wolsink, 2006, 2007). NIMBY paints all opposition similarly; it equates the opposition in Cape Cod too offshore wind energy development to rural landowners opposing wind energy development in Oklahoma even though the local arguments and narratives opposing wind are vary different. It does not allow for the unique , often place-based, oppositional arguments to be included in discussion or analysis and therefore hinders the ability of advocates to adequately respond to opposition. Hence, in order to better understand oppositional movements and motivations, a deeper understanding of the social and cultural factors is needed, including using different methods to collect and analyze data. Devine-Wright, (2005, 2011), Smith and Klick, (2007) and Bell et al. (2013) point out that it is often the broad questions posed in surveys that are at fault, and more detailed surveys might provide so much data that would be more difficult to evaluate but which would yield a more accurate measure of people’s perceptions of wind farms. Community discussion of NIMBYism can itself affect how individuals interact. It has been shown that individuals involved in surveys or interviews are often aware that pollsters are looking for NIMBY-related responses and therefore respond differently or not at all (Burningham et al., 2014; Enevoldson & Sovacool, 2016; Klick & Smith, 2009).

Other, non-NIMBY-based research points out that other factors are involved, including institutional bias, knowledge gaps, and place-attachment values (Burningham et al., 2006; Van der Horst, 2007; Wolsink, 2000). Wolsink (2006) found that attitudes toward wind energy as a whole often differ from attitudes toward wind farms themselves. The visual impact of seeing wind turbines on a once-familiar, non-wind-turbine landscape is a huge factor in how people feel about wind energy. Guo, Ru, Su, & Anadon (2015) found that in China there is a more complicated NIMBY response referred to as "Not-In-My-Back-Yard-But-Not-Far-Away-From-Me" and reinforces the idea that broad concepts like NIMBY are more complicated than we imagine at first glance and that location/place matters.

NIMBYism describes a negative situation, but some research has taken a different approach by looking at the positive: those factors that encourage acceptance of wind energy or discourage opposition to it (Jobert, Laborgne, & Mimler, 2007; Rand & Hoen, 2017). Devine-Wright (2005), in particular, argues for a new, social perspective that seeks to understand the role of different societal factors. Devine-Wright (2007) provides an overview of studies on public acceptance of renewable energies and found that acceptance occurs at three different levels: the personal, the psychological, and the contextual. In other words, people are complicated, and their survey responses do not necessarily reflect what the researcher is hoping to measure. Often, social acceptance -- willingness of a *community* to accept a given phenomenon -- is at least as important as *individual* acceptance (Yiridoe, 2014). Enevoldson & Sovacool (2016) found that without social acceptance, successful completion of wind energy projects was questionable. Wustenhagen, Wolsink, & Burer (2007) conclude the same, adding that social acceptance is based on a variety of factors including economics, socio-political affiliation, and community-wide approval. Yuan, Zuo, and Huisingh (2015) found that social acceptance is linked to

demographic factors including age and education. Wolsink (2012) suggests that local reactions to wind farm development are too complex to suggest that there is a singular successful process for creating social acceptance. Hence, these studies underscore the ineffectiveness of using NIMBYism alone to explain resistance to making a transition to a society more dependent on renewable energies.

What is known is that social acceptance is a vital part of successfully promoting wind energy to communities (Hall, Ashworth, & Devine-Wright, 2013). Gross (2007) points out that community acceptance is tied to how a community perceives and values governmental legitimacy (for the project) and how benefits outweigh costs. They go on to suggest that specific policy solutions may be required to address individual communities' concerns. Musall and Kuik (2011) show that acceptance may also rely on a buy-in from the community in the form of wind co-ops or co-ownership. It is important that communities do not feel that wind energy projects are being imposed on them from the outside, but rather, that the community is involved from Day One. Gross (2007) finds that trust in the wind companies is a key factor in order for wind energy to be viewed as legitimate by a community. Aitken (2010) adds that trust and fairness at the community-level are necessary from the planning stage through construction and eventual operation of the facility. Hence, building trust and a sense of legitimacy for a "Social License to Operate" may be incredibly beneficial in social acceptance at the community level (Hall, 2014).

Geographic scale plays a role when considering social acceptance. Toke et al. (2008) show that social acceptance for wind projects varies due to regional differences in governance and ownership values. Gross (2007) similarly shows that trust in government and perceptions of fairness can determine whether communities are for or against wind energy development. Other research confirms that the community discussions around wind energy development can affect

acceptance of wind projects. Breukers and Wolsink (2007) describe a situation where policymakers and wind energy developers did not adequately understand local tensions toward wind energy, and it led to problems. They advise increasing public participation and ownership to decrease social barriers to wind energy development. Even using the NIMBY term can change interactions between developers and communities, because it is seen as needlessly antagonistic and makes those opposed to wind energy feel they are not being heard. Hence, using NIMBY as a communication tool in community discussions may actually result in an unfavorable response toward wind energy development (Bell et al., 2005; Bell et al., 2013), because locals perceive developers as unable or unwilling to hear and understand their concerns.

As our understanding of opposition to wind energy has evolved, there have been many attempts to define exactly what opposition arguments are used. D'Souza and Yiridoe (2019) found that suspicion of the wind turbines themselves was the most important factor. Swofford and Slattery (2010) showed that the distance of an individual or community from wind turbines is a factor. The greater the distance from the wind turbine, the more favorably wind energy is perceived. Cohen, Moeltner, Reichl, and Schmidthaler (2014) point out that the visibility of new infrastructure or changes to current infrastructure, such as transmission lines or power substations, causes a negative public response. Obviously, people grow accustomed to landscapes and viewsheds, and any changes, whether beneficial or not, are viewed initially with suspicion.

Pasqualetti (2001, 2011a) found that wind opposition is often tied to local perceptions of place and therefore influenced heavily by local narratives. Narratives are actionable statements or stories constructed by individuals within a community (Drummond & Grubert, 2017; Paschen & Ison, 2014; Roe, 1994). Narratives are shared among individuals and contribute to the various

communities' sentiments or positions on a given issue. What sets narratives apart from other forms of discourse is that narratives are inherently actionable. That is, narratives incite and provide a pathway to action. Narratives have identifiable goals, whether it is support or opposition. Narratives often encourage specific solutions to solving or mitigating previously-identified problems, and the specific solution is often due to creating a perception of victimization of popular and sympathetic members of the community (Paschen & Ison, 2014). It is this action-ability of narratives that give narratives power.

3 Methods: Narrative Policy Framework

The use of narratives in research methodologies is a relatively new field. Few studies have been published that use narratives as data, and even fewer studies are concerned specifically with renewable energy development (Walker, Baxter, & Ouellette, 2014). The research that does exist indicates that individual, local, and regional narratives can provide place-specific explanations for wind energy opposition (Pasqualetti, 2001, 2011b). Narratives have the potential to provide a variety of types of information including evidence of processes of opinion-formation, persuasion, and the steps some communities take to achieve a particular goal (Jones & McBeth, 2010; Miller et al., 2015; Shanahan, McBeth, & Hathaway, 2011). This dissertation seeks to add to this growing field by showing how narrative analysis can be used to understand opposition to wind energy development and thereby understand how best to develop strategies to counter negative perceptions of wind energy development.

The case study described in this chapter uses the Narrative Policy Framework (NPF). As described in more detail below, the NPF is one type of grounded analysis. Grounded analysis was first described in Glaser and Strauss's 1967 work where the researchers allowed the data itself to set the parameters of their analysis. That is, instead of creating a set of criteria by which

to measure data before data collection begins, grounded analysis uses the data itself to create a framework for analysis. This can be effective in social research related to place, as it allows the place-attachments and place-based responses to reveal themselves and develop over repeated interactions with respondents. This allows this unique localized information to reveal itself to the researcher, and not be assumed. Glaser and Strauss (1967) compared each survey respondent's answers (the data) to all other respondents' answers and discovered patterns of repeated or recurrent themes. These themes then became the framework by which all the data was analyzed by "constant comparison" to the themes. Because the themes originated in the empirical data (rather than in a hypothesis-testing framework set up before data was collected), the analysis is "grounded" in the data.

Grounded analysis has been used for decades and is considered a reliable methodology that provides insight into social processes. Grounded analysis is especially useful when the phenomenon being studied is not well understood (Charmaz & Belgrave, 2012; Cho & Lee, 2014). More recently, grounded analysis has been used to understand patterns in qualitative data associated with broad social and cultural processes too complex and site-specific for quantitative methods to be effective (Charmaz, 1996; Charmaz & Belgrave, 2012; Cho & Lee, 2014). The researcher is able to examine social processes within the contextual conditions influencing it (Charmaz & Belgrave, 2012; Cho and Lee, 2014; Timmermans & Tavory, 2012), and the parameters of analysis are specific to each situation. This methodology is particularly valuable in the case of understanding societal factors affecting acceptance of wind energy development, since the field is relatively new and opinions are still widely distributed across a spectrum ranging from opposed-to-wind to supportive-of-wind, and opinions are still shifting across geographic scales from individuals to communities to regions.

The NPF is a type of grounded analysis developed specifically to better understand how political narratives are crafted (Jones & McBeth, 2010). It was in part the proliferation of the use of on-line narratives by organizations as their primary means of communication that brought about the invention of the NPF. It was not developed expressly for social media or internet narrative analysis, but it has been adapted to and then used in a wide range of studies to analyze data taken from websites and social media (Gupta et al., 2018; Jones & McBeth, 2010; Shanahan et al., 2011).

The NPF allows researchers to assess or evaluate raw data within narratives and then designate categories into which repeated elements of the narratives fall. Known as inductive coding, this methodology relies on the researcher to set the parameters by which the data will be tagged or coded. Such a framework is particularly useful when little is known about the subject being analyzed (Chandra & Shang, 2017) and where there are no pre-existing categories for data analysis. In this study, narratives created by organizations associated with Oklahoma's wind energy debate were analyzed using an NPF with two major categories: Narrative Elements and Narrative Strategies (see Table 2). Identification of the elements – and resultant structure of the framework -- for this study comes from focusing on the *function* of the elements of the narrative and not on *actual wording*. This is because the framework is used to understand the purpose of the narratives to persuade (Gupta et al., 2018). There is not a wide body of literature on the analysis of online groups' narratives (Gupta et al., 2018), but there are numerous calls for increased analysis of online messaging, in particular, understanding patterns of engagement and information sharing (Gupta et al., 2018; Miller et al., 2015).

The methodology used here includes collecting and analyzing the online narratives of seven different advocacy organizations currently involved in creating public discourse over wind

energy development in Oklahoma. Having an online presence provides organizations with relatively inexpensive and wide access to like-minded audiences. Messages may be contained in written text or through graphics, including video testimonials. The seven organizations used in this study were discovered by speaking with individuals as well as seeing the organization mentioned in periodicals and various news outlets. The narratives come from the content of each organization's website, and both text/verbiage and graphics/imagery were included. These organizations communicate with their members and a larger audience primarily through their online presence. Two groups exist only on Facebook, a social media platform, while the others have specific websites and linkages to other websites dedicated to sharing and promoting their narratives. All identify themselves in their mission statements as organizations associated with Oklahoma wind energy.

The seven organizations and the acronyms used in this dissertation are as follows: The Windfall Coalition (TWC), WindWaste (WW), Oklahoma Wind Action Association (OWAA), Southern Great Plains Property Rights Coalition (SGPPRC), Oklahoma Power Alliance (OPA), American Wind Energy Association (AWEA), and American Energy Action – Oklahoma branch (AEAO). As encapsulated in Table 1 below, four organizations represent themselves as being in opposition to wind energy development (Anti-wind), and three are in favor (Pro-wind). The scale of the target audience for each organization is identified. "Local" refers to organizations created to serve a small community in response to the proposed construction of a specific wind farm. "Regional" refers to organizations operating mainly in Oklahoma but who have contact with communities outside Oklahoma as disclosed on their website. "State" refers to organizations whose self-described target audience is simply "Oklahomans" and whose opposition to wind energy development is discussed on a statewide scale. All seven organizations are a mix of

citizen groups and profit- or non-profit organizations that self-identify as either an advocacy group or a citizens' group ("Type" column in Table 1).

The information provided by these organizations was coded for major narratives and narrative structure by an iterative reviewing process. Each site and the information contained within it was collected, reviewed with a focus on self-determined themes indicated by the organization. As these were often indicative of the major narrative being used by the organization as they would often create different pages or sections denoted by a theme title for specific issues the groups wanted to highlight. These were collected and then compared across the other groups for similar themes in order to identify similar narratives used by groups.

Table 1 – Organizations used in this analysis were groups that advocated either for or against wind energy development in Oklahoma; the groups are self-organized and specifically focused on wind energy development.

Name of Organization	**Acronym**	**Position**	**Scale**	**Type**
The Windfall Coalition	TWC	Anti-wind	State	Advocacy
WindWaste	WW	Anti-wind	State	Advocacy
Oklahoma Wind Action Association	OWAA	Anti-wind	Local	Citizen
Southern Great Plains Property Rights Coalition	SGPPRC	Anti-wind	Regional	Citizen
Oklahoma Power Alliance	OPA	Pro-wind	Regional	Advocacy
American Wind Energy Association	OWEA	Pro-wind	State	Advocacy
American Energy Action – Oklahoma	AEAO	Pro-wind	State	Advocacy

4 Data

As per NPF methodology, all organizations' narratives were analyzed collectively to discern recurrent themes or elements, if any. Two broad categories emerged. First were identifiable actors or narrative elements, each of which had a specific functional role to play in the narrative. Second was the strategy used to create a cost-benefit argument to support the organization's position for or against wind energy development (see Table 2). The three functional elements in this study are the role of the Villain, the Victim, and the Hero. Villains represent the problem: who or what was to blame. Identifying and describing the Villain was often part of explaining justification for the existence of the organization itself. In other words, the organization exists to combat a common enemy or villain. Victims were identified as who or what is being harmed by the Villain. Heroes were often described with explicit statements naming a person who could solve the problem or, alternatively, a solution that solves the problem. A solution might be passing or revoking legislation, for example, and need not be a named individual. Organizations' arguments were caged as costs-versus-benefits with both costs and benefits further sub-divided by the scale of their impact. For example, is the cost borne by society in general, the local community, or individual property owners?

Table 2: The Narrative Functional Structure.

Narrative Elements	**Role**
Villain	Causes the problem
Victim	Harmed by the problem
Hero	Fixes the problem
Narrative Strategy	**Scale**
Costs	Concentrated on small, select number of people
Costs	Spread out over a large number of people
Benefits	Concentrated on a small, select number of people
Benefits	Spread out over a larger number of people

Table 3. Narrative Themes by Organization.

Organization	Villain	Victim	Hero	Costs	Benefits
The Windfall Coalition	Tax credit law Foreign investors	People of OK	Repeal of tax credit law	Diffused over many	Concentrated on wind energy developers
WindWaste	Tax credit law	People of OK	Repeal of tax credit law	Diffused over many, especially property owners near wind farms	Concentrated on wind energy developers
Oklahoma Wind Action Association	Industrial wind energy companies	People of Kingfisher and Okarche Counties	OWAA	People in Kingfisher and Okarche Counties	Concentrated on wind energy developers

Southern Great Plains Property Rights Coalition	Industrial wind energy companies	OK property owners and tax payers	Compensation for utility easements	Concentrated on people in region	Not addressed
Oklahoma Power Alliance	None	None	Wind energy development	No/little cost	Everyone
American Wind Energy Association	None	None	None	No costs addressed	Everyone
American Energy Action – Oklahoma	Reliance on fossil fuels	All people (global scale)	Wind energy development in OK	No/little cost	Everyone (social and environmental benefits)

4.1The Windfall Coalition

The Windfall Coalition (TWC) uses textual descriptions – many with bold and provocative headlines; data-sharing with like-minded individuals, groups, and organizations; eye-catching infographics; and testimonials to develop a strong anti-wind narrative. Oklahoma's Renewable Electricity Production Tax Credit Law (herein referred to as "the tax credit law") is portrayed as the primary Villain, the people of Oklahoma are the Victims, and repealing the tax credit law is the Hero. TWC went so far as to explain that state revenue lost through the tax credit law is not a situation unique to Oklahoma; their studies showed that benefits of wind energy development are realized only by people living far away from the actual wind farm. According to TWC's online narrative, the tax credit law has caused a statewide budget deficit, reducing the state's ability to pay for important social services such as public education, health care, and infrastructure: "Money for schools, for teachers for kids…. all GONE!" Repealing the law will solve Oklahoma's problems.

A secondary Villain is identified as foreign or out-of-state investors in wind energy development. The caption, "93% of wind company owners are not Oklahomans" appears in a graphic where the flags of non-Oklahoma US states and flags of foreign countries are attached to individual wind turbines within photograph of an Oklahoma wind farm (TWC, 2016). The phrases "out of state" and "foreign" are repeated throughout. The villainy of outsiders investing in and benefiting from Oklahoma's wind resources is further solidified with a graphic showing money flying out of Oklahoma and toward maps of non-Oklahoma political entities. The associated text vilifies the (former) Oklahoma governor who created the tax credit law. These powerful graphics reinforce elements within the broader narrative of Villain and Victim, where the latter is Oklahoma's hard-working taxpayers.

Costs and benefits are addressed in TWC online narratives by portraying state tax revenue lost through the tax credits as a cost borne by many or everyone in the state, and the benefits (taxes credits) are reaped by only a few (executives and shareholders of wind energy companies), but no specific individuals or companies are named. Text describes Oklahomans who are losing hundreds of millions of dollars in tax revenue: "Left unchecked, the growing zero emission tax credit alone will cost Oklahoma taxpayers $2.1 billion over the next 10 years," "Why are wind companies taking advantage of Oklahomans?" and "Oklahoma cannot afford a giveaway" (TWC, 2016)

4.2 WindWaste

Windwaste's (WW) Villain is large-scale, "big business" wind energy companies who have taken advantage of the tax credit law. "Industrial Wind Policies are blowing our future" is the website's headline (WindWaste, 2019). The Victim is the people of Oklahoma, and WW's narrative provides focused statements on victimhood. The Victims are Oklahomans affected by

the same budget shortfalls addressed by TWC but with particular emphasis on public education. The Hero or solution is more amorphous than simply repealing the tax credit law. In WW's narrative, the solution includes using new legislation to rein in wind energy development generally. And, an additional type of Hero is the people reading the website. The website calls for action by telling like-minded, concerned citizens to contact their legislators to complain. Therefore, individuals spurred to become actively involved in the battle against wind energy development become the website's Heroes, too.

Costs are shown as being spread out over multiple sectors of society, and many such sectors are addressed specifically: (1) Property owners who own land adjacent to wind farms but who do not receive payments from wind energy companies, because the turbines are not on their land. In other words, adjacent property owners suffer perceived negative consequences without "just compensation." (2) Oklahoma citizens and taxpayers, because they lose out on services the state can no longer provide due to tax revenue lost through the tax credit law; and (3) environmental impacts to wildlife, particularly birds. In addressing costs, WW makes its argument by comparing the salary of first-year public school teacher with the total subsidized cost of a single 2-megawatt turbine. Hence, whereas the TWC makes a sweeping case that, "Oklahoma's children, state employees and infrastructure have sacrificed enough" (TWC, 2016), WW provides specific numbers, claiming tax credits for industrial wind projects will cost Oklahomans $5.2 billion between 2019 and 2030. Although alluded to, costs associated with foreign ownership do not receive the attention in WW online narratives as they do with TWC.

WW devotes a large portion of its website to discussing the costs to property owners living near wind farms who do not have turbines on their land but who do have transmission lines on their land. Presented in terms of threats to private property rights, the argument is made using

two different testimonials from actual property owners who complain that their right to control development around their land constitutes a sort of "takings." The testimonials include references to undesirable changes to the landscape, generic concerns for the "nuisance" of the turbines, a decrease in property value, deleterious effects on health of livestock, and the possible relationship between spinning turbines and a spouse's medical problems.

4.3 Oklahoma Wind Action Association

The Oklahoma Wind Action Association (OWAA) is a local citizens' group that communicates through Facebook. It was created to oppose wind energy development in Oklahoma's Kingfisher and Okarche counties. The group is largely inactive now, and the last posts were uploaded to the internet in 2017 most likely due to the organization's failure to stop construction of wind farms. The OWAA still exists, however, and provides data for this study. The OWAA portrays large scale wind farms as the Villain, the people of Kingfisher and Okarche Counties as the Victims, and themselves (the OWAA) as the Hero. The mission statement, to "protect the people of Okarche and Kingfisher against the nuisance caused by industrial wind turbines" shows how site-specific the organization's reach or scale is (OWAA, 2019).

The OWAA created and posted a 20-minute video of interviews with Kingfisher and Okarche County landowners affected by wind energy transmission lines (OWAA, 2019). Personal health and generic nuisance concerns are the reasons given for feeling that their property rights have been infringed upon. It is important to note that the OWAA pursued these concerns in court by filing a law suit against the Kingfisher/Okarche Windfarm (Walker vs Kingfisher, 2016). The OWAA lost the law suit.

4.4 Southern Great Plains Property Rights Coalition

The Southern Great Plains Property Rights Coalition (SGPPRC) is a regional organization whose mission is to protect private property rights from encroachment by wind energy

development, electricity transmission lines in particular (SGPPRC, 2019). The organization's narrative exists on Facebook and relies on posts and comments to share its information. The organization's mission, goals, and grievances are explained in the "About" section where they clearly identify wind energy developers as the Villains and property owners as Victims. The Hero is a solution whereby property owners affected by wind energy transmission lines receive annual payments for devalued property, nuisance, and inconvenience. The SGPPRC's Facebook page states explicitly that the organization supports the expansion and development of wind energy in Oklahoma but seeks fair treatment through monetary compensation for those affected most directly by wind energy development. In other words, the SGPPRC's narrative addresses benefits of wind as well as costs, but the narrative focuses on the concentration of costs on only a few.

4.5 Oklahoma Power Alliance

The Oklahoma Power Alliance (OPA) is the Oklahoma branch of a nationwide renewable energy advocacy group known as the Advanced Power Alliance that has branches in Kansas, Missouri, Nebraska, and Texas as well as Oklahoma (OPA, 2019). The national organization exists to support the development of renewable energy sources, especially solar and wind; the Oklahoma branch focuses on wind. The OPA's website does not identify a Villain or Victim, although it does mention Oklahoma's recent budget shortfall as a backdrop to explain wind energy's economic benefits to the state. Instead of naming a Villain and Victim outright, there is subtle innuendo that the problem is reliance on fossil fuels, and wind energy development is the Hero.

Benefits rather than costs are stressed in the narrative, and OPA points out the income generated by land leases to landowners as well as the relatively inexpensive cost of producing

electricity by wind. The latter is explained as a cost-saving measure to current and future Oklahomans, because "wind energy investment will save Oklahoma $2.1 billion over time." The OPA also highlights the number of jobs created through proliferation of wind farms throughout the state. In other words, costs are negligible or non-existent in the narrative, and benefits are touted as being spread out over a wide range and number of beneficiaries.

4.6 American Wind Energy Association - Oklahoma Branch

The American Wind Energy Association (AWEA) is a nationwide non-profit advocacy group that provides information on wind energy for the USA as a whole and for specific states. Information for Oklahoma is available online as an Oklahoma Factsheet enumerating the many economic benefits to Oklahomans of developing the state's wind energy resources (AWEA, 2019). As such, the organization does not directly indicate a Villain, Victim, or Hero. Instead, it provides information in the form of a factsheet of detailed benefits: (1) cost savings to electricity customers due to the low cost of producing electricity with wind; (2) the number of jobs created; and (3) direct and indirect benefits to the state through job creation and taxes. Benefits affect everyone, not just a few. The AWEA narrative does not identify a Villain or Victim, nor is there discussion of a problem requiring a Hero or solution. Instead, the narrative is confined to discussion of benefits (AWEA 2020).

4.7 American Energy Action - Oklahoma Branch

The American Energy Action Association (AEAO) is a non-profit established to "advance wind energy policy" with individual sites designated for each state (AEAO, 2019). The AEAO is similar to the other pro-wind narratives in that it, too, has no clearly-defined Villain, Victim, or Hero but highlights the positive economic impacts of wind energy development as an important benefit to all Oklahomans. The website provides data on job creation, tax income, and cost

savings to taxpayers that result from wind energy production and development. Unlike the other pro-wind organizations, however, the AEAO addresses benefits to the environment such as zero greenhouse gas emissions and the use of "virtually no water" in energy production, an important concern for the more arid western parts of Oklahoma.

For the purposes of this study, there may be some merit to consider continued reliance on fossil fuel as the Villain, the global community (all people who must suffer the effects of environmental degradation and climate change associated with continued reliance on fossil fuels) as the Victim, and wind energy development as the Hero. Granted, the characterization is a bit tenuous. However, because the AEAO includes environmental degradation caused by fossil fuel energy production in framing the AEAO's benefits argument, there is an assumed, although not explicitly stated, Villain-Victim-Hero framework to their narrative.

5 Discussion

The narratives from the seven organizations involved in this study serve the same purpose: to advocate for a specific cause, either Anti- or Pro-wind, and supply evidence or arguments to sway public opinion in support of their cause. Due to the online platform used for the narrative messaging, the narratives were simple, in that the heroes, villains, and victims were fairly straightforward and not given the nuance that would be developed in a more robust communication style. Analysis of the narratives reveals key differences between the Anti- and Pro-wind narratives. Four general deductions can be drawn from the data. First, Anti-wind narratives contain clear Villains, Victims, and Heroes, whereas Pro-wind narratives do not. Second, Anti-wind narratives identify a problem that must be addressed quickly, suggesting that if the problem is not addressed immediately, the problem will cause or continue to cause harm to the narratives' intended audience. Third, Anti-wind organizations' narratives frame their

narratives within a context supportive of a transition to more renewable energies generally but against specific wind energy projects: the classic NIMBY situation. Each of these points is described in more detail below.

5.1 Villain, Victim, Hero framework

Anti-wind narratives begin with clear, short-and-to-the-point, unambiguous identification of a Villain, Victim, and Hero and typically in that order. These are the functional elements of the narrative that spur the audience to action, and the wording used to describe Villain, Victim, and Hero appears in large font, bright colors that contrast sharply with the rest of the text, or other methods of attracting attention. In the four Anti-wind organizations used in this study, the Villain is either a specific wind farm (proposed or completed), the tax credit law, or utility easement laws. Landowners must allow utilities such as electricity, natural gas, and water lines to cross their land for the greater good, i.e. the distribution of these necessary services. However, the property owner owns and pays taxes on the land used by the utility lines without receiving subsidies or direct monetary compensation for use of the land. Hence, in the energy debate, easement laws are perceived as hurting or disadvantaging property owners with land adjacent to wind energy installations, because they do not receive payments for perceived use of their land, whereas their neighbors with turbines on their land do receive payment (compensation).

The Victim is the people of Oklahoma, and there are a variety of Victim subsets, the most popular of which is the state's public education system. TWC and WW, in particular, directly link Oklahoma's budget shortfalls for education and other social services to the state's wind industry, citing the 2018 statewide teachers' strike as an example. The strike itself lasted two weeks, but memories of the hardships linger. As a result of the strike, 97 school districts changed to a four-day school week to save money (TWC, 2016; WW, 2019), so working parents

of school children continue to suffer the effects of the strike. The strike also affected Oklahomans whose jobs rely on the public education sector: teachers, custodians, bus drivers, cafeteria workers, textbook suppliers, and so on.

Another popular and effective Victim in the narratives is Oklahoma tax payers, specifically Oklahoma tax payers who reside in community or county affected by existent wind energy projects. Those organizations with smaller scale audiences such as SGPPRC, OWAA, and TWC craft the Victim element to appeal directly to their audience including those who pay property taxes without compensation for transmission line easements; the perception of decreased property values; nuisances such as noise and flickering lights from the turbines; and health concerns resulting from proximity to wind turbines. Diagnosed diseases or health conditions are not specified in the narratives, but hearsay and rumors support what some landowners already assume is true. Emotionally-charged and full of we're-all-in-this-together-themed testimonials from actual property owners help flesh-out the Victim role in the Anti-wind narrative. Vital in all such characterizations of Victim is empathy for the unfairness, powerlessness, and lack of control felt by individual Oklahomans.

In all four Anti-wind organizations' narratives, the Hero is identified as a solution or goal rather than an individual as the term "hero" might imply. The Hero might be taking steps to join the organization, respond to a Call to Action, work to repeal a bill, defeat a candidate, or pass new laws limiting wind energy development or industries. Both TWC and WW identify the Hero/solution as increasing taxes on wind energy developers to compensate for state budget shortfalls. TWC even provides specific tax solutions: end the tax credit, impose new energy production taxes on wind, and increase regulation of wind energy production. In those narratives where the Victim is uncompensated property owners, the Hero is "fair compensation," although

how much compensation is fair is not specified. Instead, the term seems to indicate that an undisclosed amount of money will be dispersed annually to compensate victims of unjust property right infringement by wind energy development (SGPPRC, 2019).

Pro-wind organizations do not use an easy, Villain-Victim-Hero message. On one hand, this No Villain, No Victim approach might appear to be a more sophisticated message, because it does not pander openly to its audience. However, in an emotionally-charged debate such as one erupting over a proposed wind farm, sophistication is probably not as effective a communication tool as finger-pointing at a named Villain, Victim, and Hero. Instead, Pro-wind organizations' narratives tout wind energy development as the Hero, the solution, to a problem. The problem itself is not identified as one thing (Villain) but as a complex web of societal circumstances that require transitioning to renewable energy, wind specifically. These circumstances include lower utility bills, clean air, clean water, and a reduction in greenhouse gas emissions, for example. Some Pro-wind narratives include mention of compensation for transmission line easements, but the real Hero is wind energy development and improvement in the lives of Oklahomans. Pro-wind narratives have narrative elements, but these elements are not really *functional* narrative elements. If no one is harmed, then there really is no problem or reason to rally around a cause.

5.2 Problem Identification and Costs and Benefits

Anti-wind narratives have built-in problem identification in their Villain. Whether the Villain is industrial wind energy, specific wind farms, tax credits, foreign investors, or utility easements, the audience can easily see the problem caused by each Villain and who pays for or is harmed by it. Distinct, readily-discerned problems embody a sense of immediacy to solve each problem, and solutions are fairly clear and finite: stop a wind farm from being constructed; repeal or replace a law; or compensate land owners, for example. The problem-structure implies

a cost, someone is losing out, and reducing or ending that cost is the benefit. In other words, Anti-wind narratives focus on costs rather than benefits.

In Pro-wind narratives, the implicit – rather than explicit -- problem is that there is not enough wind energy development occurring (in Oklahoma). This is not stated directly but can be assumed from each organization's mission statement. Pro-wind narratives emphasize economic benefits and breadth of those benefitting, whereas Anti-wind narratives focus on costs and who will bear the brunt of them. These benefits take many forms including job creation, payments to property owners for wind farm land leases, and cheaper energy costs. Some, AWEA and AEAO in particular, address environmental benefits. Local environmental benefits refer to how much cleaner energy wind energy development is when compared to fossil fuel power generation, especially in light of water demands made on local communities undergoing a boom in the natural gas fracking industry. At a national and global scale, Pro-wind narratives point to the economic benefits associated with reducing global climate change and protecting global ecosystems affected by climate change.

Pro-wind narratives are quite informative, but they are not persuasive and have no immediate Call to Action to rally their constituents. Without a Villain, Victim, or clearly identified problem, Pro-wind narratives present the assumption of a problem that is diffuse and hard to act on. Instead of crafting actionable goals to solve clearly-identified problems with viable solutions, Pro-wind organizations craft narratives with broad descriptions of benefits without actionable paths forward. Perhaps because of this, Pro-wind narratives seem weak relative to their counterparts in the Anti-wind camp. This weakness creates a vacuum in Pro-wind narratives which Anti-wind narratives can fill with their own pointed messaging about victimization and actions required to solve the problem.

5.3 NIMBY Revisited

None of the narratives analyzed as part of this study pointedly disagreed with or demonized the *concepts* of renewable energy, wind energy, wind energy development, or an eventual societal transition away from fossil fuels and toward renewable energy sources. Such reticence, especially among the Anti-wind organizations, can be explained by NIMBYism but only after thoroughly examining the reasoning behind the opposition. High levels of support for wind energy in national and statewide surveys corresponds to support for wind energy in the narratives analyzed here. Anti-wind organizations, in particular, went to great lengths to assure their audiences that they did not oppose wind energy *per se*. However, each Anti-wind organization did identify a specific facet of the wind energy debate as their Villain. Both TWC and WW targeted the tax credit law; OWAA and SGPPRC targeted wind energy developers and utility easements; and OWAA targeted wind turbines. These organizations recognize and acknowledge that there are benefits to wind as a renewable energy source, but they oppose wind energy development occurring in their sphere of influence where impacts are negative and seemingly unfairly distributed.

Anti-wind organizations dissect a single yet complicated wind energy debate into discrete bits and then use some of those bits to their advantage. Anti-wind organizations extrapolate the bad experiences of local individuals into a broader narrative of Villain and Victim that is powerful, because it is rooted in people and place. As its name implies, NIMBYism is rooted in place, in my "back yard." Localized narratives are powerful, because the functional elements are personal, focused, and discrete. Audiences reading the websites may even know some of the people featured in testimonials and feel a connection. It is harder to feel a connection to a concept or future global benefits. When viewed from the outside, Anti-wind organizations' strategy may seem hypocritical. However, Anti-wind narratives take advantage of the disconnect

between approving of a concept while simultaneously disapproving of its real-world manifestation (NIMBYism) as seen in their successful attempts to slow or stop wind energy development in parts of Oklahoma.

6 Conclusion

Deconstructing narratives surrounding wind energy development in Oklahoma provides a framework for understanding local opposition. There are stark differences in how Anti- and Pro-wind organizations create their narratives. Anti-wind narratives create an image of wind energy as a good thing that is flawed but can be fixed. And, Anti-wind narratives provide clear instructions on how to fix it. Localized opposition to wind energy is characterized as concerned citizens who want to rectify perceived injustices. Understanding how opposition organizations, their audiences, and local constituencies perceive themselves as Villain, Victim, and Hero is integral to creating competing narratives that can help ease a transition to renewable energy development. Encouraging community support for wind energy development should include attention to the community's specific concerns and values. Oversimplifying their pushback without engaging in a meaningful discussion and evaluation of their concerns will most likely intensify, prolong, and expand the power and reach of their opposition.

In Oklahoma, opposition to wind energy development has created effective narratives that tie into local, regional, and statewide concerns. They have localized their arguments to appeal to local stakeholders and policymakers and cause intense and increased scrutiny of new wind energy development projects. Anti-wind narratives used in Oklahoma are constantly being modified, allowing them to gain traction and affect state energy policies, and politicians incorporate elements from Anti-wind narratives to promote their agendas. The promotion of renewable energy faces challenges, not the least of which is the use of NIMBYism to frame the

opposition argument process, instead of actively engaging with local concerns over wind development. Understanding the most effective means of communicating what is at stake, who benefits, and who loses in a productive way is an important first step in the right direction.

CHAPTER THREE: USING THE SOCIO-ECOLOGICAL SYSTEM FRAMEWORK TO ANALYZE REPONSES TO THE WIND CATCHER PROJECT

Abstract

Transitioning to a more sustainable energy production system is an integral component of mitigating the impacts of climate change, and increasing renewable energy development – such as large-scale wind farms -- is a key part of this transition. Wind energy development can become controversial due to pushback located near the site of proposed installations. This local opposition is often characterized as a NIMBY, Not-In-My-Back-Yard, situation, and little is done to better understand it. This chapter uses Ostrom's (2009) Socio-Ecological System (SES) framework to investigate anti-wind energy development narratives associated with the failed Wind Catcher Project in the south-central region of the USA. Results indicate that local values and perceptions of social and economic resources are the most important factors determining opposition to wind energy development, and little weight is placed on environmental concerns. Landscape and viewsheds as resources equal to or greater than the value of a more sustainable energy production system. The wind farm, turbines, and associated transmission lines are seen as a threat to their way of life and their perception of place. In addition, past experiences in the region with volatile energy prices made people distrust long-term projections on cost-savings. Hence, opposition to wind energy development is the result of deep-seated place-attachment and distrust of rosy economic arguments rather than a simple NIMBY excuse. This study suggests that new energy development projects must include open discussion with local stakeholders, multi-dimensional analysis of how the opposition frames its arguments, and acknowledgment of local place-attachment.

1 Introduction

Recent readings by the National Oceanic and Atmospheric Administration (NOAA) for carbon dioxide (CO_2) at the Mauna Loa Observatory on the island of Hawai'i rose above 410 parts per million, and a further increase is expected (NOAA, 2020). As atmospheric CO_2 levels increase, the impacts of global climate change are unavoidable and will increase in severity (IPCC, 2018). Renewable energy sources currently constitute a small percentage of the global energy production system and need to become more important if the world is to slow the pace of global climate change (EIA, 2019). However, though support for renewable energy is high, traditional energy production systems are entrenched in the current economic-social-ecological system, making a transition to renewables a complex process (Miller et al., 2015). Even when renewable energy resources are plentiful and relatively cheap to produce, local pushback can impede sustainable development to energy systems. However, the environmental cost of remaining in our current energy production system is high, both environmentally and economically. To this end, a better understanding of energy transitions is necessary.

Americans have favorable views of renewable energy and the increased development of renewable energy generally (Leiserowitz, et al., 2019; Pew Research Center 2016, 2019). This support is similar across political boundaries. People's perception of climate change does not affect their general support for renewable energy development. However, individuals and communities tend to oppose renewable energy development, like wind farms, when the development is located near them (Handy, 2018; Kempton et al., 2005; Monies, 2016; Seelye 2017). This pushback is usually identified as Not-In-My-Back-Yard or NIMBY response that frames the opposition as a single-minded antagonistic force made up of people who are unhappy with change for the sake of change. However, relying on NIMBY oversimplifies what is often a complex mix of social and cultural processes and values (Burningham et al., 2006; Burningham

et al., 2014; Devine-Wright, 2005, 2009, 2011; Petrova, 2013; Van der Horst, 2007; Wexler, 1996; Wolsink, 2006). Framing opposition to renewable energy development as NIMBYism minimizes the concerns and values within a group. Refusal to address these concerns can lead to a renewable energy project being stalled or failing altogether. In order to increase renewable energy development, a better understanding of its opposition is needed. This chapter sets out to do just that.

To better understand why some communities oppose renewable energy development, a case study of the failed Wind Catcher wind farm project located in Oklahoma, USA was conducted. The study used Ostrom's SES framework (2009), because its tiered system of factor identification and interaction includes social and environmental variables and provide a much more detailed lens through which to understand opposition arguments than provided by NIMBY. The SES framework has been adapted to suit a wide variety of studies (Flynn & Davidson, 2016). In the study, public comments from the legal dockets filed for the Wind Catcher project were analyzed to understand how opposition to the project was framing its arguments. (Details of the methodology appear below.) Public comments came in many forms including handwritten or typed notes, form letters, and formal requests from individuals and/or groups. All were written and submitted with the intent of persuading the Oklahoma Corporation Commission (OCC) to vote against the proposed Wind Catcher project.

This study used the SES framework to analyze narratives within the public comments. Narratives are parts of discourse that both inform and incite action (Gupta et al., 2018; Roe, 1994). They differ from statements in that they provide actionable contexts and goals (Shanahan et al., 2011; Roe, 1994). Narratives can be powerfully persuasive tools if embedded in a community's discourse when faced with a decision with uncertain future impacts such as the

effects of climate change (Curran, 2012; Miller et al., 2014; Milojević & Inayatullah, 2015). Because they are used to take a position and promote action, narratives reveal shared community values and can shape a common perception of a given situation (Hermville, 2016; Gupta et al., 2018; Roe, 1994), such as proposed Wind Catcher project. The comments and their embedded narratives used in this chapter reveal the presence of strong place-attachment values and other narrative elements that became powerful tools in defeating the wind energy project. Hence, analyzing public comments provides a richer understanding of how communities conceptualize complex phenomena (Young, 2013) such as transitioning to renewable energy development.

1.2 Background: The Wind Catcher Project

American Electric Power (AEP) is an investor-owned electric utility company that supplies the majority of Oklahoma with power. Corporate AEP has two regional subsidiaries: Public Service Company of Oklahoma (PSO) and Southwestern Electric Power Company (SWEPCO). In July, 2017, AEP announced it was ending its plans to build the Wind Catcher Project, a 2000 megawatt wind farm to be located in the Oklahoma Panhandle (AEP, 2019). Wind Catcher would have been the second largest wind installation in the world, providing wind-generated electricity to four states: Oklahoma, Texas, Arkansas, and Louisiana (AEP, 2018). The Wind Catcher wind farm would have covered over 300,000 acres in mostly agricultural land in Oklahoma and required 350-miles of transmission lines. The project was expected to cost $4.5 billion and would have produced enough energy to power over 1.1 million homes in the four-state area with about half that number in Oklahoma alone (AEP, 2018).

In order to complete Wind Catcher, AEP had to receive approval from utility oversight committees in all four affected states, because rate increases would be needed to fund the project. Each of the four states has a committee tasked with representing the best interests and values of

energy consumers in the state, including customers of AEP. The four committees are the Oklahoma Corporation Commission (OCC), the Public Utility Commission of Texas (PUCT), the Arkansas Public Service Commission (APSC), and the Louisiana Public Service Commission (LPSC). These commissions are charged with ensuring any changes to electricity rates and infrastructure benefit the electricity users and maintain reliability of electricity production. AEP received permission from both the APSE and LPSC to increase electricity rates based on two factors: perceived environmental benefits from clean energy production and long-term cost savings (AEP, 2018; Patel, 2018). The PUCT denied permission to build Wind Catcher due to concerns that electricity costs would increase over time (Efstathiou, 2018; Efstathiou & Martin, 2018). The OCC did not make a final decision, because PUCT had already declined approval and effectively stopped the proposal (Bryant, 2018). The decision to walk away from Wind Catcher was met with mixed reactions.

The main reason for opposition to the Wind Catcher project was a strong belief that the new facility could not guarantee that future energy prices would be lower. Government agencies, oil and natural gas companies, and even representatives of other wind industry companies supported such a view (Ellis, 2018). Self-contradictory reports from different consultancy agencies complicated the picture (OCC, 2018). At the same time, public comments solicited as part of the regulatory process from towns in Oklahoma and Texas put pressure on the commissions to vote against the project (Money, 2018b). Thus, arguments against the project came from all different directions including economic arguments, place-attachment values, and assertions that private property rights would be violated. In order to best understand this complicated backdrop of how and why the Wind Catcher project failed, a more complex

framework for analysis that includes attention to environmental and social components is needed.

2 Methods: Ostrom's Socio-Ecological Systems

Where NIMBY fails to address the intricacies of the Wind Catcher situation, Ostrom's (2009) Socio-Ecological Systems framework succeeds. As the name implies, the SES framework incorporates both social and ecological/biophysical aspects of a system (McGinnis, 2010; Ostrom, 2009, 2011; Vogt, Epstein, Mincey, Fischer, & McCord, 2015). The SES framework originated with Ostrom's 2009 work on common-pool resource management as part of a "resource system" and factors affecting the system as well as the interactions between and among factors to produce outcomes (Anderies, Janssen, & Ostrom, 2004; Hinkel, Bots, & Schlüter, 2014; McGinnis & Ostrom, 2014; Ostrom, 2009; Vogt et al., 2015). The SES framework was created as a platform for research in different fields to facilitate the co-mingling and co-production of knowledge that could then be shared across disciplines (Ostrom, 2009).

Conceptualizing resource systems as having both social and physical factors that interact at different scales is key to creating new paradigms for sustainable resource use (Cote & Nightingale, 2012; Partelow, 2016; Partelow & Winkler, 2016). Ostrom's SES framework has been used on resource systems that are commonly-held and managed by communities such as fisheries, lakes, or forests. However, the SES framework lends itself to almost any human-technological system (Hinkel et al., 2014). Energy systems are typically viewed as socio-technological systems as opposed to socio-ecological systems, but both systems (socio-technical and socio-ecological) include social factors in their analysis (Geels, 2012; Rutherford & Coutard, 2014; Verbong & Geels, 2006).

Energy production systems are not usually analyzed using the SES framework, but the breadth and flexibility of the SES framework lends itself well to studying energy transition (Bauwens, Gotchev, & Hostenkamp 2016; Delgado-Serrano & Ramos, 2015; McGinnis, 2010; Schlüter & Madrigal, 2012). Hodbod and Adger (2014) suggested using an SES framework to study energy systems because it addresses social interests that affect both the local and global environment. Framing energy transitions as SESs provides a well-rounded view of both scaled impacts as well as social concerns over the development of energy production systems (Goldthau, 2014). In Ostrom's SES, data falls into two broad, over-arching categories: Related social, economic, and political settings is one; related ecosystems is the other. Within these two categories lie four sets of criteria or data: Governance systems; Resource systems; Resource units; and Actors. These sets of data are then understood to interact or contribute to one another by serving as inputs or parameters or by defining each other and Outcomes. Thus, the framework serves to both sort the data and show how sets of data overlap and interact to explain outcomes.

Wind energy production has a reputation for causing only minimal environmental impacts despite the fact that turbines, sub-stations, and transmission lines change the physical and cultural landscape. Wind Catcher would have changed both the physical and cultural landscape as part of its resource system, so it is a good candidate for analysis using the SES's integrative framework. Binder, Hinkel, Bots, and Pahl-Wostl (2013) stated that the SES framework with its ability to show how interactions between social, physical, and economic factors can interact makes it useful for identifying how factor interaction leads to different outcomes. Delgado-Serrano and Ramos (2015) highlight the framework's attention to interactions as a major reason to use it to analyze socio-ecological systems.

The goal of this study was to understand what factors caused or facilitated opposition to the Wind Catcher project through the analysis of narratives in public comments from the four state commissions overseeing the Wind Catcher proposal. The outcome of the project is known in that Wind Catcher was not built. Using the SES framework to analyze the data, insight is provided into why the project failed. In total, almost 600 unique comments filed in 30 public comment sections of the OCC docket were reviewed (OCC, 2018). The dockets of Wind Catcher-associated court filings in Texas (PUCT, 2018), Arkansas (APSC, 2018), and Louisiana (LPS, 2018) were included only in so far as to gather basic information. The comments used in this study came from the public comments section of the OCC docket and came solely from private individuals. Comments from businesses or industrial entities were not included, but form letters from groups were, if they were signed by private individuals. All the public comments came from individuals living in Oklahoma and did not contain any identifying demographic information.

The legal filings from the four states' oversight commissions contain wide array of data including AEP's rate projections, the viability of Oklahoma's wind resources, and estimates for construction costs and timelines. The filings from Oklahoma contain a series of public comment sections where Oklahoma residents wrote to OCC to share their views on the value of the project and what they perceived as to how the project would affect them directly. These public comments were coded to find the major factors that led to interactions as found in Ostrom's SES framework. The coding relied on grounded analysis, an inductive process through which codes emerge through analysis of the data as a body of the whole (Chandra & Shang, 2017). Major themes were isolated as repeated patterns within the data. Most of the theme identification and interactions came from the OCC docket's testimonies and public comments. Some of the

framework's factors came from other parts of the dockets as well as media reports. Including the latter increased substantially the representation of local and regional factors within the SES framework's analysis (Culbertson & Stemple, 1986). The complete SES for this research is shown Table 5 which uses six first-tier variables, the same ones used in Ostrom's framework: Social, economic, and political settings (S); Resource systems (RS); Governance systems (GS); Resource units (RU); Users (U); and the combined tier of Interactions (I) and Outcomes (O) (Ostrom, 2009). The first-tier variables then have variable numbers of second-tier variables linked to them.

Once the information was coded, multiple interactions were evident that appeared as major themes explaining why the Wind Catcher project failed: Distrust of the information provided by project proponents; perceived threats to property owners; and economic concerns. These larger themes contained sub-themes tied specifically to individualized, local experiences. Table 4 shows the major themes and sub-themes below.

Table 4. Themes in the SES framework.

Major Theme	Sub Theme 1	Sub Theme 2
Distrust	Failure to believe projected lower energy costs	Illegitimacy of the whole process
Threats to property owners	Unwanted changes to land, cultural landscape, and viewshed	Devaluation of property
Economic Concerns	Money Leaving Rural Area	Cost of living increases

For the purpose of this study, Ostrom's two overarching "Settings" categories were merged together, because the narratives revealed that the social, economic, political, and ecological settings were actually merged into one. Elements of narratives describing how the

wind energy project would affect the physical landscape were intertwined with the social, economic and political values of the region. Hence, in this particular case, the overlap of social and ecological systems imbues the Wind Catcher land parcels with an incredibly high or strong emotional value to the land owners and their communities. This specific place-attachment underlies a recognized strong connection between people, whether individuals or communities, and place (Hidalgo & Hernandez, 2001). Place-attachment is often a key component of opposition to wind energy development (Bidwell, 2013; Devine-Wright, 2009, 2013; Swofford and Slattery, 2010). In order to best represent this situation, the framework used here was modified to more accurately describe these internal interactions that led to the specific outcome. Ostrom's SES framework was created with the intention of it being modified. It was launched as an analytical framework rather than a methodological one (Binder et al., 2013; Delgado-Serrano & Ramos, 2015).

3 Data

Ostrom's SES framework provides a detailed structure to organize the elements found within a given socio-ecological system (Ostrom, 2009). Table 5 shows Ostrom's framework as it relates to the Wind Catcher situation, providing structure to areas of interaction, rule-making, and social-ecological connections. Ostrom's framework was adapted to accommodate multiple resource systems within the same level on the framework.

Table 5. The SES Framework for the Wind Catcher Project Analysis.

First-tier variable	Second-tier variable
Social, economic, and political settings (S)	**S1 - Economic development**: Larger cities like Tulsa and Oklahoma City are growing, but areas most likely to be affected by wind energy development currently have low or declining populations.
	S2 – Demographic trends: Declining rural population due to limited economic opportunities. Most communities are racially and culturally

	homogenous with strong ties to conservative values such as private property rights and dislike/distrust of government subsidies.
	S3 – Political stability: Highly stable.
	S4 - Governance resource policies: Multi-state public utilities are overseen by committees that focus on their own states.
	S5 - Market incentives: Wind energy developers suggest short-term increase in job opportunities during construction phase and long-term benefits from lower electricity bills.
	S6 – Media: Consistent and detailed media coverage in a variety of local and regional outlets.
Resource systems (RS)	**RS1 – Sector**: Renewable energy production system; agricultural land uses; cultural landscapes based on historical traditions and strong private property rights values.
	RS2 – Clarity of system boundaries: Boundaries are clear and codified by law.
	RS3 – Size of resource system: The area encompasses four states with the majority located in Oklahoma, including a 300,000 acre wind farm and a proposed 350 mile transmission line running from the Oklahoma panhandle to Tulsa that crosses or encroaches upon private land.
	RS4 – Human-constructed facilities: There are a variety of structures, wind turbines, transmission lines, and substations most conspicuously. Additionally, parcels of land needed for construction are socially-constructed to provide significant value to landowners.
	RS5 – Productivity of system: Highly productive energy system with oil, natural gas, and wind energy already developed. The land itself is valuable to owners for agriculture and cultural ties to place, but the land is not more productive economically than surrounding land.
	RS6 - Equilibrium properties: Wind is consistent and persistent in western Oklahoma's "Wind Corridor."
	RS7 - Predictability of system dynamics: Wind energy resources are well-known, well-researched, and well-monitored.
	RS8 – Storage characteristics: Battery storage is evolving, but infrastructure does not yet exist for long-term electricity storage. AEP plans to use natural gas to supplement energy production when needed.
	RS9 – Location: Wind energy development requires significant infrastructure and quantity of land, so location of facility is variable.
Governance systems (GS)	**GS1 – Government organizations**: There are a number of publicly -appointed and -elected commissions and city councils.

	GS2 – Non-governmental organizations: There are a wide variety of organizations comprised of private energy users, private landowners, private wind utilities, oil and gas companies, and opposition groups.
	GS3 – Network structure: There is frequent communication between involved parties, but many claims contain unclear or incorrect information.
	GS4 – Property rights system: Robust belief in private property rights and that the government will protect these rights. Any encroachment on private property is perceived as a threat to the region's cultural fabric.
	GS5 – Operational rules: Users pay for electricity based on rates determined by cost of development and production of electricity.
	GS6 – Collective choice rules: Oversight commissions are either elected directly by tax-payers or appointed by public officials. Privately-owned lands are not generally subject to collective/community choice.
	GS7 – Constitutional rules: All may participate in voting for commissions; commissions set rate changes.
	GS8 – Monitoring and sanctioning process: The Oklahoma Corporation Commission, Texas Utility Commission, Louisiana Public Service Commission, and Arkansas Public Service Commission, and private land owners.
Resource units (RU)	**RU1 – Resource unit mobility**: There is no mobility. However, electricity is dispersed to multiple states through transmission lines.
	RU2 – Growth or replacement rate: Wind is renewable and does not deplete. Place-attachment land values cannot be replaced with the same place-attachment values, but new ones may form (positive or negative). Land ownership may increase or decrease.
	RU3 – Interaction among resource units: Wind energy is not rivalrous in that one wind turbine does not decrease the value of another. Land ownership is rivalrous: use of one parcel may exclude particular uses of another parcel. Placement of a wind turbine may affect the use of adjacent land.
	RU4 – Economic value: The Wind Catcher Project was valued at $4.5 billion.
	RU5 – Number of units: The Project was to have 800 turbines to be located on many parcels of land. Because the exact route of transmission lines was never completed established, there is no accurate count of how many property owners would have been involved.
	RU6 – Distinctive markings: Turbines located on parcels of land are visually distinctive and obvious; fencing and signage are less conspicuous.
	RU7 – Spatial and temporal distribution: There are differences in the characteristics of wind energy resources across a region. However, electricity

	rates and access to facilities are similar within a service area. Wind farm land parcels are larger to the west and smaller as one nears urban areas.
Users (U)	**U1 – Number of users**: The Wind Catcher Project would have served 545,000 rate payers in Oklahoma, and 1.1 million throughout the service area
	U2 – Socio-economic attributes of users: The median annual income of those living in western Oklahoma/north Texas is $25,000 to $30,000 and differs somewhat between rural (lower) and urban (higher) residents/users.
	U3 – History of use: Wind energy has been used since the early 2000s and is now common regionally. Land is predominantly agricultural.
	U4 – Location: Oklahoma, north Texas, western Louisiana, and western Arkansas
	U5 – Leadership/entrepreneur: AEP has a CEO who answers to a Board of Investors. AEP itself answers to a public commission in matters of rate changes and reliability issues. Land owners answer to themselves but also recognize the authority of the OCC and Oklahoma state government's right to enforce eminent domain.
	U6 – Norms/social capital: Private landowners have significant social capital. Because AEP is a large corporation, it is perceived as an outsider and has little to no social capital.
	U7 – Knowledge of SES: Most people living in the affected area understand the environmentally positive aspects of wind energy, although their attitude toward climate change is mixed (positive and negative aspects), especially when their own land is threatened.
	U8 - Importance of resource: Energy development is integral to the economy of the region. Currently, wind energy is not necessary to meet energy needs, because oil and natural gas are available. For landowners, protection of their private property rights and familiar viewsheds are paramount.
	U9 – Technology used: Wind turbines, transmission lines, construction technology, and agricultural technology.
Interactions (I) => Outcomes (O)	**I1 – Harvesting**: There are different levels of users based on socio-economic variables. Rates are the same for all users, but future rate increases would affect people with lower incomes more severely than people with higher incomes. Because not everyone owns the land where wind energy structures will be built, concerns over access would affect only the specific landowners. However, perceived de-valuation of viewsheds or familiar landscapes due to the presence of turbines and other structures affects both landowners and their neighbors.
	I2 – Information sharing among users: Information is shared through websites, meetings, and legal proceedings and documents. Information shared

	by AEP with users is often unclear or vague, especially information about where turbines and other infrastructure will be placed. AEP did not share information effectively on the subject of long-term energy cost savings.
	I3 – Deliberation process: State commission boards oversee Oklahoma's private electric utilities through hearings. As part of these hearings, there is a call for public input that is considered as part of any deliberation.
	I4 – Conflicts among users: There were no real head-to-head conflicts, but there were concerns between AEP and users over construction details (incomplete information).
	I5 – Investment activities: Rate payers would be paying more to offset the cost of development.
	I6 – Lobbying activities: OCC commissioners were appointed by the state government, and hearings over rate increases included calls for public testimony as well as expert testimony from AEP. Various groups formed who opposed AEP providing additional information to the commission.
	I7 – Self-organizing activities: Some municipalities, users, and other utility companies formed independently and then worked together to oppose the project
	I8 – Networking activities: There were several types: public town halls, online media-sharing, public comments provided to the OCC, and public testimony at hearings.
	O1 – Social performance measures: Landowners threatened to (1) sue the OCC and AEP; (2) oppose the re-election of OCC commissioners who approved the project; and (3) impede "by any means necessary" the construction of transmission lines on their land. There was also widespread distrust of AEP by affected communities due to the perception that they had not received truthful or complete information previously, especially information on the volatility of future energy pricing.
	O2 – Ecological performance measures: Construction of structures would affect land surrounding the project, although no information is available on specific impacts to soil, air, water, and so on. Although there is no evidence to support the claim, there was some concern for the health of species designated as "threatened" under the Endangered Species Act;
	O3 – Externalities to other SES: The wind farm would likely affect local agricultural practices or routines to some degree, especially on land crossed by transmission lines or where turbines were located. There are concerns for the health of people living near turbines and transmission lines and vague "nuisance" claims, but these concerns are perceived rather than verified.

3.1 First-tier variable: Social, economic, and political setting

The people affected by the Wind Catcher live in four states: Oklahoma, Texas, Arkansas, and Louisiana. The utility company constructing Wind Catcher, AEP, provides electricity to parts of Oklahoma, a portion of the Texas panhandle, and smaller portions of western Arkansas and Louisiana. Broadly, the region is characterized as having lower than the national average median incomes and higher than average poverty rates (US Department of Agriculture, 2017; US Census Bureau, 2019a). Both at the state and county level, the area in question is politically conservative, predominantly white, and largely rural except for a few urban hubs such as Shreveport, LA; Lawton, OK; and Tulsa, OK (Pew Research Center, 2017); US Census Bureau, 2019b). Private property rights are stubbornly defended, and all the land in question is privately owned. Some large tracts of land has been in the same family since the mid-1800s. For most of the area, the population is skeptical of climate change, and three of the states -- Oklahoma, Texas, and Louisiana -- have long histories of fossil fuel energy production. That history has created a long and deep connection to energy production generally, and the people in the area are accustomed to being part of the decision-making process. All four states have commissions that oversee public utilities. In Oklahoma, the commission is elected by popular vote. In the three other states, members of the commission are appointed by the governor. The purpose for all the commissions is to approve or turn-down rate changes so that they reflect the best interests of electricity users.

3.2 First-tier variable: Resource system

The Wind Catcher Project would have been located in the Oklahoma panhandle where wind resources are robust and evenly distributed (National Renewable Energy Laboratory

(NREL), 2019). The area is home to significant large-scale agricultural interests. Some landowners' ancestors were the first EuroAmericans to settle the area, creating deep land-attachment values. Residents support a governance regime that respects and defends individual private property rights. To this end, the socially-constructed perception of land ownership and land values becomes a form of resource within the SES framework. The interaction or overlap between the social-economic-political setting and the resource system categories often leads to negative outcomes.

3.4 First-tier variable: Governance systems

The comments used here as data often framed AEP and its subsidiaries, SWEPCO and PSO, as outsiders who are threatening local and regional insiders. Individuals called on the commissions to use their authority to stop the project. The OCC was viewed as the most powerful governance entity, and appeals to the OCC often included threats to vote against them or get legal authorities involved if the commission did not vote against Wind Catcher. This indicates that the OCC was perceived as both a governance system and as a subset of a larger governance system which could be constrained by democratic elections and legal battles. This situation was unique to Oklahoma, because the other state commission members were appointed by the governors. In Oklahoma, the commissioners relied on their constituents for re-election.

3.4 First-tier variable: Resource units

The 300,000 acre Wind Catcher project would have required the construction of over 800 wind turbines and over 500 miles of transmission lines (AEP, 2018) to generate more than two gigawatts of electricity per year (AEP, 2019). More than 360 miles of transmission lines would have been necessary to make the resource useable to residents of Tulsa, OK alone (AEP, 2019).

Many of the pro-Wind Catcher comments mentioned Oklahoma's excellent wind resources, indicating local and regional awareness of and appreciation for wind resources. Opposition narratives did not include mention of the states' wind resources and focused instead on another resource: land rights and familiar landscapes. Repeated themes in the narratives discussing landowners' rights, usually in connection with an expressed fear that private land would be seized by the government for transmission lines. The argument was framed as theft, government overreach, and/or a deterioration of the regional socio-cultural norms which have traditionally favored private landowner rights.

3.5 First-tier variable: Users

The service areas of the combined SWEPCO and PSO utilities would have provided power to over a million users in the four-state area in which they operate. A little over half that number, 554,000 people, would have been in Oklahoma. Most users are people living in private homes, although SWEPCO does serve some large commercial interests. These commercial interests had an important voice in the permitting process. The US Census shows the private users are considered rural, lower than average income, and politically conservative (US Census Bureau, 2019). Tulsa and Lawton, OK and Shreveport LA are the only large urban centers in the Wind Catcher service area, and users' comments were generally framed as rural community members who felt their voices were not being heard in the ongoing debate. Further, most comments complained that the long-term energy cost projections and savings were not true and that the project would cost more than projected and energy costs to consumers would not decrease over time. In other words, there was a lack of trust in the information provided by the energy providers. In addition, the comments frame rural users as being neglected when compared to urban users who are perceived as having access to many more resources than rural

users. Rural users urged the OCC to listen to them for "the greater good" of those living in rural areas, representing themselves as a marginalized group fighting to maintain their way of life. Their way of life, economy, and identity were all described as inextricably meshed with the land and landscapes.

3.6 First-tier variable: Interactions and Outcomes

The interactions in this SES framework resulted for the most part in negative social outcomes. Because developers were in a hurry to construct Wind Catcher before federal Production Tax Credit for Renewable Energy incentives phased out, there was little time to listen to all concerns. Rural stakeholders, especially felt disenfranchised and that their voices were not being heard. The inability or unwillingness of SWEPCO and PSO to communicate effectively and convincingly regarding the benefits of Wind Catcher to all users led many to distrust the company and view the project negatively. This was especially true for those who feared for they would lose control over their land. In Louisiana and Arkansas, in part due to large commercial partners signing on to the project, there was no or little opposition. Even the giant conglomerate Walmart joined petitions in both Arkansas and Louisiana, because the company had made a pledge to move toward getting all its energy from renewable sources with a goal of reaching 50% renewable energy by 2025. Environmental benefits of wind energy did not factor into opposition narratives in Oklahoma and Texas, however. This is most likely due to the area's suspicion of climate change generally. The lack of concern for negative environmental impacts most likely allowed other narratives to take hold, such as those describing fear of property right infringement and associated impacts to individual landowners and communities.

4 Results: Major Themes in the Narratives

4.1 Land Rights and Property Rights

The most frequent theme present in oppositional narratives found in the public comments filings for the Wind Catcher Project is the threat to private property rights. This theme is expressed as fear of land seizure to construct the transmission lines. Fears over eminent domain often accompanied the broader fear and focused on it being an unfair and unnecessary threat. Some comments included pleas to the OCC to "Save my ranch" or "Save my farm" and labeled the proposed actions as "theft" and "stealing" while also complaining that this project was the beginning of the end of Oklahoma landowners' rights in general. Many comments discussed anger felt at having the land their family had owned for generations be cut-up by transmission lines over which they had no control (Bixby, 2018). Transmission line construction and the resulting land seizures were viewed as threats to their strong private property rights value system. They discussed the impact this would have on their families including threats to traditional activities such as horseback riding, camping, and even simply enjoying the scenery. Possible health impacts from transmission lines were also evident, though there is no evidence of transmission lines affecting human health. There were threats to do whatever they could to stop the project such as voting commissioners out of office or bringing legal procedures against the commission and commissioners. Some comments even accused the commissioners of being in AEP's pocket. One comment stated that if her land was divided by transmission lines, the commissioners would have to "Answer to God for your actions" and to "please seek his guidance!"

4.2 Distrust of AEP

Along with threats to their property, many of those opposed to Wind Catcher were distrustful of AEP and cited a number of reasons. The phasing out of the federal Production Tax Credit for Renewable Energy played an important role. As the deadline to use the tax credits drew near, AEP and its subsidiaries tried to save time by not using a public bidding process for both construction and energy development. The rushed bidding process along with a perceived lack of information-sharing from AEP led many to distrust AEP and question the project's general merits and validity. They framed AEP as a "greedy corporate overlord" who was "sneaking around" in order to subvert the laws of Oklahoma for its own financial gain. Further problems with the tax credit deadline was that Wind Catcher's cost projections were based on earning federal tax credits. Without them, the project would be much more expensive than originally advertised to users. Both the hurried bidding process and the need for tax credits to absorb some of the cost resulted in negative comments in the commission filings. Comments expressed a desire for the "free market" to control what projects were viable and which ones were not.

4.3 A History of Bad Experiences

A subset of the lack of trust in AEP was a lack of trust in the long-term cost savings projections. In Texas and Oklahoma, there were concerns over the 25-year projections for both the cost of wind and the cost of natural gas; this comparison that favored wind energy was the basis for Wind Catcher's cost savings argument. However, many in the industry as well as the public found these projections unrealistic and called into question whether or not Wind Catcher would actually lower electricity rates for consumers in the long run. Users referenced Oklahoma's history of changeable energy prices and the cultural memory of boom and busts cycles. They labeled AEP's projections "speculative" and as "assumptions full of risk." Many comments suggested rates would, in fact, not decrease thereby leaving many rural Oklahomans

to spend far more on electricity than they were now. Some indicated that this could have an immense burden on elderly rural Oklahomans who live on fixed incomes with limited options to augment their household budget. One public comment even stated that this was paramount to elder abuse.

5 Discussion

When the TPUC presented its ruling against the Wind Catcher project, they cited a lack of confidence in the long-term energy price projections. The impact of rate increases to largely rural and lower-income users was too great a risk, and the project failed. Immediate fears of cost increases and a regional "livability" decreases competed with possible future benefits AEP claimed would occur. Members of the Texas and Oklahoma public utility oversight boards were unwilling to rely on seemingly untrustworthy energy price projection data. Past boom and bust cycles in the oil resource system of this SES has left behind cultural sensitivity to and skepticism of long-term energy forecasts. Hence, energy experiences in Oklahoma and Texas led to the creation of a powerful anti-wind price projection narrative. This narrative relied on consumers' and residents' shared experiences of past oil and natural gas price variability. Hence, AEP's decision to use promises of future wind energy prices to prove Wind Catcher's long-term value was a bad decision. Beyond this, there was significant pushback from local users and landowners for different reasons, particularly concerns over property rights and changes to the landscape and ways of life. Comments relied on recounting memories of family, friends, events, and activities that had taken place on the land to be usurped by Wind Catcher and of the absolute right residents had to preserve and use the land as they saw fit, not AEP. Land owners saw the threat of land seizures as a threat to their own identities and that of their communities.

A discussion of the environmental benefits of transitioning to renewable energy was completely absent from opposition narratives. Instead, touting environmental benefits was almost the entirety of pro-wind narratives. For those opposed to Wind catcher, there was no benefit to making a change, because there is no need to find a more sustainable energy production system. One comment stated that there was "no clarified need" for this project." The reality is that without accepting environmental benefits, Wind Catcher had no purpose to many users and would bring only negative impacts to the region. For some of those users, the costs would be focused very specifically on them, because control over their land would be lost, and there was nothing they could do to stop it. The distrust that lingered between AEP and users was offset by or compensated for with environmental benefits. In fact for many of those opposed to Wind Catcher, there were no direct benefits at all. In order to increase the approval of large-scale wind energy projects such as Wind Catcher, developers need to better understand the cultural values inherent in the whole socio-ecological system surrounding any energy debate.

The inclusion and influence of the social variables revealed by the use of the SES framework differs from the literature and shows how a deeper discussion of social variables can influence resource systems. Traditionally, the framework has been used for systems that have clearly defined and measurable physical attributes that contribute to the functioning of the system such as fisheries (Basurto, Gelgich & Ostrom, 2013; Partelow, 2015; Arlinghaus et al., 2016). The emphasis on systems that have been traditionally characterized as complex and adaptive Socio-ecological systems (McGinnis Ostrom, 2014; Hinkel, Bots Schluter, 2014; Anderies, Janssen & Ostrom, 2004), minimizing its expansion into new or novel complex system. Systems such as fisheries, that have clearly defined ecological variables and boundaries lend themselves to the framework. However, there are recent calls for a deeper analysis of how

to apply the framework in non-traditional systems, such as energy systems (Delgado-Serrano & Ramos, 2015, Hinkel et al., 2015). In an increasingly connected world, where governance systems are more inclusive and aware of social variable and social capital, there is a need to use to the framework in non-traditional systems to better understand how social factors effect SES systems (Brondizio, Ostrom & Young, 2009). The complex socio-ecological system of the Windcatcher project is not the normal subject of this framework, but the focus on social variables shows the flexibility of the framework and the increased explanatory ability of it when the social factors are incorporated just as robustly as the ecological ones.

6 Conclusion

From the start, the Wind Catcher Project faced an uphill battle. It not only required approval from four separate state oversight commissions but also faced legal battles associated with construction of transmission lines. Further, it needed this approval quickly as t federal subsidies were being phased out for renewable energy, an important cost factor for the entire project. The deadline also meant the bidding process was not transparent, and there was little time to spend in calm and thorough discussion with stakeholders to qualm fears and listen respectfully to their concerns. The accelerated process angered entrenched energy interests, including other wind companies, as well as advocacy groups and a variety of stakeholders (Money, 2018; OCC, 2018). At a local level, communities and individual landowners were unhappy and believed their property rights and lifestyle were threatened without recourse. Also, past experiences with energy price fluctuation made users suspicious of long-term energy price projections that benefited the project.

Transitioning our energy production system is important for many reasons, most immediate of which are mitigating the impacts of climate change and creating more sustainable

energy production systems. However, there are strong social barriers to making large-scale change. Local opposition rises against wind energy development, whether the project is large or small, and such opposition in typically characterized as NIMBYism). Using NIMBY as an excuse instead of real engagement with the values and world view of the opposition hinders an increase wind energy development. What is needed are multi-dimensional discussions of how users affected by these installations value resources and what benefits they will need to see in order to change their opposition to support. Studying and understanding opposition narratives can help instigate more open, informed, and productive discussions of benefits and drawbacks. Often, those opposed and those who support wind energy development base their arguments on completely different sets of values, which makes most counter-narratives useless, meaningless, and ineffective. If global-scale change is going to occur, a better understanding of opposition to wind energy development is needed. New models for analysis, such as adapting the SES framework to opposition narratives, can further understanding.

CHAPTER FOUR: LOCAL IMPACTS OF WIND ENERGY DEVELOPMENT AS A NICHE-LEVEL INNOVATION: USING THE MULTI-LEVEL PERSPECTIVE TO ANALYZE INTERVIEWS

Abstract

Much research has been conducted on understanding how various segments of society perceive or value a transition to a future with a more sustainable energy production system. Little work has been done, however, on understanding the opinions and experiences of those currently living and working most closely with actual renewable energy installations. This gap in the literature is addressed here by using the Multi-Level Perspective framework to help analyze interviews with people directly involved with Oklahoma, USA's wind farms. This framework is important because it helps understand how niche experiments (e.g., such as landowner's behavior change due to wind turbine construction) can influence changes to regime subsystems (e.g., political willingness to support wind energy) as part of broader shifts in energy systems in Oklahoma. Wind energy development enjoys broad support but is often portrayed as causing problems for farmers, ranchers, and their communities in the places where wind farms have been constructed. Using fifteen face-to-face interviews with landowners, site-managers, community representatives, and pro-wind non-profit organization representatives, this study finds that these individuals have, in fact, created novel and unique uses for wind farm infrastructure. In contrast to previous studies, local perceptions of the benefits of wind energy production are mostly positive with only minimal negative opinions. Thus, understanding how wind energy development affects individuals and surrounding communities can aid decision-making and strategizing in the push to increase renewable energy production overall.

1 Introduction

As a result of global climate change, the entire village of Newtok, Alaska had to be relocated to its new home in Mertarvik, about 10 miles inland. The move was due to flooding from melting permafrost and sea level rise and made the citizens of Newtok the first climate change refugees in the USA (Hermann, 2017). Around the world, communities and even whole countries are bracing for the new normal, wondering what they will need to do to survive. In places like Newtok, people can be relocated inland. In other places, the Maldives, for example, there is nowhere to go. To avoid this seemingly apocalyptic future, the world must reduce its greenhouse gas emissions (IPCC, 2018). And, since global energy production accounts for most of the world's increase in atmospheric CO_2 concentrations, a transition to a more sustainable energy production system is vital (US Environmental Protection Agency, 2019).

Sustainable (e.g., low environmental impacts) and renewable (e.g., can be replenished quickly by nature) energy sources are viewed favorably around the world, and some countries have started making a measurable transition away from fossil fuels. Gansu, China is now home to one of the largest wind farms in the world, and Senegal completed its own large-scale wind farm in 2019 (Frangoul, 2019). Producing electricity from wind is now the second-most important source of renewable energy in the world behind only hydropower (IEA, 2019). Wind energy is popular because it produces electricity with no direct greenhouse gas emissions while having only minimal impact on land use (Jaber, 2013). In the USA, wind energy provides 8% of the country's total electricity and some states get over 30% of their electricity from wind (EIA, 2019). In 2018 the USA reduced its carbon emissions by over 200 million tons thanks in large part to wind energy production (AWEA, 2019).

Despite global support for the idea of wind energy development, it often faces opposition at the local scale. In the USA, the UK, and even the Netherlands where windmills have long been a part of the cultural landscape and mindset, individuals and communities situated at or near the location of proposed wind farms have successfully stalled or stopped specific wind energy projects (Kempton et al., 2005; Lawhon & Murphy, 2012; Seelye, 2017). As discussed in chapter 3, the Wind Catcher Project was to be the largest wind farm in the USA, but developers walked away due at least in part to local pushback. Such local opposition within a broader sphere of acceptance is often described as a Not-In-My-Back-Yard phenomena or NIMBY, and NIMBYism is common within the wind energy development debate. People support wind energy development generally but do not want an actual windfarm near them or their community (Devine-Wright, 2009; Wolsink, 2006, 2014). However, the use of NIMBY to frame opposition limits the ability to explain how and why opposition to wind exists (Burningham et al., 2003, 2014; Devine-Wright, 2005, 2009; Wexler, 1996; Wolsink, 2006).

This chapter contributes to the literature associated with understanding opposition to wind energy development through analysis of interviews with fifteen individuals involved directly with specific wind energy projects in Oklahoma, USA. The goal is to capture, identify, and analyze individual, personal experiences with and behavioral responses to wind energy development. A Multi-Level Perspective framework (MLPF) is used to analyze interview content by placing it within the energy transition process and creating new knowledge of micro-level wind experiences. This research adds to the literature describing a transition from the current fossil fuel-based energy production system to a renewable and more sustainable future energy production system by including people's experiences at the smallest scale of the energy transition process. Currently, there is little insight into how and why those individuals most-

closely associated with sustainable energy production (e.g., the construction phase of wind farms) oppose sustainable energy projects (Brannstrom, 2015; Slattery et al., 2011). Even less is known about individuals who are near wind energy development in general. A more detailed understanding of how wind energy development impacts the individuals or communities in close proximity is needed. Sustainability transitions occur when factors across the different levels of society interact often pushing back against other forces supporting the current system (Gliedt & Larson, 2018). More information from local or individual level experiences with wind energy development could help in identifying the interactions between wind energy development and individual landowners and small communities. This will increase the breadth of knowledge available to facilitate the societal transition to a future based on renewable energy rather than fossil fuels.

1.2 Background: Energy Transitions and the Multi-Level Perspective (MLP) Framework

Any transition to a new energy production system must include not only the availability of the physical resources (energy sources) but also social factors conducive to allowing the transition to occur (Lagendijk & Verbong, 2012). The MLP was developed by Arie Rip and Rene Kemp, and then expanded upon by other researcher, most notably Frank Geels and as a framework to study how societies transition from one energy production system to another, in particular, a transition from a socio-technical energy system based on fossil fuels to one based on renewable energy sources such as wind and solar, among others (Geels, 2002, 2010; Gaziulusoy, 2015; Markard & Truffer, 2008; Rip & Kemp, 1998; Smith et al., 2010). The MLP allows analysis of interactions between three levels: Niche, Regime, and Landscape (Geels, 2002, 2010; Grin, Rotmans, & Schot, 2010). The interactions within and between levels are essential processes, because that is where transitions occur (Grin, Rotmans & Schot, 2010). Within each

level of the MLP framework, there are factors that stabilize (maintain) or destabilize (change) the current energy system by interaction with other facets of the system. Stabilizing factors include existent policies, ideologies, widely adopted and used technologies, and other entrenched social characteristics that resist change. Destabilizing factors include new technology, flexible social networks, and economic incentives that support a transition (Geels, 2010). Depending on the factors, there may be a co-evolution of technologies and resultant societal responses (Geels, 2002, 2010, 2018).

The Regimes are middle- or "meso-level" processes and include the rules and regulations, institutions, and technologies currently in place. Regimes are typically strong stabilizing forces maintaining the status quo. Regimes allow for but also constrain progress within the current system so that it moves forward without deviating much from the norm. In other words, at the Regime level, progress might mean that current technology becomes more efficient, but it does not substitute for that technology altogether (Geels 2002, 2010, 2018).

Landscape is the macro-level and encompasses cultural, political, economic, and spatially relevant processes that provide context for the energy production system. The Landscape level includes cultural attitudes toward energy production, social behavior (such as faith in the long-term economic viability of the current fossil fuel-based technology), and other stabilizing factors that form the foundation of the whole energy production system (Geels, 2002, 2010; Grin, Rotmans, & Schot, 2010). Whereas changes may occur quickly at the Niche level, change comes very slowly at the Landscape level.

Niches are the smallest level of the framework, the "locus for radical innovation" that leads to the development and diffusion of new technologies or novel uses of current technology (Geels, 2002, 2010). Because Niches represent the micro-level where something new and

different is first introduced, the MLP framework describes Niches as places that provide funding and support for new ideas as well as protection from market forces and limited supply chains that favor the status quo (Geels, 2010). Research and development facilities and grant funding agencies are examples of Niche level processes, making urban areas more likely to serve as Niche level sites for energy transitions. Cities typically have far more access to resources supporting innovation, such as funding and personnel, than rural communities do. Given that the MLP framework has been adapted for use in non-traditional non-urban energy systems in other studies (Hargreaves et al., 2011; Kern and Howlett, 2009), it can be adapted to Oklahoma's more rural setting for the purpose of this study.

For this analysis, Niches are represented as innovative uses of wind energy infrastructure, funding, and other outcomes resulting from wind farms as well as novel experiences encountered by landowners and community members residing near existent wind farms. Niche-level innovations can include social innovations, not just technical ones linked to infrastructure, and are composed of non-Regime actors (Gliedt & Larson, 2018). Individuals living near wind farms are actors and not part of Regime processes as part of the SES framework. These individuals are entities existing within a "bubble" of their privately-owned land and in the greater area of their and rural communities rather than being part of a larger Regime. Interviews with these individuals reveal how beneficial innovations emerge from their involvement with wind energy development in a rural setting. How wind energy development affects individuals at the Niche-level has not been well-examined in Oklahoma or elsewhere, because most studies focus on the impacts of wind energy development at the county or regional level (Brannstrom, 2015; Brown et al., 2012; Drewitt & Langston, 2006; Kikushi, 2007; Kunz et al., 2007; Lantz & Tegan, 2008; Madsen et al., 2009; Slattery et al., 2011). There is little to no understanding of how wind energy

development affects micro-level processes nor and how a deeper understanding of these impacts could affect an energy transition.

The three levels (Niche, Regime, and Landscape) differ in scale, characteristics, and influence on the transition process, but the framework allows analysis of the factors within and among the levels. For example, by including the influence and interaction of innovative technology, powerful actors, and environments/resources, the MLP framework provides a lens through which to identify the most important factors at play in different places. This broadly-inclusive and highly adaptable framework allows researchers to conceptualize the roles played by technology, and economic, environmental and cultural forces in different places with different characteristics.

1.3 Applying the MLP Framework to Oklahoma's Wind Energy Development Debate

Oklahoma, USA has both a long history associated with traditional, fossil fuel energy production and the potential for a bright future associated with sustainable energy production due to plentiful and persistent wind resources (Ferrell & Conway, 2015). Oklahoma is a predominantly rural state whose primary industries are oil production and agriculture, but wind energy production has increased steadily (Ferrell & Conway, 2015). Annually, Oklahoma now produces over 8000 MW of electricity at 47 wind farms, making Oklahoma the third highest state in the USA in terms of wind power production (AWEA, 2018). Benefits from increased wind energy development include jobs, funding for public education, and improved environmental quality. Wind energy currently provides roughly one third of the state's total electricity generation, a situation which has helped Oklahoma cut its carbon emissions, air pollution, and water diverted for fossil fuel energy production (AWEA, 2018). Oklahoma's current push for more wind energy development is as much a cultural issue as an economic one

(Drummond & Grubert, 2017) because it juxtaposes past and current cultural norms tied to oil and natural gas with current and future cultural transitions to wind. The MLP framework is particularly well-suited to understanding at least part of this transition.

Because this study is concerned with understanding Niche level factors in Oklahoma's wind energy development, those revealed through personal interviews, the Landscape and Regime levels will be described first, setting the stage for the lengthier discussion of the Niche level. The socio-technical Landscape for wind energy development in Oklahoma includes energy-related legislation and economic policies, political ideologies, and social values. As mentioned, Oklahoma is largely rural, and most Oklahomans are politically conservative and staunchly supportive of private property rights (Jones, 2019). One-quarter of the state economy is dependent on oil and natural gas production, so people's livelihoods and values reflect this close association with fossil fuels and the fossil fuel industry (OERB, 2019). Oklahomans generally pay little attention to environmental concerns and are very suspicious of -- or do not believe – the science of global climate change. The reality of more severe and more frequent storm events in the state are passed off as natural fluctuations. Oklahoma is experiencing a rural to urban shift as well as out-migration, and rural communities are declining in population and wealth. Increasing economic insecurity makes many suspicious of the government, especially when intervention comes in the form of wind energy subsidies and utility easements.

At the Regime level, Oklahoma's current institutions favor oil and natural gas production and development and show little or no willingness to publicly support wind energy development. The state has significant wind resources, but most institutional resources and media messaging is centered on oil and natural gas. There have been some attempts to understand and inform the public about wind energy and the wind industry. In 2014, the Oklahoma Commerce Department

commissioned a report on wind energy impacts (Ferrell & Conaway, 2015). However, falling oil prices the next year caused a statewide budget shortfall, and the state's conservative politicians abandoned discussing wind energy development for fear of public reprisal. There are private wind energy companies and non-profit organizations that publicize the benefits of wind energy development in the state, but these voices have been muted by fossil fuel interests and associated political clout (Handy, 2018). Major stabilizing factors within the Oklahoma wind energy development system include limited institutional support, strong cultural and economic ties to the fossil fuel industry, and a lack of possible Niches where innovative technologies can be developed.

Previous research conducted through surveys suggests that the main arguments against wind energy development are nuisance concerns, failure to accept predicted economic benefits, and anger over changes to familiar landscapes or viewsheds (Bell et al., 2005; Brannstrom et al., 2011; Devine-Wright, 2005; Jones & Eiser, 2010; Krohn & Damborg, 1999; Pasqualetti, 2011; Smith & Klick, 2009; Swofford & Slattery, 2010; Wolsink, 2007). These studies are informative but address wind energy development only at the Landscape and Regime level. Not much is known about Niche level responses to wind energy development despite the fact that making a transition to more sustainable energy production systems requires understanding Niche level processes; it is at the place-based level that the transition will be felt most immediately and personally. This study used interviews with local stakeholders where wind farm projects were built or are proposed to be built to understand Niche level factors as part of a successful energy system transition.

Niche level processes are those characterized by the addition of new, innovative technology. Wind turbines, the platforms upon which turbines sit, transmission lines, substations,

and other wind energy-related infrastructure may be considered “new” or “innovative” technology for rural Oklahoma residents and communities where wind farms have been constructed. This is because the rural Oklahomans must create new patterns of behavior and rethink their perception of place in response to the construction of turbines. Farmers, ranchers, and their communities live and work in a landscape transformed at least in part by the visible presence of wind energy development. These people’s experiences are unique, immensely valuable, and an important subset of local opposition described as NIMBYism generally. Insight into how people perceive living with wind energy development and how doing so affects their behavior and attitudes provides Niche level data.

2 Methods: Interviews and the Multi-Level Perspective

In order to explore how wind energy development affects individuals and communities in rural Oklahoma, interviews were conducted with those most directly involved. The interviewees were either landowners or community representatives who live in close proximity to a wind farm, wind energy representatives who often lived and worked within these rural communities and/or individuals who worked in regional non-profit organizations promoting wind energy in Oklahoma. The interviews were a mix of phone interviews and face-to-face interviews, depending on the preference of the respondents. They were conducted using an interview guide selected based on the interviewee’s role in relation to the wind farm. In total, there were three different interview guides, all of which can be found in appendix A.

The interviews were semi-structured, based on the interview guide, and also included a grounded-analysis component that allowed the interviewer to ask follow-up questions when respondents provided novel, outside-the-box answers to open-ended questions (McIntosh & Morse, 2015). Such a methodology provided freedom to explore new ideas and information

learned in the course of the interview while still providing consistency (use of the same framework for comparison) throughout all interviews. After the interviews were conducted, they were transcribed, coded for major themes using an inductive coding process, and then re-analyzed using the data-based codes. Inductive coding relies on the researcher's interpretation of raw data to develop themes by coding similar patterns of responses (Chandra & Shang, 2017). The codes were identified by reading and re-reading the transcripts and then completing a formal coding process on the interview responses to isolate repeated themes. If multiple individuals described similar perceptions of the impacts of the wind farm, these were considered major themes. After identifying the major themes, that same coding was used to categorize similar responses in other interviews.

The data was gathered through 15 interviews with four landowners, three community representatives, six wind farm site-managers and two spokespersons from regional pro-wind non-profit organizations. The sample size was similar to the sample size of similar papers that focused on wind opposition or local level impacts that included interviews with individuals connected to local level impacts of wind energy development, with interviews of ranging between 10-30 individuals depending on the scope of the research (Hall, Ashworth & Devine-Wright, 2013; Mulvaney, Woodson & Prokopy, 2013; Scherhaufer et al., 2017). These papers included not only local landowners and actors, but national level company representatives as well as policy-makers in their datasets. The focus of this research was to examine these local or niche level impacts, so the sample pool was smaller than other research in the field that included individuals from other facets of the wind development process. Oklahoma government representatives and policy-makers were approached for interviews but the responses from them were all were similarly phrased in that they declined the interview as they did not think they had

any information pertinent to the research. The interviews that were general lasted between 25-30 minutes and were focused on getting in-depth qualitative information to better understand the impact of wind energy development on landowners. Interviewees were chosen for use in this study based on their personal experiences with wind energy development generally and an existent wind farm specifically. Missing from the interviewee pool are representatives from anti-wind organizations or government officials involved in some way with Oklahoma wind energy development. Attempts were made to contact such individuals, but invitations to participate were declined or simply not returned. Interviews followed guidelines and procedures approved by the University of Oklahoma's Institutional Review Board. Authorization to conduct the study is found in Appendix B.

2.1 Landowners

The four landowner subjects all had at least one wind turbine on their land, and all had their permanent or primary residence on that same land. This distinction is important, because many Oklahoma landowners either rent their land to other farmers or reside elsewhere, making it unlikely that they could have firsthand knowledge or experience of wind energy development.

2.2 Community Representatives

The three community representatives were chosen because they were civic leaders living in a community (town or city) in close proximity to a wind farm and were willing to be interviewed and participate in this study.

2.3 Wind Farm Representative

The six wind farm site-managers used the title "site-manager" or "local manager" depending on the internal structure of the wind energy company. All site-managers communicated regularly with landowners and most lived in Oklahoma, although not necessarily within sight of the wind farm.

2.4 Non-profit Organization Representatives

The two non-profit representatives were chosen from organizations that had extensive interactions with either landowners who had wind turbines on their land or communities affected by wind farms or both. These organizations work as liaisons between wind farm developers and private landowners and were familiar with local as well as regional or national concerns.

2.5 Snowball Sampling

Interviewees were found using a snowball sampling technique beginning with wind farm site managers, because they had the most visible, public presence. Snowball sampling describes how an initial interviewee is asked to identify another potential interviewee familiar with the topic being studied. The second and third subjects also refer others, thus creating a "snowball" effect whereby more subjects are added to the pool of interviewees (Noy, 2008). Unlike the other respondents, site-managers' names and contact information were available on the internet on the websites of wind energy companies. Site-managers then provided contact information for pro-wind advocacy groups who, in turn, provided contact information for community leaders from communities near wind farms, and from them to individual landowners. The landowners willing to be interviewed as part of this study are private citizens and not easily identifiable without the help of other subjects.

Snowball sampling is considered an excellent means of locating subjects within a target population that is hard to reach, such as individuals within a relatively small field of interest (Biernacki & Waldorf, 1981; Heckathorn, 2011). Snowball sampling makes use of subjects as sources of both information and additional potential interviewees (Biernacki & Waldorf, 1981). However, because all subjects are connected to one another, albeit tenuously in some circumstances, snowball sampling may cause unintentional bias with the sample (Biernacki & Waldorf, 1981; Heckathorn, 2011). Every effort was made to find subjects who might provide

unique and/or contradictory perspectives on wind energy development. As such, three individuals from local communities were contacted who were not closely associated with the wind energy projects. They could not and would not speak to on-land impacts of wind farm projects, but they did provide valuable insight and served as a check and balance to potential bias within the sample.

2.6 Interview Questions

All interviewees within each category were asked the same questions, although there was some slightly different wording between categories. For example, landowners were asked what factors played a role in *their decision* to lease their land for wind turbines whereas site managers were asked what *they believed* were the main reasons *farmers agreed* to lease their land for turbines. The face-to-face interviews were recorded and later transcribed, and an open coding system was used in line with principles of grounded analysis. Previous studies have shown that such qualitative assessments are useful when not much is known about the given topic (D'Souza & Yiridoe, 2014). After initial review of information gathered in all the interviews, major and minor themes were identified. Three main themes emerged from this grounded analysis: (1) economic benefits to land lease holders; (2) mention of new, wind-related infrastructure; and (3) perceived impacts to the broader community. The transcripts were analyzed again by coding for whether these themes were present and how the themes were described. Descriptions of themes may either be positive or negative, or a detailed example of how the theme relates to a respondent's personal experience. As a body of data, the information collected through the interviews served as a rich source of insight into the wind energy debate.

3 Results

Results from the interviews are presented here anonymously. All respondents included in their answers to questions a mix of economic, environmental, and social factors explaining their

relationship to wind energy development. These responses are interpreted as descriptions of Niche level innovations stemming from wind energy development in rural regions. The interviewees describe the unique ways that the wind energy development has affected them. All respondents other than site-managers lived and worked on the land and in the communities where the wind farms are located, so they spoke to their own, personal experiences and perceptions of how they and their communities were affected by the presence of wind turbines on their or their neighbors' farming and ranching operations. To maintain anonymity, the information gleaned from the interviews is referenced only by the category of the interviewee as part of this study: land owner or representative of the wind farm, the community, or a pro-wind non-profit organization.

3.1 Economic Benefits

The most prominent theme or shared experience addressed by landowners was the economic benefit they received from leasing their land to wind energy companies. Landowners compared the chance to lease their land and the resulting wind energy company royalties to "winning the lottery" (Landowner, 2018). One landowner noted, "It's always good to get a check in the mail when you're in the agriculture business," and another stated, "The only negative is that I have to drive half a mile to my mailbox to pick up the check" (2018). None of the landowners expressed concerns about the wind turbines and described the income as consistent and, in some cases, necessary. Landowners with more rugged, difficult to farmland, described royalties as a lifeline at a time when many farmers and ranchers in the region were being forced to sell their land due to drought and economic troubles. The land lease income from wind development made it possible for some landowners to continue farming and ranching. One stated that the royalties "saved his life and his whole family," because he "was about to go broke" (2018).

All landowners expressed a desire to have more turbines on their land, a position supported by site-managers. Site-managers stated that most landowners wanted more turbines, because the land leases were valued as income generators. All site managers indicated that in their experience working with landowners, economic benefits were by far the most important incentive, a sentiment repeated by both representatives from non-profit organizations. One site manager noted receiving requests from landowners almost daily asking that their land be evaluated for possible wind development due to the perceived economic benefits.

None of the landowners indicated dissatisfaction with any part of the wind turbine construction phase or long-term leasing. Two were interested in discussing negative impacts, but when asked to elaborate, they described the impacts as minor annoyances that were solved quickly. One landowner grew frustrated when construction crews repeatedly left a gate open, which allowed his cattle to escape. However, the problem was solved when the site-manager was informed of the situation and alerted his construction crew. This same landowner also noted that he wished the gates in his fencing had been installed elsewhere, but he did not consider it a major problem. Another landowner complained of sensation of flickering light caused by sunlight and shadow sequences caused by the rotating turbine on a sunny day. The landowner discussed the situation with the site-manager and was given the option of having the wind energy company plant trees to shield the house from the lights or to be reimbursed for the purchase of blackout curtains. The landowner chose the curtains and has been content with the solution.

Landowners were aware of and mentioned specifically the nuisance narratives often used in opposition to wind farm development: turbine noise, flickering light-and-shadow, and bright red lights at the top of the turbines. They stated that they get used to the “whooshing” sound and compared it to living next to a train although better, because turbines only make noise when the

wind is blowing (2018). In reference to the red warning lights for aircraft, one farmer said that he and his neighbors joke about "living in the red-light district" (2018). Far from being bothered or even ambivalent to the turbines, many of the landowners indicated a level of comfort and admiration for them, describing them as "beautiful," "like cranes," and "intriguing to look at" (2018). One even went so far as to say he felt the turbines were far more attractive than the oil derricks that he also had on his land. None reported headaches, nausea, or other medical issues connected to wind turbines.

Most respondents did acknowledge that some members of their communities did not like the turbines. Landowners believed the source of such negative comments was jealousy over not receiving royalties due to not responding to wind companies' initial requests for land leases, or because they were never asked to participate in land leases at all. One of the landowners noted that anti-wind community members were the same ones who turned down original land lease offers and now regretted that decision. One landowner described it as "sour grapes" and another stated his unhappy neighbors were "envious" (2018).

3.2 Infrastructure

There are four main components to wind energy infrastructure: roads, platforms, wind turbines, and transmission lines. Wind energy developers need to build roads to access sites where platforms will be built as well as for transporting construction equipment to build platforms, erect turbines, and for long-term maintenance of the turbines. The number and length of roads depends on the orientation of the wind farm, the location of the platforms/turbines relative to existing roads, and the number of turbines to be constructed. Roads are usually one-lane gravel or other unimproved surfaces that lead from landowners' driveways and other access roads to each platform. In some cases, pre-existing roads are simply lengthened, widened, or

resurfaced to accommodate equipment needed for construction and maintenance. Except for transmission lines that cross non-turbine land lease properties, all infrastructure is located on the property belonging to the wind turbine land lease landowners.

All lease holders involved in this study used their land to grow crops, raise cattle, or both. In other words, there were no land leases on property used for commercial or industrial purposes. Generally, lease holders had positive perceptions of the new infrastructure on their land. Cattle ranchers noted that the new and/or improved roads helped them move livestock from place to place on the ranch. This was particularly true for land-owners with large ranches or whose land was otherwise difficult to cross with a vehicle due to rough terrain. Others noted that the new roads made herding their cattle easier because it could be done by car or truck rather than on horseback. A landowner stated that before the wind farm, "I always had to find a horse. Now, I can check on them (his cattle) in my car" (2018). He was especially happy about this because he was getting older and climbing into his car was a lot easier than saddling and climbing onto a horse. Another landowner appreciated the gates installed in fences crossed by the new roads. The new road-fence-gate configuration allowed him to not only move his cattle on the roads but caused no disruption to his routine. He could still move his livestock to the same pastures he did before the turbines were erected.

A wheat farmer noted how the new roads allowed him to transport his machinery through his fields without leaving tracks and destroying crops. And, because he was being paid for the land now being used for roads, he enjoyed the benefit of easier travel in his fields without loss of income for that land being removed from production. One site manger noted that one of the landowners had incorporated the roads into a controlled burning land management system, using the new roads as a fire break to better manage his burns. Overall, the new roads created a more

efficient way to care for livestock and move farm machinery without relying on more physically demanding means such as walking or riding horses, a growing concern for many older farmers and ranchers.

The platforms built during wind turbine construction were also discussed by landowners. Beneath every turbine is a 60 x 60 square foot platform that serves as the footing for the turbine and related mechanicals. Many ranchers mentioned using platforms as a distribution site for cattle feed in winter or during droughts. One rancher noted how easy it was to drive his truck up to the base of the turbine and lay down feed. He continued to say that his cattle grew accustomed to this routine and would stand and wait at the platform during feeding time, exhibiting no fear or signs of pain due to the windmills. This sentiment was echoed by other ranchers who noticed that once their cattle got used to the turbines, the animals ignored them, often congregating in the turbine's shade on hot summer days when there was no other reprieve from the sun. Another rancher stated other wildlife made use of the shade, and he had seen foxes and deer lying in the turbine's shadow on hot summer days.

In sum, in terms of roads, platforms, and turbines as wind farm-related infrastructure, respondents were overwhelmingly positive and singled out the new gates as particularly beneficial. None of the community representatives, however, mentioned anything about infrastructure, whether positive or negative. This suggests that although problems with infrastructure is an oft-repeated theme in anti-wind campaigns, the idea is not supported by interview evidence in this case. Those most closely involved, the lease holders, have only positive things to say about wind energy infrastructure, and their neighbors and members of their communities do not mention infrastructure at all.

3.3 Impacts to Community

Community response to local wind energy development revolved around two major topics as revealed in interviews with community representatives, site-managers, and non-profit organization representatives. These major topics were how the wind farms affected public schools and the unfairness that some community members were chosen to have turbines installed on their land and others did not. Some landowners addressed the question of how they (landowners) thought their communities felt about the wind farm (described below), but the theme of impacts to the community emerged primarily from interview information from respondents other than landowners. Site-managers' comments were often at odds with comments from representatives of the communities and non-profit organizations. Three of the four site-managers lived in the same communities as the wind farms, and they believed that the community generally supported the wind farm and saw it as a benefit. Two of the three community representatives, however, stated that their communities saw no positive impacts apart from an increase in school funding.

Everyone – site-managers, community representatives, organization representatives, and, to some extent, landowners – agreed that wind farms benefitted local schools financially, mostly through an increase in property taxes but also through school program sponsorship; both paid for by wind energy companies. Everyone mentioned the *ad valorum* property taxes paid to the school districts, all of which were rural schools, and many are on a state formula for underfunded schools. One site-manager pointed out that beyond the increase in tax revenue, his wind energy company sponsored programs such as The KidWind Challenge, a nation-wide competition for students to use their imagination and household materials to design the most efficient wind turbine system (KidWind Project, 2019). One Oklahoma school has made it to the competition's national level several years in a row. Reaching the national level has become a source of pride

for the students' communities and is an example of the grassroots investment some wind farms make in community outreach. Some of the Oklahoma wind energy companies sponsor recycling programs and local Earth Day events through the public schools.

Most of the landowners indicated in some way that the impact to schools was important to them, for example, because they had grandchildren in these schools, and they worried the schools would close due to budget constraints. In some school districts, increased tax revenue from wind farms improved school infrastructure. One mentioned specific buildings including a "domed shaped tornado shelter than can fit all the kids in the school", which "also doubles as a basketball court" (2018). Another described the new gym and school sign outside the local high school.

The second topic addressed in the general field of impacts to the community is the unfairness or unevenness of benefits. In other words, the underlying assumption is that wind farms produce economic benefits, but these benefits are not distributed equally among members of the community or even among communities generally. Some landowners choose to spend their land lease money close to home in their local communities, while others do not. Economic benefits are seen to come most often to communities closest to the wind farms, though the impact of the money is not always meaningful. One community representative remarked that there was no visible economic impact in that particular town, probably because the town is so small and the surrounding rural region is underpopulated. The rural landowners often have few places to spend their money, so they go to the rural towns near them. However, most acknowledged that there are community level benefits to rural schools and perhaps roads adjacent to the wind farms and during the construction phase when workers stay in town, purchasing meals and lodging.

Another respondent, a landowner, however, noted that his town had benefitted greatly stating, “I can’t find any help now, because the kids who used to work for me for minimum wage now have good jobs in the windmills” (2018). He continued, “These kids, they used to just drive old used rattletrap pickups. Now, they’re driving brand new ones!” (2018). All respondents indicated that it was primarily the landowners and only the landowners who saw real financial benefits, although one landowner did note that the wind farm jobs were benefitting his town.

Unlike the other respondents, community representatives described the economic benefit to rural schools as the only community level impact. They did not see any real economic, social or cultural change from wind energy development. Site-managers and organization representatives suggested that it is simply any change, whether to the landscape or to the community, that might cause ill will within the community. For example, addressing the issue of wind turbine noise specifically, one respondent stated that “some people hate hearing them and looking at them, and other people love hearing them and looking at them” (Site Manager, 2018). A site-manager summed up his perception of the community’s response: “Some people get it in their head that there’s an issue” (2018). Speaking from the perspective of being both a site-manager and member of the community, this respondent said he knew there was little that might change some people’s minds.

Oklahoma’s Wind Catcher project would have been the largest wind energy operation in Oklahoma if it been built. Assuming the project would be approved and constructed, surrounding communities began preparing rental units and improving their streets and businesses in anticipation. Wind catcher was not built, but the communities’ response is evidence of the implied economic benefits to rural communities associated with wind farm construction.

4 Discussion

In the MLP framework, Niches are where new technologies are created and deployed as sustainability experiments; Regimes are where current institutions and cultural values act to stabilize society; and, Landscapes are the broadest trends of society including policies and ideological contexts (Gliedt & Larson, 2018). The experiences shared through the interviews reveal a series of positive interactions between the Niche and Landscape levels within the rural Oklahoma system. This indicates that wind energy development impacts the broader social and cultural contexts of the areas where they are developed. The data collected in these interviews suggests that economic benefits to landowners and rural school districts lead to changes in the broader contexts in the rural communities including the increased resilience of landowners to climatic and economic factors and increased income for rural school districts. This suggests that niche experiments focused on rural wind development strategies are generating benefits for the specific socio-economic system that wind energy development occurs.

The increased tax base in rural counties leads to significant economic benefits to the rural school districts, impacting the broader economic resources of the rural communities with wind energy development. Those interviewed provided specific examples of how the increased economic resources impacted the schools: additional infrastructure and the creation of successful after-school programs. There are few other options for increasing the tax base in rural counties, which makes the impact of wind energy development an innovative and critical way to increase funding for these districts. The interactions between these niche innovations and the broader socio-economic processes in these rural school district results in positive effects. In some ways, these sustainable niche experiments are counteracting the issues caused by out-migration and a declining economic base in communities with close proximity to the wind farms leading to spatially specific Landscape changes as a result of wind energy development.

Innovative uses of wind energy development infrastructure to feed livestock or using the new roads to contain prescribed burning are outside the original envisioning of the purpose of the construction of the turbines. However, these along with the income generated from land leases are expanding how wind energy development impacts the rural ranchers and farmers leasing land. These innovations prolong the ability of a rancher or farmer to continue their livelihood by providing consistent income during periods of drought or decreased farm productivity. This can impact the rural agricultural Landscape as the socio-economic context of the region changes. The Niche level behavioral innovations are impacting the larger cultural Landscape in these rural communities, by allowing ranchers and farmers who lease their land to adapt their methods, increasing their resilience to climatic and economic factors.

Apart from the positive economic benefits to local schools, Regime level political and governance systems show a lukewarm response to wind energy development. Often, the governing structures are unwilling to create or extend policies that would encourage wind development. This slows the transition process. Regime level political actors are one step removed from the landowners and even rural communities affected directly by the new technology. They are also heavily entrenched in the current oil and natural gas-based energy production and economic system. Without support from the current governing structures, the scale of the innovations is relatively limited. As revealed through the series of interviews, apart from the impacts to schools, most of the innovations occurred at the individual level with little impacts to the surrounding community. Without either an expansion of regime level support for wind energy development, or greater awareness of the positive effects, local level forces will remain dependent on the current energy production system.

The statewide dependence on oil and natural gas as an economic driver and the intertwined relationship between fossil fuel interests and the Oklahoma government are all likely slowing the transition process. These are deeply entrenched both economic and cultural values, as the state of Oklahoma has been reliant on oil production since before its statehood. The Regime level forces are focused on maintaining the current energy status quo and will remain so without meaningful disruption. To this end, the innovations found through the interviews are not currently interacting with Regime level forces, in part, because they are not being effectively communicated. The information shared by Regime level wind advocacy groups often includes general environmental and economic impacts. However, including the more specific examples like the landowner and community specific ones presented here can be used to more effectively advocate at the Regime level adding needed pressure. The Niche level experiments with wind energy technology and infrastructure changes need to be coupled with Regime level messaging about how wind energy development effects communities in order to help mitigate oppositional forces that frame wind energy development as a threat to rural communities and their way of life. These adaptations should be included in robust narratives from advocacy groups in order to increase the rate of change at the regime and landscape level.

For the modern world to undergo a socio-technical transition from regimes dependent on global climate-altering fossil fuels to regimes dependent on renewable energy sources, new and innovative technology must be allowed to develop at the Niche level and become acceptable at the Regime level. This is particularly important in places like Oklahoma, where the current energy production system has deeply entrenched stabilizing forces and power dynamics that do not encourage innovative changes. If a global transition is going to occur, then even places within more conservative Regimes and Landscapes need to be actively engaging in sustainable

innovations and the transition process. By actively engaging oppositional forces and groups with Niche innovations that show examples familiar to rural communities are more persuasive and therefore effective, advocacy for wind energy development could occur. The destabilizing forces caused by interactions between Niche and Regime levels can become more effective in pressuring stagnant Regime structures and policies to promote a transition. By combining niche experiments focused on wind technology and infrastructure with regime changes focused on policy, governance, political, and cultural changes, sustainability transition experiments (Williams and Robinson, 2020) can have a better chance of succeeding by overcoming barriers to change and building momentum towards sustainable development outcomes.

5 Conclusion

This study provides a detailed glimpse into wind energy development in rural Oklahoma. Other studies using generic surveys of public opinions regarding wind energy development generally do not provide the individual and personal level of place-based analysis. In Oklahoma, the socio-technical Regime is driven by customs, habits, and the stabilizing power of entrenched social, political, and economic interests associated with the fossil fuel industry. But, as this study shows, the arguments based on intangible benefits of a future society based on renewable energy are not as convincing as the tangible benefits they experience today. The benefits of wind energy development, as described through interviews, focused on economic and agricultural innovations, not environmental ones. These interviews show that at the Niche level, where wind energy technology experiments take place, landowners support wind energy development. These innovations are impacting the rural Landscape, though they lack the power to overturn current energy production systems that are limited by the Regime level forces. Positive innovations such

as land lease payments and their personal experiences adapting new infrastructure on their property to their advantage and improving their communities could lead to systemic change.

The inclusion of these very local or individual innovations can be highly beneficial to the transition process and these experiences and innovations need to be added to the current discourse surrounding energy transitions. By using local and individual experiences, more localized or place-specific innovations can be analyzed, providing needed inclusion of place-based variables into the transition process. This can be beneficial to the transition process, as the localized experiences can heavily influence support for (or against) sustainable energy production development (Binz et al., 2020; Devine Wright, 2005; Murphy, 2015). Resistance to change can be weakened with the positive inclusion of localized impacts and experiences as these unique experiences often better reflect the regionally relevant social values and cultural shifts (Binz et al., 2020). A more robust discussion of place as a lens to analyze and promote transitions could better frame how the local or regional scale factors impact larger scale decision-making. For example, incorporating how rural residents have adapted and even benefited from novel and innovative uses and experiences of wind energy development could be beneficial to often antagonistic siting discussions. Providing specific examples of how other rural communities or rural Oklahoman ranchers and farmers have benefitted from wind energy development makes the expected changes less threatening and the benefits more relatable to the individuals and communities unsure of what to expect. Wind farms may slowly come to replace oil derricks on the Oklahoma landscape if these experiences are communicated to the correct audiences with the correct form of messaging. A deeper understanding of how wind energy development impacts individuals and communities in ways that matter to them is a key step to a sustainable energy system transition.

CHAPTER FIVE: CONCLUSION

1 Introduction

Global climate change is disrupting environmental and social systems all around the world, and fossil fuel-based energy production is a major source of the carbon emissions causing climate change. Therefore, transitioning to renewable energy systems is key to mitigating global climate change as well as creating more sustainable societies in general. Renewable energy production generates electricity with lower or no carbon emissions and also has fewer detrimental environmental impacts. The transition to renewable energy systems is already taking place in different parts of the world, and general support for renewable, alternative energy development is high. But, there are significant political, economic and social barriers slowing such progress (Lagendijk & Verbong, 2012). These barriers are often characterized as NIMBY situations, and analysis typically stops there. In most cases, it seems the NIMBY label is enough to conclude that barriers are the result of human nature, cannot be better understood, and are ultimately insurmountable. The research conducted in this dissertation, however, shows that, sometimes, NIMBY is too simplistic a description of barriers, and a better understanding of the barriers themselves as exceptions to NIMBY provides fertile ground for finding ways to transition to renewable energy systems. Instead of NIMBY as a framing tool, other lenses to frame and characterize opposition to wind energy development should be explored. This dissertation examined wind energy development in Oklahoma using three separate frameworks that allowed the analysis of wind energy opposition through the lens of regional and local factors such as narratives and individual experiences.

In the second chapter, narratives on wind energy development were explored and the resulting anti- and pro-wind narratives were analyzed and compared. The major difference in

narratives between the two sides was the inclusion of local voices and values in the anti-wind narratives which resulted in a more targeted and more convincing narrative. The third chapter revealed how defense of these local values lead to the rejection and ultimate demise of the Wind Catcher project. The project's owner, AEP, failed to address local concerns and fears that easements for transmission lines were eroding private property rights as well as suspicions that the promised future energy prices were not true. AEP was unable to convince the local population that positive, future environmental outcomes should outweigh their more immediate and personal negative perceptions of wind farm development. In Chapter Four, interviews revealed local and individual responses to actual wind farms, and most of them were positive. Data derived from individuals, rather than third-party narratives, showed that land owners found unexpected, here-to-fore not mentioned uses for wind energy infrastructure. Their experiences can be described as generally positive, especially in terms of the economic benefits of lease royalties and show that there are powerful, personal arguments that can be made in pro-wind narratives beyond those arguments linked to environmental benefits.

This dissertation investigated wind energy development in Oklahoma from different perspectives, at different scales, and using different methods of analysis. Three major conclusions can be drawn, each of which is discussed in more detail below. First is that narratives are an important means of communicating ideas, positions, and arguments in the wind energy debate, and anti-wind narratives are more effective at swaying local public opinion than are pro-wind narratives. Second is that those most directly affected by wind farm development see the wind farm as a net gain rather than loss. Third and finally, people and place matter.

1.1 Effective narratives

Given that narratives are a form of communication intended to persuade, both pro- and anti-wind positions are presented to the public through narratives. The Narrative Policy Framework used here was especially helpful, because the framework was created specifically for research into political and on-line narratives, both of which apply here. Analysis shows that anti-wind narratives contain messages that stymie wind farm development, and, in Oklahoma, these narratives are often supported by groups or individuals with interests in oil and natural gas industries (Monies, 2017). According to my research anti-wind narratives are much more effective than pro-wind narratives in stating their case in such a way that leads to action. Anti-wind narratives describe what is being lost, whose fault it is, and how the situation can be remedied through place-specific and clearly-defined heroes, villains and victims. Their message is personal and place-specific; therefore, it is relatable and targeted to its Oklahoma audience. Anti-wind narratives paint a picture of sympathy and empathy for the victims (Oklahomans living in those communities slated for wind energy projects), name the villains (wind energy developers or their projects), and provide instructions on how to be the hero (pushing back against wind farm projects or wind energy subsidies).

Using this information can help the pro-wind position create more effective messaging. Most pro-wind narratives are generic and globalized; they speak to the general good and the welfare of future generations but lack an explanation of who will benefit today. The research conducted here suggests that if pro-wind narratives identify and then address the immediate, personal, and place-specific benefits of wind energy development, their message would be more effective and gain traction against the anti-wind narratives.

1.2 Net benefits of wind energy projects

Most studies investigating people's perception of renewable energy do not rely on interviews with people affected by actual – or proposed -- wind farms (Enevoldson & Sovacool, 2016; Jobert et al., 2007). This dissertation included interviews analyzed through the Multi-Level Perspective framework to provide insight into what is often missing in other studies. Data gleaned from interviews suggests that although oil and gas interests are entrenched at the Regime-level in Oklahoma, there are Niche-level innovations that provide individuals and communities with numerous benefits. These benefits are not purely financial but also create positive opportunities that make daily chores more time-efficient and less physically-demanding. Platforms were being used as staging areas for feeding cattle, and new roads and fencing eliminated time-consuming travel on horseback. These highly-local benefits are reaped by rural communities and individuals located in close proximity to wind farms. Naming the communities (and even individuals, with permission) as Beneficiaries and the wind farm as Hero is one way for pro-wind interests to counter the anti-wind narrative Villain-Victim-Hero argument and paint a picture for a pathway forward as part of a system-wide transition to renewable energy production in Oklahoma.

1.3 Place matters/local support key

The third major conclusion drawn by this research is that if a transition to renewable energy societies is to take place, local people must be involved in the process and the unique cultural and environmental conditions of each locality where new energy development projects will be built must be taken into consideration. Place is an important and valuable concept and needs to be included in the energy development process. Bringing an actual wind farm on-line requires local support regardless of how popular wind energy is at the national or international scale (Frondel et al., 2009). Here, Ostrom's Socio-Ecological System framework was used to

make sense of social comments associated with the failed Wind Catcher project. The analysis revealed that people's fears over the possibility of specific, personal, negative outcomes outweighed their approval of unquestionable, verifiable positive environmental outcomes. In particular were the perception of loss of control over the use of their property by transmission line easements and uncertainty of future energy pricing. The good news is that most, if not all, perceived concerns can be addressed and solved or mitigated with open lines of communication and financial considerations. The failing of the Wind Catcher project exemplifies this as it shows that unaddressed local concerns can fuel patterns in pushback. The lack of engagement with local concerns creates windows for negative narratives to take hold and these can be powerful- especially if they engage with local concerns. Place-based values are necessary towards developing a smoother and more successful renewable energy development process.

2 Research Questions

2.1 Narratives: This dissertation shows that different narrative structures have different abilities to be functional, especially in a local setting. Anti-wind narratives created fully developed narratives that appealed to place-based values and local concerns that strengthened their power in the local rural communities that are affected by wind energy development in Oklahoma. Pro-wind arguments often lack key parts of narrative structure, making them less persuasive and more informative.

2.2 Public Perceptions: In Oklahoma the opposition to the Windcatcher Project from individual Oklahomans and communities was focused on the shared past experiences and value of place. The lack of trust caused by previous experiences with energy pricing instability as well as more socio-cultural values led to general public concern and distrust for the project. Responses to the project relied on themes present in anti-wind narratives including cost concerns, property right

violations and little to no discussion of the environmental benefits gained by wind energy development.

2.3 Interviews: The landowners and communities impacted by wind are experiencing adaptions, change and benefits not seen in most advocacy discussion on wind energy development. These local and individual level impacts need to be better incorporated into discussion of wind energy in order promote wind energy development in a way that matches the local concerns that dominate wind energy opposition.

3 Policy Implications / Suggestions

This dissertation suggests that the adage, "All politics is local," applies to sustainable energy development. Local factors affecting narratives and perceptions surrounding wind energy development are more important than promises of a cleaner environment and slowing of global climate change. Further, there is no single framework that will address satisfactorily the many unique ways different communities contextualize their opposition to wind energy development. Perhaps this is why the importance of the small or local has been discounted in favor of attempts to frame opposition more broadly. Some scholars have noted the lack of understanding of geographic "place" as a factor in current sustainability frameworks (Binz et al., 2020), and moving in this direction is a positive step. A new approach that recognizes the local uniqueness of opposition narratives is needed so that the concerns and experiences can be understood and addressed. This dissertation makes three policy recommendations for a successful path to sustainable global energy production and for the implementation of wind energy development in particular in local places.

First, any wind energy development project should start by reaching out to the community or communities that will "host" the wind energy development and actively engage with them. This

engagement should be thorough, transparent, and unhurried and can take place through town hall meetings and/or focus groups and might even include personal interviews. An in-depth and meaningful understanding of the community's values, concerns, and fears must be secured first, before any public announcement of the project is released.

Second, initial and subsequent engagement and interaction with the communities should address factual and specific benefits to individuals, the community, and larger region involved in and affected by the proposed wind energy project. In so doing, project leaders gain insight and understanding of local values and experiences. These, in turn, can be used to create focused, true, and even poignant narratives about how wind energy development could benefit each community. Assuming from the start that opposition narratives will be framed as Villain-Victim-Hero scenarios, detailed and intimate knowledge of the specific communities affected by the wind farm can help allay fears and negate opposition narratives before they take hold.

Finally, include in the message an explanation of the greater good, the broad benefits to the environment, the region, and future generations alongside local benefits to rural communities and local individuals. Understanding that local values and incentives are paramount should not negate also including information about global goals for sustainable development. Bringing future generations and participation in a global movement into a conversation about local benefits may help bring local politicians on board, because they will have talking points for speaking to constituents and stakeholders. Changing the current political Regime begins with reducing their power with sound economic arguments that also reveal an understanding of local, place-based concerns and conditions.

Wind energy development is just one part of moving toward a more sustainable energy production system. This dissertation shows that the power of place can determine either success

or failure for sustainable energy projects. Respect for "place" should be a pillar of sustainable development. If local individuals and their communities feel that their needs, opinions, traditions, and values are respected and are taken into consideration, global goals are validated, too. Future research needs to focus more deeply on how the inclusion of local elements affects the acceptance of renewable energy development. Perhaps, due to the global challenge of dealing with climate change, current research and development plans have focused on largescale impacts and general patterns of resistance. This ignores the power to motivate-to-action of local concerns and place-attachment values.

In 2020, at a time when information, whether factual or not, may be created and shared in seconds, a rethinking of how energy development engages with communities is needed. The globalization of information generation and distribution has made telling the best story to the right audience incredibly important. Opponents of renewable energy have managed to refine this process and create persuasive place-specific narratives. Proponents of renewable energy and sustainable development in general need to rethink how they engage with the non-scientific community. This can include facilitating conversations and discussions where energy developers listen to and are respectful of local points of view. This dissertation shows that it is at the local level where power to change the future lies. Dismissing opposition arguments, no matter how outrageous or incorrect, without local engagement does not stop these false arguments from affecting individuals' perceptions of wind energy development. In our increasingly smaller and more-crowded world, it is easy to forget the power of local and place-specific concerns. It is even easier to dismiss them as one-dimensional arguments against change or uncertainty, NIMBYism, but by giving them the attention they deserve, barriers to a more sustainable future can be overcome.

APPENDIX A: INTERVIEW GUIDES

Interview Guide: Farmers

1. How did you first learn about the land leasing process for wind farm development on agricultural land?
2. Is it common to be approached by a company or do farmers actively pursue a land lease?
3. Why did you/famers agree to lease land to a company building a wind farm?
4. How long have the wind farms been on your land?
5. What aspects of wind farm development are emphasized to encourage land leasing?
6. What environmental factors (if any) did you take into account when considering leasing your land?
7. How long is the lease on your/the farmers land?
    a. Do you wish this was longer/shorter? If so why?
8. Do you see water scarcity as a current problem? One that may occur in the future?
9. What is your major water resource/major water resource for those with wind farms?
10. Would you consider this resource a healthy or robust resource?
11. Are you aware of any policies or programs to conserve this resource?
    a. If so, do you believe they are effective?
12. Have the land leases changed your concerns about water/resource use on your farm?
13. Have you changed your resource use since the wind farm was completed?
    a. If so how and why?
14. Does the wind farm have any negative impacts on your farm?
    a. If so how and why?
15. Have the land leases impacted how you invest in your farm?
16. Does the addition of wind farms on agricultural change any method of farming you/farmers use?
    a. Have you/farmers let land go fallow or change crop types/livestock type due to wind farm development?
17. What if any long term impacts do you expect wind farm development on agricultural land to cause?
18. Did you expect these changes, were these changes part of the reason that wind farm development was allowed/encouraged?
19. Do you think wind farm development is changing rural agricultural communities? Or could it in the future?
    a. If yes, in what ways is it/could it cause change?
20. What type of policies do think would encourage more rural wind development?
21. Are any of these already being considered?
22. Do you ever contact your local representatives about advocating for wind development?

Interview Guide: Wind Industry Reps

1. How do you determine which landowners you will approach for a hypothetical land lease?
    a. What is your 'success rate' so to speak of acceptance of land leases?
        i. Why, do you think, people say no?
        ii. What reasoning brings them to say yes?
2. Do you see wind energy development increasing the next 25-50 years?
    a. What could slow or speed up this development?
3. What benefits other than income, have you seen in the areas where you have built wind farms?
    a. Do you notice any changes to agricultural land?
        i. In terms of fallow fields, crop choice or other changes to the farming process?
4. What aspects of wind energy development do you emphasized when approaching a landowner about a wind farm lease?
    a. Other than income, do you discuss environmental concerns?
    b. Do socio-cultural concerns impact decision-making processes surrounding wind farms?
5. Do members of the agricultural community generally support wind development?
    a. If so, why?
    b. If not, why
    c. Are there differences between general groups who support wind and not?
        i. Ideology, industry, urban vs rural, young vs old ect

Interview Guide: Policy-Makers

1. Are you happy with the level of wind development in your district?
    a. If so, why
    b. If no, why?
    c. What has led to this development, any policies or constituent efforts?
2. What impacts have you seen due to wind development?
    a. How large is the financial impact?
    b. Do you hear about any other impacts, particularly from rural farmers that aren't financial?
        i. If so, what?
3. How would you characterize the discussions from constituents who support wind development?
    a. What are there major concerns or narratives? Why do they support wind?
    b. What are the advantages they see in wind development?
4. How would you characterize the discussions from constituents who do not support wind development?
    a. What are their major concerns or narratives? Why don't they support wind?
        i. Could anything change to make them support it?
        ii. What are the major disadvantages in wind development?
5. Do you see wind development increasing or decreasing in the next 25-50 years?
    a. What could be done to increase or decrease development?

APPENDIX B: INSTITUTIONAL REVIEW BOARD DOCUMENTS

The UNIVERSITY of OKLAHOMA

Institutional Review Board for the Protection of Human Subjects

Approval of Initial Submission – Expedited Review – AP01

Date: February 19, 2018 **IRB#:** 8875

Principal Investigator: Caroline E Pavlowsky **Approval Date:** 02/16/2018 **Expiration Date: 01/31/2019**

Study Title: Wind Farm Development on Irrigated Lands: Strategies for Mitigating Water Scarcity in Semi-Arid Agricultural Regions

Expedited Category: 6 & 7

Collection/Use of PHI: No

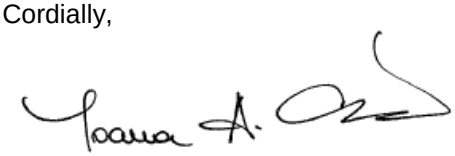
On behalf of the Institutional Review Board (IRB), I have reviewed and granted expedited approval of the above-referenced research study. To view the documents approved for this submission, open this study from the *My Studies* option, go to *Submission History*, go to *Completed Submissions* tab and then click the *Details* icon.

As principal investigator of this research study, you are responsible to:

- Conduct the research study in a manner consistent with the requirements of the IRB and federal regulations 45 CFR 46.
- Obtain informed consent and research privacy authorization using the currently approved, stamped forms and retain all original, signed forms, if applicable.
- Request approval from the IRB prior to implementing any/all modifications.
- Promptly report to the IRB any harm experienced by a participant that is both unanticipated and related per IRB policy.
- Maintain accurate and complete study records for evaluation by the HRPP Quality Improvement Program and, if applicable, inspection by regulatory agencies and/or the study sponsor.
- Promptly submit continuing review documents to the IRB upon notification approximately 60 days prior to the expiration date indicated above.
- Submit a final closure report at the completion of the project.

If you have questions about this notification or using iRIS, contact the IRB @ 405-325-8110 or irb@ou.edu.

Cordially,



Ioana Cionea, PhD
Vice Chair, Institutional Review Board

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