5-28-2019

Graceful Infrastructure: Harvesting America's Wind Corridor

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Portland State Urban Honors College – Spring, 2019
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Abstract

The central purpose of this thesis was to identify how the choices made by wind farm developers lead to backlash from local community members, focusing primarily on a resistance mentality referred to as NIMBY (Not In My Backyard). The goal of this discussion is to offer wind farm developers a medium by which to understand the causes and concerns of the NIMBY movement, as well as what steps can be taken to address or prevent these issues. Research was pursued by selecting a number of wind farms and searching for correlations between technical specifications and political backlash. By first collecting characteristic information of these wind farms (budget, type/number of turbines, etc.) and then reviewing publications about NIMBY opposition regarding the particular projects that were selected, this thesis was able to identify three primary considerations for wind developers. Firstly, an open, ongoing dialogue with local residents allows for a sustainable community-facility relationship and helps to foster grassroots reinforcement of the entire wind industry. Secondly, ecological considerations should be accounted for before and during development, and just as consistently throughout commercial operation. Lastly, location and configuration of the turbine field should offer a balance of employee accessibility and seclusion from residential populations.

Research Question

The first step in the process of building this thesis was choosing a subject matter. For a substantial period, the intention was to form a project that would target the communication gap between the technical implementation of renewable energy infrastructure and the political climate surrounding development of such infrastructure. This particular approach to the issue of climate change has been a central concern of mine as I learned of the variety of positions that surround climate change in general. Throughout my K-12 education, I continued to learn more about the climate crisis, paralleling the development of my physics and mathematical knowledge. Observing the incongruities between the capabilities of clean energy infrastructure technology and the actual rollout of such technology led to the gradual realization that there exists a substantial barrier between the scientific community and the general public, particularly on the issue of climate change. The dawning of this information demonstrated to me that there exists a deficit in the science-based communities, not in terms of technical skill, but regarding the ability to constructively communicate.

Working to resolve this issue by combining my scientific education with my

interest in social and political dynamics has been an ambition of mine since entering the realm of higher education. I felt that my honors thesis would be an ideal platform for demonstrating this intent. However, the general observation previously outlined is so broad that, in a practical setting, it is addressed by teams of interdisciplinary experts focusing their entire careers on specific aspects of the communication issue facing the sciences. Such an expansive topic is not realistic for the subject of an undergraduate thesis, and thus needed to be narrowed down.

Wind farming in the plain states became the intended subject of my thesis after I had a conversation with Casey Tiley concerning his 12 years of work in the wind industry. During the discussion, he brought to my attention the degree of opportunity for wind farming in the plain states. After we spoke, I began to consider that, while the plains offer a topographically ideal setting for wind farming, the overwhelming social dynamic of the region carries an underlying mistrust of climate science and renewable energy.

Although I primarily identify with a scientific understanding of issues such as climate change, I spent the first eighteen years of my life in Ohio frequently observing discourse between individuals with highly conflicting viewpoints, climate change being a recurring subject of these discourses. As such, the concerns and arguments of individuals in the plains region who oppose renewable energy infrastructure are not foreign to me. I feel that this experience offered me a context which allows me to approach politically charged scientific issues with a willingness to take steps in understanding opposition to ideas that I personally take to be fact. I feel that effectively wielding such context is important to bridging the communication gap surrounding the highly politicized and polarized issue of climate change.

Narrowing down my focus from sustainable energy to Great Plains wind farming was helpful in directing my research, but my overall research goal remained too general. Regardless of how black and white any given issue is painted, it will still harbor a gradient of nuanced opinions when it comes to individuals. This fact makes it difficult to form a concise dialogue that is capable of covering such a wide array of topics. For this reason, I honed my focus on the Not In My Backyard mentality, often referred to as NIMBY.

NIMBY is the most organized anti-wind infrastructure movement that is widely documented, presenting a substantive bank of research information concerning the subject. Furthermore, having been raised in a cultural environment in which landowners' rights enjoy a similar degree of respect and protection as those in the Great Plains, I am particularly keyed in on how this social focus shapes policy & infrastructure in these regions. My perspective allows for an acceptance of elements of both polarized stances on local sustainable development, a subject matter that requires significantly more complex discussion than "pro-" or "anti-". This research was designed to help fill in the empty space in understanding between those two oversimplified responses to wind farming.

Brief History of the Great Plains

The American Great Plains (also referred to as The Great American Desert) is a region of the United States that includes 10 different states and spans about 500,000 square miles [3]. Early European settlers did not have the same relationship with the ecology of the region as the Native American tribes that had previously inhabited it. As many of these tribes were wiped out by the end of the 19th century either during military invasion or from foreign diseases like smallpox, their agricultural practices were never understood or adopted by the eastern settlers. This led to disastrous overgrazing and unsustainable farming practices that left the entire region barren by the 1930's. Land which had sustained hundreds of thousands of people for roughly fifteen millennia. Such depletion, combined with a series of severe droughts throughout the decade resulted in an environmental, social, and economic crisis for the United States, substantially contributing to the conditions of the globally catastrophic Great Depression.

While the soil of the plains has lost its pre-settlement fertility, the region offers an ideal platform for the harvesting of a resource that cannot be depleted: wind. A majority of the topography of the Great Plains fosters high, strong, consistent winds that are ideal for engaging wind turbines. A significant investment in the development of wind farms throughout the Plains is the current best option for revitalizing a large portion of the United States that has not experienced long-term sustainable land use at any point in its history as part of the country. In addition to the energy that can be generated in such an expanse of unused land, large scale wind farming projects offer thousands of jobs for surrounding communities, with the wind industry projected to support 600,000 jobs by 2050 (department of Energy study).

Kansas

The first project researched in this process was the Meridian Way wind farm in Cloud County Kansas [4]. This facility was chosen due to the degree of landowner involvement that the developers established. A man named Jim Roberts was selected to seek out usable land for the Meridian Way project. The farm was originally intended to be built in the Flint Hill of Kansas, which sustain high winds and a close proximity to Kansas City offering a massive energy demand. Roberts is cited as having refocused his search as a result of local NIMBY backlash in the area.

In an effort to address NIMBY controversy, the then-governor of Kansas Kathleen Sebelius established the Wind & Prairie Task force in 2004, which offered specific land use guidance for wind farm developers. Whereas many wind projects were slowed by the process of waiting for the task force's recommendation, Roberts and his team shifted there pursuits to Cloud County, an area which they knew shared similar topographical qualities to the Flint Hills but have far less political division surrounding wind farming.

Although Cloud County residents were not as directly charged by NIMBY sentiments, they were still rooted in traditional agrarian pragmatism & a laisse-faire attitude about government regulation. Roberts was able to acknowledge this fact early into the process of scouting Cloud County. In order to avoid a similar experience to that of the Flint Hills, he

decided to initiate the process by directing his focus on local residents. His first prominent step was making contact with local landowner Kirk Lowell, who run's Cloud County's economic development corporation, CloudCorp. This first contact with Lowell allowed Roberts to get his foot in the door with community, and established a locally reinforced foundation for the Meridian Way Wind Farm.

Prior to development, Roberts organized a meeting for invited landowners of Cloud County. In this process, he explained that Zilkha, the project's parent company, would offer money for the exclusive option to explore wind farming interests on the land, and that landowners would be entitled to further benefits during development and operation. In only six weeks after this initial meeting, seventy different landowners had organized a combined 22,000 acres of potential land for the Meridian Way project.

In addition to the relationship with local landowners established by the Meridian Way team, they also took steps to account for potential environmental issues that could arise during development. State conservation groups were brought in to help organize specific mating and roosting land for the area's wildlife, such as the greater prairie chicken. Furthermore, ecological experts were consulted to ensure that development did not disrupt the low-lying wetlands protected by state and federal land laws.

With all of the ways that the Meridian Way wind farm fostered positive relationships with the surrounding community during development, it continued this trend regarding operation. Rather than relocating existing Zilkha employees to the plains of Kansas to operate and sustain the project, it helped to spawn the wind energy training program at Cloud County Community College, allowing for an increased localization of the project ranging from landownership to daily maintenance operation.

Although residing in the same state as the locally reinforced Meridian Way project, the early-stage Neosho Ridge Wind Project has not shared such consistent support [5]. Throughout 2018 and early 2019, residents of Neosho County have repeatedly clashed on the issue of accepting Apex Clean Energy's development plan. This plan involves the investment of approximately half of a billion dollars in order to quickly install and activate 139 turbines in time to enjoy the full breadth of the federal tax benefits that had been available to clean energy developers.

While this is a fiscally efficient plan, expediency is not without its side effects. The rushed nature of the project's development have backfired in terms of community trust, and have resulted in ongoing heated debate surrounding a number of issues ranging from regulation of rural infrastructure development to corporate secrecy. These meetings have been a reactionary response to issues raised by local landowners rather than an attempt to prevent it in the first place. The tone of these meetings will naturally be more combative, more polarized, and inherently less focused on the search for a middle ground.

An example of the extent to which a lack of transparency can perpetuate a problem is the adjustment to the standardized distance Apex may build from

landowners being called for by some residents of Neosho County. As it stands, developers may build at least 1,025 ft. from collaborating landowners and 1,540 from non-collaborating landowners. Locals who have shown up at meetings to resist Apex's developmental momentum have urged that those distances be doubled. Neosho County Commissioner David Orr explained that this would make it nearly impossible to build at all due to the residential density of Neosho County.

The social dynamic established by the Neosho Ridge Wind project's hasty development and borderline non-existent community outreach perpetuates a "developers versus landowners" stigma that is detrimental to the progress of the wind industry, and sustainable infrastructure in general. Local landowners, who feel as though they are now being infringed upon after years of minding their own business, have no clear incentive or obligation to meet developers half way on this issue. For this reason, developers must take active measures to extend a hand to landowners in order to demonstrate a respect for local sentiment, a willingness to listen, and a contrary narrative to that which is often associated with financially driven energy organizations.

Wyoming

The NIMBY movement does not only address the backyards of human residents, it also seeks to protect the rights of the animal occupants of the land. Environmental respect is especially necessary for an industry that presents such a strong force in the fight against climate change. Not only is the conservation of a wind farm's occupied land a contribution to efforts minimizing negative human impact on the environment, it also demonstrates that the wind industry is earnest in its pursuit of long-term sustainability.

Duke Energy has been made aware of the financial and political ramifications that follow when ecological development factors are not considered [13]. Their Top of the World and Campbell Hill wind farming projects of Converse County, Wyoming reported 163 mortality cases of protected avian species from 2009-2013, including 14 golden eagles [6]. The company plead guilty to violating the Migratory Bird Treaty Act for unpermitted avian takings at wind projects, resulting in $1 million owed in fines, restitutions, and community service. Additionally, the company was put on a five year probation period and required to execute an environmental compliance plan at all of their facilities in the state.

The charges against the organization highlighted the fact that, during development, no reasonable steps were taken to ensure that avian collisions with turbines could be avoided. Furthermore, they ignored direct warnings from the U.S. Fish and Wildlife Service (USFWS) [7] about this subject matter, demonstrating an active choice to overlook ecological concerns during development. While the organization was compliant with the investigation and the resulting legal fallout, due to a lack of judgement during the development process, permanent damage was inflicted on both the environment of Converse County and the overall credibility of the wind industry's commitment to sustainability.

Oklahoma

Research into the political dynamic surrounding wind power in Oklahoma revealed an explanation for why a pragmatic advocacy for landowners' rights in response to incoming infrastructure has been weaponized in an attempt to cripple the entire wind industry. While NIMBY embodies the voices of landowners who feel as though they are being overlooked and taken advantage of, the rhetoric of groups often associated with the NIMBY mentality rarely offers any solution to the issues, instead delivering criticism in a way which demonizes the wind industry and leaves no room for conflict resolution.

Local residents have no apparent motive for attacking the wind industry in such a forceful and one-sided manner. Furthermore, landowners in Oklahoma have been generally welcoming to land leasing payments and increased property values that wind farming development can bring to a community. This predominantly positive relationship makes it even more curious as to why the Oklahoma countryside is smattered with anti-wind billboards.

The answer to this mystery begins with Oklahoma resident Frank Robson. Robson became involved with NIMBY activism when he learned that EDP Renewables intended to build a wind farm nearby to his Double R Ranch in Craig County. Disgruntled by the prospect that the turbines would obstruct his view of the landscape and equipped with his millions of dollars from his commercial real-estate business, Robson established WindWaste, a nonprofit with the sole intent of using the NIMBY banner to turn Oklahoma landowners against the wind industry.

WindWaste's primary attacks on the wind industry surround the state funding they receive, arguing that these projects remove money from Oklahoma's economy. While some landowners are reasonably concerned with the tax system plays in wind development choices, attacks manipulate carefully selected statistics that, when presented as vaguely as possible and with no context, paint the wind industry in a negative light.

WindWaste has also been cited attempting to inform Oklahoma residents as to the dangers of "wind turbine syndrome." This diagnosis includes symptoms of headaches & dizziness resulting from the operation of wind farm, an affliction that is not acknowledged by any formal disease classification system. Furthermore, the syndrome has been widely identified as literal pseudoscience, a classification describing cases where findings are presented as if they are scientific fact when they have not undergone the methodological process of scientific review.

Additional evidence that organizations such as WindWatch are willing to offer misleading information to Oklahoma residents can be found on the previously mentioned billboards strewn across the landscape of the state. Billionaire Harold Hamm, founder of the massive oil-and-gas company Continental Resources, was inspired by Robson's NIMBY organization, and decided to found his own. The Windfall Coalition is the group responsible for many of the anti-wind billboards, including one which reads "Cost to Oklahoma taxpayers in 2016 is $242 million. Out-of-state wind companies benefited. That BLOWS."

The $242 million discussed on the billboard is a reference to the tax subsidies offered to wind developers in 2016. While these funds were ultimately provided by taxpayers, such presentation of that figure implies that this is the net financial impact of Oklahoma wind farming, neglecting the hundreds of thousands of dollars offered to landowners in development and leasing payments, the substantial increase in property value that wind farming facilities bring to a community, and the local employment opportunities created when a wind farm is established.

Another example of the Windfall Coaltion's campaign of spreading misleading information can be found at the top of their website. A pie chart is shown predominantly filled in by international flags and labelled around the edge "foreign" and "out-of-state," with a small blue sliver representing Oklahoma ownership. The tagline of this figure is "93% of wind-company owners are not Oklahomans." Invoking the word "foreign" in such a context is a transparent effort to apply an incendiary political climate fueled by xenophobic fear to the significantly less political issue of wind energy.

While this is clearly an attempt to communicate that the wind industry is not demographically equipped to address the concerns of Oklahoma landowners, the inverse could be argued by simply contextualizing number that they present. If 93% of wind companies are not owned by Oklahomans, that means that 7% are. With Oklahomans only making up about 0.00009% of the global population, the fact that residents of the state share 7% ownership of one of the most rapidly expanding industries in the world could be used to argue that Oklahomans are in fact one of the best-represented populations in the entire wind energy community.

South Dakota

Wind farming in South Dakota would seem to developers like a guaranteed lucrative pursuit. In addition to the ideal wind farming topography of the state, the recent construction of two high-capacity regional transmission lines would allow a patched-in wind farm to export the electricity it produces to its neighboring states, including the significantly more populated Minnesota. However, with the deadline being rescinded for projects that begin development as early as 2020, local landowners and developers alike share growing concerns that the market is becoming oversaturated and inefficient.

Many locals believe that the sudden surge of concern for the economy of South Dakota recently shown by dozens of energy companies is about financial self-interest rather than symbiotic investment. For instance, the newly proposed Crocker Wind Farm in Clark County has instigated a battle among locals who, while often harmonious in all other aspects of life, staunchly stand against their neighbors when it comes to wind farming [8]. A retired teacher living in Clark County who shares the NIMBY mentality with many of her neighbors says that she felt compelled to call the sheriff in response to an incident where a wind farming advocate drove onto an opponent's land and began shouting at them.

Such dramatic confrontations are the natural result of an issue being turned so

divisive that no form of reasonable discourse can take place. Mentioned in the discussion of the Clark County wind farming contention was the observation that, when wind farming advocates and developers attempt to address NIMBY using statistical arguments, they are often met with either anecdotal rebuttal or by specific studies designed to negate those produced by wind industry researchers.

Scientific communities rely heavily on their empirical evidence to build arguments, which often leads to conflict when emotionally-charged subjects are in question. When their data is dismissed with seemingly no justification for doing so, a common and critical mistake of these communities is to disengage from a discourse, either by ending the conversation entirely or by taking the lofty position that science is infallible and emotion is a petty inconvenience. Particularly in the context of a highly political issue like wind farming, it is crucial for developers to remember that being "correct" does not, on its own, mean that anyone will listen or care.

This further highlights the importance of prioritizing community engagement over fiscal efficiency, especially in a unique time when wind developers are facing a deadline regarding benefits, a fact which skeptical local community members are fully aware of. As an energy development, entering a county and then bombarding its residents with statistics proving why their concerns abou their landowners' rights are unimportant is the exact type of out-of-touch condescension that rural landowners are so wary of.

With that said, the problematic nature of such polarized issues is that both sides often remaining uncompromising on their position, regardless of any sort of reasonable challenge to their opinion, scientific or otherwise.

Clark County resident Dave Finsted, a wind energy advocate who believes wind farms have little impact on a community's compared to the local financial growth they create, was prepared to allow the Crocker wind farm to build a turbine on his land. He felt that the leasing payments he would receive for harboring the turbine were simply a financial opportunity for him as a landowner.

However, a wind farming opposition group (including one of Finsted's neighbors) convinced the Clark County Commission to increase the setback for wind turbines from neighboring properties by almost 3,000 feet, disqualifying Finsted's land as a possible turbine site. While he holds no animosity for his neighbors, he verbalized his regret that such an amicable community as his own is so deeply and angrily divided on an issue such as wind farming.

Data & Discussion

The following table acts as a compilation of the specifications of wind farming projects throughout the American Great Plains, acting as empirical context for the subsequent NIMBY atmosphere that grips the region's wind industry [1, 2, 9, 10, & 11].

Name	Location	Began Operation	Organization(s)	Budget (million)	Number of Turbines	Turbine Manufacturer & Model	Generation Capacity (MW)
Meridian Way	Cloud County, KS	2008	Horizon Wind Energy	N/A	67	Vestas V90	201
Neosho County Wind Energy	Chanute, KS	2019	Apex Cleam Energy	450	139	N/A	302.5
Duke Energy "Top of the World" Wind Project	Converse County, WY	2010, October	Duke Energy	111	110	Siemens (44) & GE (66)	200
Foote Creek Wind Farm	Carbon, WY	April 22,1999	PacifiCorp	N/A	69	Mitsubishi	40.8
Day County Wind Farm	Day County, SD	2010	NextEra Energy Resources	297	66	GE Energy 1.5xle	99
Titan Wind Farm	Hand County, SD	2010	BP Alternative & Clipper Windpower	N/A	10	Clipper Liberty C89	25
Persimmon Creek Wind Farm	Dewey, Ellis, and Woodward Counties, OK	2018, September	Scout Clean Energy	270	73	General Electric Energy	200

Table 1: Wind farm information collected from various sources

The first significant correlation between the data and NIMBY backlash is that farming projects with more turbines (particularly in a single location) receive more consistent negative community response. This trend is likely a result of local landowners feeling as though a multi-million dollar organization has forced their way into their community and installed an unsightly industrial factory. Despite the particularly high mega-wattage capacities of these projects, for many locals, such large facilities bring to mind commercial interests taking advantage of the community's land.

Particularly concerning the last few years, it has not helped this image that organizations have been rushing the development on wind farming projects to meet the 2020 deadline for the Renewable Electricity Production Tax Credit. While the pursuit of such a substantial tax credit is a reasonable priority of developers, they cannot allow this goal to hinder other components of sustainable development like community engagement and ecological awareness. When cases of this occur, such as that of Duke Energy's 110 turbine Top of the World project, the company and the industry in general suffer both financial and political setbacks.

The most substantial observations made by comparing the data presented above with those respective projects' NIMBY climate is that a singular pursuit of fiscal efficiency in project development is alienating to community members, and that large farms (~80+ turbines) constructed on a single site can be overwhelming to landowners throughout the region, resulting in a harmful and unnecessary exacerbation of NIMBY sentiment.

Central Findings

The first step that developers must consider in order to confront NIMBY criticism head on is to begin a dialogue with those who would criticize. As previously discussed, although the NIMBY mentality retains a fundamental validity, the practical manifestation of the sentiment as a movement has been subjected to a campaign of hyperbole and misinformation. As organizations such as WindWaste & the Windfall Coalition manipulate the genuine concerns of local residents in wind farming communities, they attempt to put an end the conversation. They often highlight admittedly problematic aspects of the wind industry as evidence that wind power should be abandoned. The leaders of these organizations make these attacks not to protect landowners, but to preserve own economic interests in the energy industry.

By engaging in a consistent, transparent, and streamlined discussion with concerned community members, problems that would be entirely divisive when processed through the NIMBY filter can be used instead as points of ideological convergence. This raises an important distinction that can easily be overlooked when researching the degree obstruction of which NIMBY is capable. Local landowners of the Great Plains stand to benefit from continuous improvement to the system of wind farming development. Those primarily responsible for funding and dispersing NIMBY rhetoric stand to benefit from the complete dissolution of the wind industry as a whole.

Pursuing a direct line with the community while introducing a wind farming project allows developers to ultimately bypass the political agenda established by the NIMBY movement. Instead, complaints and concerns voiced by locals can be viewed as opportunities to tailor the project to the specific needs and desires of the community in which it will reside. An important idea to bear in mind while building this relationship is that should be fostered based on a mutual respect.

A destructive habit of many members of scientifically driven industries is to adopt an air of condescension when discussing technicalities with those who did not receive such an expansive scientific education. In the context of sustainable energy, this not only alienates individuals who would otherwise be willing to amicably voice their concerns, it also reinforces the connotation of elitism that climate deniers and opponents of sustainable infrastructure often impart upon the scientific community.

In addition to the consideration of the people who reside near wind farming sites, developers must also take into account the ecology of the land upon which they are developing. While wind turbines can serve an ultimately environmentally conscious cause, they are still large, powerful machines that must be carefully integrated into their environment in order to ensure sustainable operation.

As discussed, cases of poor ecological integration have resulted in the deaths of hundreds of animals who also reside in those locations. Given that many members of the wind industry are at the forefront of establishing a lasting, sustainable relationship with the natural environment, it is crucial that proactive steps are taken to ensure that the implementation of a sustainable

infrastructure does not infringe on the ecology of the land.

A straightforward approach to this preemptive targeting of potential environmental issues is to involve ecological and zoological experts in location scouting and the process of mapping out turbine fields. While the general topography of the Great Plains is relatively consistent throughout the entire region, seeking out local experts on the specific environmental conditions of a site allows developers to account for issues that may have otherwise been overlooked, and also demonstrates that the wind industry is willing to take interdisciplinary steps to ensure that infrastructure development is being executed in a sustainable and conscientious way.

While the wind industry is generally more environmentally conscious than most infrastructure industries, it is still constrained by financial concerns. Purely fiscal interpretations of a wind farm's budget may lead to a conclusion that commissioning ecological advice is an extraneous expense. Such considerations are often the first to be discarded by economists, who tend to focus instead on materials and labor for the physical elements of the project. This can be politically and financially taxing on developers, with Duke Energy's one million dollar settlement standing as a prime example. Had preemptive steps been taken to account for avian mortality prior to the installation of the turbines, the organization could have avoided the political & financial burden that their controversy carried.

The third significant consideration developers should account for is balance of proximity factors. The central concern voiced by the proponents of NIMBY is the essence of the mentality's name: infrastructure is infringing upon the privacy of local residents. It is a knee-jerk reaction for individuals who are educated in sustainable energy to assume that this complaint is petty and insignificant. This is a dangerous approach for wind farm developers to adopt when addressing NIMBY backlash because it perpetuates a social rift that individuals who live in the Great Plains tend to be particularly sensitive to.

Dismissing the concerns of an entire regional demographic on the grounds that they have been misinformed by well-coordinated outside interests is a misstep in the process of establishing a respected and welcomed wind industry. Before selecting a project location, developers should discuss the dispersion of the intended turbine field(s) with landowners in surrounding areas. This detail of the development process is overlooked at times, resulting in unnecessary conflict that should be particularly avoidable given the sparse population distribution so characteristic to the region.

Farming projects which arrange their turbines in separated clusters often receive less NIMBY confrontation throughout development and operation. The creation of multiple outposts helps to deconstruct connotations of the commercial factory-like imposition on the landscape which NIMBY proponents so heavily criticize. Furthermore, the versatility of land use that the split-project approach offers allows developers to more carefully integrate a project into both the social and ecological environments of their residing communities. This allows for a carefully selected project location that offers a balance between seclusion from NIMBY landowners and reasonable proximity to the recipients of the wind farm's produced electricity.

Further Research Prospects

While the research conducted in this thesis ultimately achieved its goal of structuring a nuanced discussion of NIMBY and the Great Plains wind industry, there are many avenues left to be explored, and several more facets of the discourse to be accounted for. Provided additional time and resources, the groundwork that this research has laid can act as a sound platform upon which these specific topics could be expanded.

Most significantly, IRB approval and the time to organize personal interviews of both wind developers and NIMBY proponents into qualitative research would allow the focus of this thesis to hone in even more specifically on the socio-political elements of NIMBY. This would offer first-person points of context for the dynamic of the movement's relationship with the industry. While an interview stage was initially included in the plan for this project, it soon became clear that a literary review of the NIMBY backlash surrounding specific wind farming projects would be better suited to the scope of this research.

Another road of analysis that could expand this research would be widening the lens in a geographical sense. A more extensive discussion of NIMBY and wind farming would include the movement's presence on the east and west coasts, comparing to the plains region. Discussion would primarily consider how the social, legislative, and topographical characteristics of each respective region contributes to the ways that the NIMBY mentality is locally manifested, and which issues its proponents focus on the most. Furthermore, the inclusion of these regions would allow for the incorporation of a larger and more diverse pool of wind projects for which to compile and analyze characteristic data, offering a stronger empirical background rather than relying as heavily on qualitative methodology.

Conclusion

Sustainable land use is a complex issue that requires extensive conversations regarding each of its nuances in the context of any given project. Respecting the degree of understanding that local community members have concerning the land on which they live is a crucial first step in dismantling the highly divisive framework that surrounds renewable energy infrastructure.

The considerations outlined in this research account for the genuine concerns associated with the NIMBY mentality while filtering out the polarizing and misleading rhetoric that has been wielded to suppress wind energy support among rural American landowners. In order for wind farm developers to best proactively address NIMBY activism, they need to take pre-developmental steps to ensure that the concerns of local landowners are being considered. These steps must include an active and ongoing transparent dialogue with community members, continuing throughout both development and operation.

The promotion of sustainable energy development cannot be pursued in the form of a superficial sales pitch, especially not to skeptical rural landowners who share a wariness of industrialism. Instead, an earnest and complex relationship must be developed with a community in order to ensure that development smoothly and naturally integrates a wind farm project into its locale. Understanding the ecological and political landscape of a proposed development location is necessary if developers truly wish to help establish a wind industry that is sustainable in both an environmental and a social sense.

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