Overcoming Barriers to Wind Energy Development: A Case Study Analysis of Native American Projects

By

Michael Zimmerman

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Faculty Advisors:

Dr. Tony Reames

Dr. Pamela Jagger

Abstract

Despite holding nearly 8% of the United States' wind energy potential, only one utility-scale wind farm exists on Native American lands. Several barriers hindering tribes' capacity to harness their lands' wind potential have been identified, including federal bureaucratic inefficiencies, tribes' difficulties securing financing, their inability to capitalize on the Federal Production Tax Credit, and tribes' internal administrative disagreements. Few studies have explored, in depth, how these barriers impact the steps of the wind energy development process, such as understanding the wind resource, project permitting, transmission, securing a power buyer, and financing. This study presents a comparative analysis framework exploring how barriers to wind development influenced two projects: the unsuccessful Rosebud Sioux North Antelope Highlands Wind Project and the ongoing Oceti Sakowin Power Authority (OSPA) project. The study finds that the OSPA, although reliant on finding a buyer for its generated electricity and the continuation of the Production Tax Credit, has created a novel ownership structure and development strategy capable of success despite pre-existing barriers. These findings further the scholarship regarding barriers to wind energy development on tribal lands, going beyond understanding what factors limit development to illustrate strategies tribes can employ to overcome the aforementioned barriers on a procedural level. The strategic changes made by the OSPA can hopefully be utilized by future tribal projects to enable tribal wind energy development despite existing barriers. On a broader scale, this study emphasizes that while barriers to wind energy development still must be addressed, it is possible for tribes to bring affordable, sustainable energy and economic opportunity to their community through wind energy despite these challenges.

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Introduction

Access to energy should be a basic right for all. This liberty, otherwise known as "energy justice," encompasses four key elements: the right to healthy, sustainable energy production; the right to the best available energy infrastructure; the right to affordable energy; and the right to uninterrupted energy service (Hernandez, 2015). The United Nations (UN) draws from these basic rights in Sustainable Development Goal 7 (2019), advocating that, by 2030, member nations including the United States must "ensure access to affordable, reliable, sustainable and modern energy for all." Since the World Bank (2019) began collecting energy accessibility data in 1990, the United States has maintained its achievement of providing accessible energy to 100% of its citizens. Similarly, the United States is on track to offer affordable energy to all by 2030, as just 1.4% of citizens experienced energy poverty in 2000 (Sandoval, 2018). Yet, these energy statistics omit Native American communities, a population of almost seven million (World Population Review, 2020). [1] Fourteen percent of Native American households experience energy poverty, ten times more than non-Native households (Sandoval, 2018). Additionally, many Native American communities are still fighting for access to any form of electricity; 40% of the Pine Ridge Reservation population and 37.5% of Navajo Nation households live without access to electricity (Rocky Mountain Institute, 2014; Tarasi et al., 2011).

For almost a century, Native American communities have sought to alleviate energy poverty through coal, natural gas, and oil extraction on tribal lands. By leasing land to energy developers, tribes earn royalties that bolster the local economy (Grogan et al., 2011). For many Native American communities, though, resource exploitation on their land involves

[1] I use "Native Americans" to recognize the indigenous people living on the lands currently occupied by the United States of America. However, the United States government officially refers to tribal policy as "Indian Law," and thus when discussing federal relationships with Native Americans I use official terminology.

consideration of factors other than economic gain. Concerns about large corporations taking advantage of tribes and disrupting sacred sites is prevalent among Native American communities. Environmental concerns, too, play a significant factor for tribes involved in energy development projects (Grogan et al., 2011). As a result of these concerns, few energy projects exist on tribal lands. According to Dr. Robert Middleton (2008), Director of the Office of Indian Energy and Economic Development, only 14% of 15 million potential acres for mineral resource energy on tribal lands are being utilized for nonrenewable energy production.

Renewable energy, however, does not present the same environmental concerns and is seen as a legitimate economic opportunity by tribes (Kronk Warner, 2010). Across the contiguous United States, tribal lands hold the potential to generate 6.5% of all the United States' power. Specifically, tribal lands hold the potential for 891 gigawatts (GW) of wind energy, or 7.8% of the national generation potential (Milbrandt et al., 2018). Yet, only one utility-scale wind farm currently operates on tribal lands. The 50-megawatt (MW) Kumeyaay Wind Farm (2010) near San Diego, California, operates 25 turbines generating electricity for 30,000 homes. The solitary success of the Campo Kumeyaay Nation to develop wind energy is not due to lack of effort by other tribes, though. Previous unsuccessful efforts include 700MW of proposed wind development by the Navajo Nation and 220MW proposed by the Rosebud Sioux Nation.[2] A major factor in these projects' failures is the Federal Government's relationship with Native American tribes.

[2] Thirteen tribal wind projects have been proposed in the continental United States. More information about these projects can be found from the Department of Energy, Office of Indian Energy, (n.d.), Tribal Energy Projects Database, Retrieved from https://www.energy.gov/indianenergy/maps/tribal-energy-projects-database

This relationship, called the Federal Trust Responsibility, formed during the 1820s over a series of Supreme Court rulings known as the Marshall Trilogy (Grogan et al., 2011; Leventhal, 1985). The first ruling, in 1823, determined that only the Federal Government holds title to Indian land. The second ruling decided Indians' relationship with the United States Government to "resemble that of a ward to his guardian" (Cherokee Nation v. Georgia, 1831). The third asserts that Indian matters are under the authority of the Federal Government, not the State Government (Grogan, 2011; Leventhal, 1985). In effect, the Marshall Trilogy determined that Indian tribes are sovereign entities, but under the authority of the Federal Government. As explained in a study from the Revenue Watch Institute, "with a status of 'domestic dependent nations' within the United States, the court decreed that Indian land could not be legally encumbered or conveyed without the approval of the United States government, acting as trustee for Indian lands and obligated to manage those lands for the welfare of tribes and their citizens" (Grogan et al., 2011). This precedent continues today through the activities of the Bureau of Indian Affairs (BIA), which invokes its responsibilities to ensure the validity of contractual agreements regarding mineral leasing on tribal lands.

Scholars have previously addressed why wind energy projects are not succeeding on tribal lands by examining how the Federal Trust Responsibility and other barriers hinder such projects. During a congressional hearing in 2011, tribal officials outlined key challenges to developing energy resources on their lands (Dreveskracht, 2012):

- Erroneous BIA records causes delays in permitting and contract negotiations
- Understaffing of the BIA further slows down permitting processes

- Lack of communication between federal agencies involved in energy projects: The Bureau of Indian Affairs, Department of the Interior (DOI), and Environmental Protection Agency (EPA)
- Tribes' inability to enter long-term, fixed-price contracts makes business deals difficult to secure
- Tribes' inability to capitalize on tax credits
- Inability to tax non-tribal energy projects due to previously-imposed taxes from state and local governments

Of these, three hurdles stand out in past academic works specifically: the BIA's bureaucratic inefficiencies, tribes' difficulty securing financial backing for projects, and tribes' ineligibility to receive tax incentives. Prior studies also highlight the role of internal conflict within tribes leading to project failures. However, existing scholarship does not explore how the Federal Trust Responsibility and its resulting limitations impact tribal wind development projects on a procedural level. By analyzing how key hindrances impact tribal wind projects throughout each phase of development, this study provides a clear understanding of strategies that tribes can employ to succeed despite them.

The study analyzes two tribal wind energy development projects: the Rosebud Sioux's unsuccessful 190MW North Antelope Highlands Wind Project and the Oceti Sakowin Power Authority's (OSPA) ongoing 1000MW project. Because the Rosebud Sioux sought to develop the North Antelope Highlands project independently before joining the OSPA, comparing the two projects provides valuable insight into how and why the Tribe's approach to wind development changed. Additionally, as both projects are located in South Dakota, the Rosebud Sioux and OSPA operate under the same state policies.

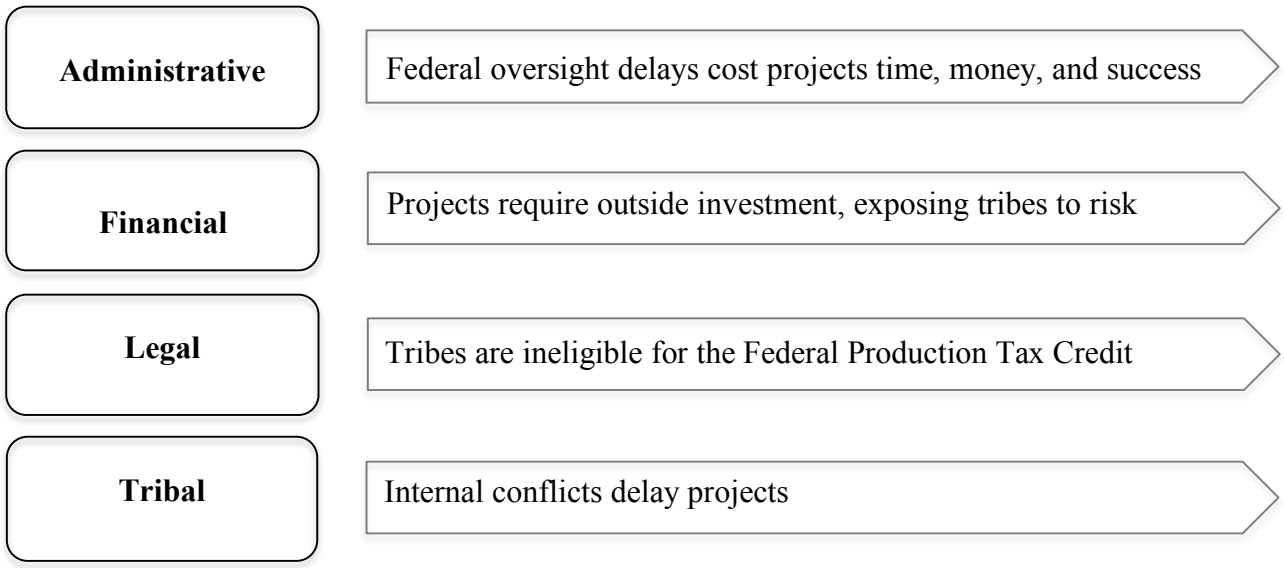
Each project employs different development strategies. The Rosebud Sioux acted as a passive landowner by earning royalties from land leased to the project developer; the OSPA owns the controlling stake in its project and will reap the profits directly. Additionally, while the Rosebud Sioux operated under its tribal status, the OSPA legally classifies as a non-profit corporation. Given these differences, the Rosebud Sioux and OSPA projects are two examples of tribal strategies to create wind energy programs. Comparing the two cases allows this research to analyze the barriers at each step of the development processes. The comparison also shows how different development strategies impact the project's outcome.

To compare the strategies used in the Rosebud Sioux's unsuccessful North Antelope Highlands project and the OSPA's current project, the policy-oriented study analyzes official project reports and publications. The analysis contextualizes key barriers to wind energy development, establishes a guiding framework for tribal wind development, and evaluates how the barriers influence the projects at each step of development. By understanding the strengths and weaknesses of each project's strategic response to existing barriers, this project will highlight successful strategies for future tribal wind energy development.

Contextualizing the Barriers to Tribal Wind Energy Development

In prior research, scholars have identified barriers to tribal wind energy development projects. This section will highlight these previous studies and their findings, providing an in-depth understanding of the four major barriers: Bureau of Indian Affairs (BIA) inefficiencies, financial costs, tax credit ineligibility, and internal tribal disagreements.

Figure 1 | Overview of Barriers to Tribal Wind Energy Development



Bureau of Indian Affairs Inefficiencies

Bureaucratic delays in reviewing tribal requests for environmental permits and contractual agreements is a key issue for tribes seeking to develop renewable energy. In a testimony for the Senate Committee on Indian Affairs, President Rodney Bordeaux of the Rosebud Sioux notes the inefficiency of the BIA. Bordeaux (2012) cites that the Rosebud Sioux signed a land lease agreement for the Owl Feather War Bonnet project in December, 2006, and did not receive BIA approval until August, 2008. This eighteen-month delay cost the Tribe valuable time and money needed to begin development. In a Government Accountability Office (GOA) report (2015) investigating the BIA's management of Indian lands, similar problems arose. Specifically, overdue reviews by the BIA caused tribes to lose interconnection agreements with local utilities, forcing projects to stall. The GOA (2015) also found that the BIA deemed a project's wind data inaccurate after taking over three years to review the proposal. Additionally, one tribe noted that the BIA reviewed its energy-related documents for eight years, costing the

tribe $95 million in lost revenues (GOA, 2015). Moreover, a previous study shows that where non-tribal Americans can receive land reports in just a few days, Native Americans wait up to six years for the same information (Regan, 2018).

In order to address these inefficiencies, the Department of the Interior (DOI) implemented policy changes as part of the Energy Policy Act in 2005. The act included the Indian Tribal Energy Development and Self-Determination Act, which introduced a tribal-Federal agreement called the Tribal Energy Resource Agreement (TERA). By entering into a TERA, tribes receive the right to lease lands and enter contracts for energy purposes for up to 30 years without approval from the Secretary of the Interior (Kronk Warner, 2012; Royster, 2008; Unger, 2009). While the benefits of the TERA seem crucial for tribes seeking to develop energy resources independently, the agreement also imposes new limitations onto tribes. Primarily, scholars note that the TERA application requires tribes to undergo an environmental review by the DOI, thus infringing on tribes' self-determination (Kronk Warner, 2012; Royster, 2008; Unger, 2009). Additionally, the application process is expected to take over a year, costing tribes valuable time and resources (Unger, 2009). Scholars and tribal officials have also noted the complicated TERA application format, as well as the DOI's refusal to provide application assistance (GOA, 2015; Unger, 2009). Furthermore, the 2005 Act creates uncertainty over tribes' access to technical and financial resources like geological expertise (Royster, 2008). Moreover, the Act includes a liability waiver from the Federal Government, stating that "the United States shall not be liable to any party (including any Indian tribes) for any negotiated term of, or any loss resulting from the negotiated terms of, a lease, business agreements, or right-of-way executed pursuant to and in accordance with a tribal energy resource agreement" (Kronk Warner,

2012). As a result of these concerns, no tribe has taken advantage of the TERA as of 2015, and the bureaucratic inefficiencies plaguing tribal energy projects persist (GOA, 2015).

Financial Costs

The cost of renewable energy projects is often too high for tribes to finance independently. Given the $2 million cost of constructing a one-megawatt turbine, tribal wind energy projects can span into the hundreds of millions of dollars (Greenhowe 2013; Bronin, 2013). Of tribal officials participating in a study by Brookshire and Kaza (2013) identifying limiting factors for tribal energy development, 83% reported "lack of funding" as the key constraint. As such, to finance large-scale projects, tribes must partner with non-tribal investors (Bronin, 2013; Greenhowe, 2013; Jones and Necefer, 2013; Kronk Warner, 2012). To incentivize these partnerships, though, tribes must waive their sovereignty, exposing them to liability and exploitation (Congleton, 2013). Moreover, since non-tribal investors often finance the majority of the project, they are entitled to the project's analytical data. If the project falls through, the tribe would be left with nothing, not even the project data to improve a future development effort (Congleton, 2013).

Tax Status

Tribes' sovereign status renders them tax-exempt, disqualifying them from receiving the tax incentives that make wind projects profitable. Specifically, the Federal Production Tax Credit (PTC) supplements the wind farm's earnings (Bronin, 2013).[3] Depending on when the wind farm begins generating electricity, the project would earn 1-2¢ per kilowatt-hour for the first 10 years of generation (Office of Energy Efficiency & Renewable Energy). Notably, this tax credit

[3] To read more extensively about the PTC and its role in Native American energy projects, see Shahinian, M., "The Tax Man Cometh Not: How the Non-Transferability of Tax Credits Harms Indian Tribes," *American Indian Law Review* 32, no. 1 (2007): 267-91.

supplements earnings *after* taxes, making it extremely attractive for developers (Shahinian, 2008). Since the PTC is proportionally allocated based on how much a developer invests in the project, non-tribal entities are discouraged from partnering with tribes because not all of the tax credits will be distributed. For example, if Tribe A contributes 60% to a project and Developer A contributes 40%, Developer A will receive 40% of the potential tax credits and the other 60% will not be allocated. As such, it lowers the total cost of the project for Developer A to partner with another taxable entity that can receive the PTC, rather than Tribe A who cannot (Shahinian, 2008). For developers, the benefits of the PTC are substantial. A study conducted by Andrew Mills (2006) with the University of Berkeley, California, found that the PTC can contribute up to 17% of a wind project's bottom line. By partnering with tribes, developers increase their total costs, thus leaving tribes at a competitive disadvantage.

Tribal Leadership

Internal discord with tribes can also lead to projects stalling. Previous research into barriers to wind energy development show that many tribes have a high turnover rate in official positions, leading to instability throughout project development phases that compromise the united vision of a tribe (Congleton, 2013; Jones and Necefer, 2011). Specifically, Caroline Herron, Project Manager of the Oceti Sakowin Power Authority, notes the challenge for developers working with tribal councils, a tribe's governing body. She states that negotiating with a tribal council is like negotiating "with the U.S. Congress…politics would be involved… there's a lot of change, a lot of turnover" (Clancy, 2018). In order for these negotiations to work, sociologist and law professor Dr. Duane Champagne writes, "private businesses need predictable, stable legal and political environments, and few reservations have expended the effort to create the legal, economic, or political infrastructure to foster a stable capitalist business

climate" (2004). Additionally, Congleton (2013) notes that tribal officials frequently seek the approval of every tribe member before entering into development projects, thus increasing the importance of tribal officials championing a single project vision. In the GOA's official report (2015), the inquiry cited tribal officials' fractionated interests in energy resources resulting in significant bureaucratic delays. While other challenges may pose more significant hurdles to tribes' energy development projects, internal disagreement must also be acknowledged as a factor.

As of now, scholarly works show *why* wind energy development is not occurring on tribal lands. But, prior academia has not yet shown *how* these limitations manifest during wind development projects. By using a step-by-step analysis of the Rosebud Sioux's unsuccessful North Antelope Highlands Wind Project and the OSPA's ongoing project, this study will provide insight into how these aforementioned barriers to development are dealt with by each project. Through analysis of the different strategies each project employed in response to these challenges, this study will create an in-depth understanding of how tribes are able to successfully develop wind projects despite the legal and economic barriers they face.

Case Study Area and Methods

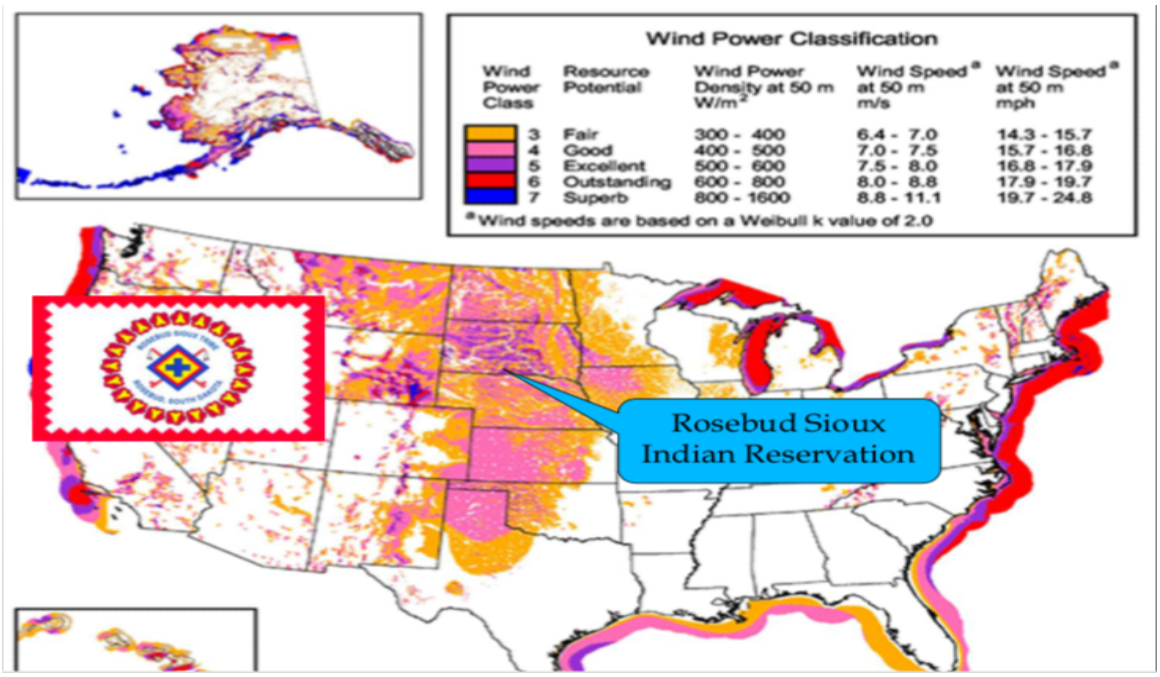
This study specifically explores the wind development efforts of the Rosebud Sioux and Oceti Sakowin Power Authority (OSPA). Because the Rosebud Sioux sought to independently develop the North Antelope Highlands project before joining the OSPA, comparing the two projects provides valuable insight into how and why the Tribe's approach to wind development changed. The Rosebud Sioux first chose to develop their wind resource under tribal authority,

before authorizing a tribally-run non-profit coalition to undertake the OSPA project. Given the Rosebud Sioux's prior decade of experience with developing their wind resource, the strategic change highlights the areas where the Tribe saw room for improvement. By comparatively analyzing the Rosebud Sioux and OSPA, these strategic changes can be utilized by other tribes.

Additionally, the Rosebud Sioux and OSPA operating under the same state policies in South Dakota provides a control for comparing local policy. As every state requires different approvals and tax structures for development, both abiding by South Dakota law creates a comparative lens to explore the internal strategy differences between the two projects rather than the external state policies.

Rosebud Sioux Case Background

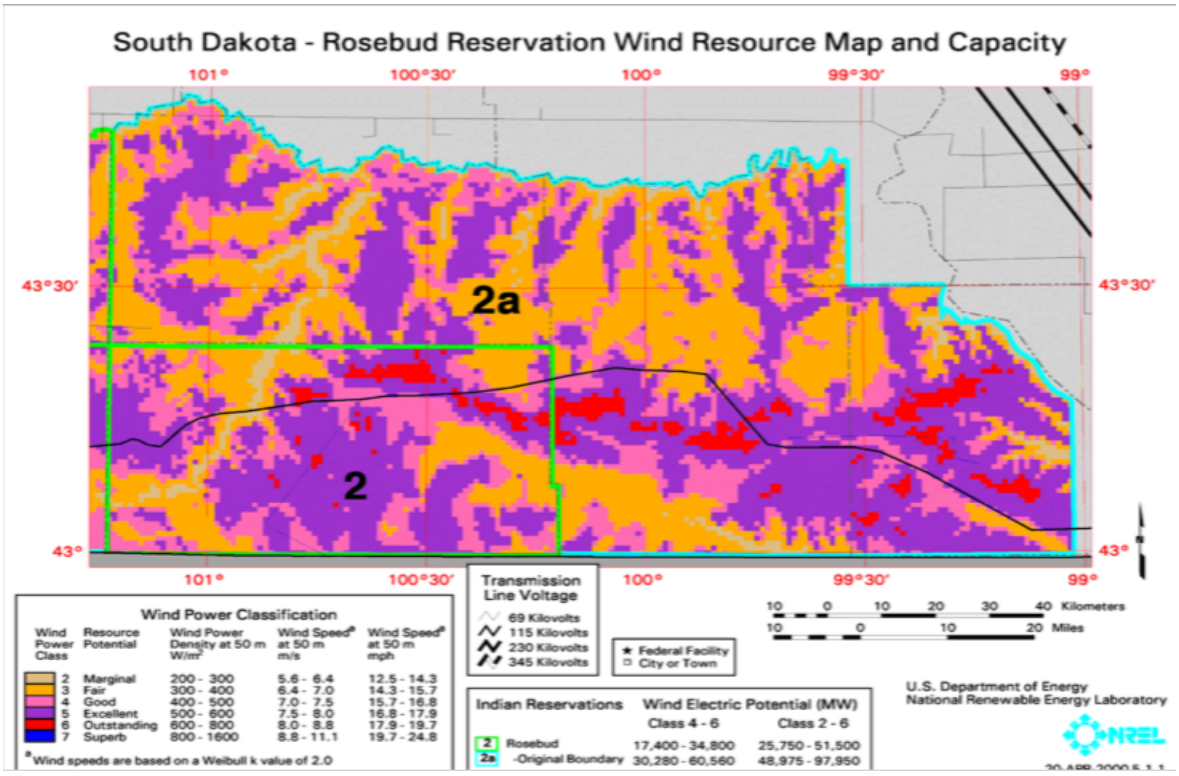
Figure 2 | United States Wind Potential Map



Source: NREL (n.d). Found in Valandra, P., (2012), Wind Energy on the Rosebud [PDF].

Located in South Dakota, the Rosebud Sioux Reservation possesses over 7,500MW of wind energy potential spanning almost one million acres of land (NREL, n.d.). The Tribe's wind energy potential breaks down into classes 3, 4, 5, and 6; the minimum wind speed for utility-scale projects is class 2, making the Rosebud Sioux's wind potential highly feasible (Office of Indian Energy and Economic Development, 2010). Despite its high renewable energy potential, the Rosebud Sioux Reservation is isolated from major transmission stations to the larger electrical grid, forcing any project consideration to incorporate additional transmission upgrades into its budget (Office of Indian Energy and Economic Development, 2010) Additionally, due to the lack of a large population nearby, there are few buyers for any generated electricity (Haukaas, 2016).

Figure 3 | Rosebud Sioux Reservation Wind Potential Map



Source: NREL (n.d). Found in Valandra, P., (2012), Wind Development on the Rosebud [PDF].

Despite the challenges facing the Rosebud Sioux to develop wind energy on their lands, the Tribe has made two utility-scale efforts to do so. Inspired by the successful establishment of a single wind turbine in 2003, the 750kW Akicita Cikala Turbine, the Rosebud Sioux sought to harness 30-megawatts of wind energy in the Owl Feather War Bonnet Wind Farm (Office of Indian Energy and Economic Development, 2010). By partnering with an energy developer, DISGEN, the Rosebud Sioux secured financing for the project in exchange for granting DISGEN ownership of the wind farm for its first decade of operation. In this structure, DISGEN would own the wind farm for ten years, then ownership would flip to the Tribe (Haukaas, 2007). However, federal legislation disqualifies sovereign entities (tribes) from earning the Federal Production Tax Credit (PTC) that largely makes wind energy cost-competitive with fossil fuels (Barradale, 2010). As such, while the first decade of operation would be profitable for the investor, the Tribe's status as tax-exempt makes the project economically infeasible once they assume ownership. Despite successful wind potential assessments, environmental and ecological permissions, and a likely buyer being the Nebraska Public Power District, the Owl Feather War Bonnet Wind Farm remains unbuilt. The author of the project's final report, Ken Haukaas (2016), concluded that the only feasible way for the Tribe to be involved in a wind project is to remain a passive landowner receiving royalties from the investor-owned project.

Rather than being dissuaded by the stalling of the Owl Feather War Bonnet project, the Rosebud Sioux Nation expanded its sights further. Beginning in 2007, the Tribe began exploring the feasibility of establishing a 190MW wind farm, the North Antelope Highlands Wind Project, on their lands (Haukaas, 2016). After preliminary studies confirmed the feasibility of the project, the Rosebud Sioux entered a development agreement with Citizens Wind, a wind energy development company. Alongside Citizens Wind, the Tribe secured all necessary environmental,

archeological, and feasibility permissions from the appropriate government departments. Additionally, the Tribe had an agreement in place with Citizens Wind to lease the project to an investor, with both parties receiving royalties and development fees in exchange. However, the Tribe struggled to secure a buyer for the North Antelope Highlands Wind Project's energy; without a contract from a buyer, investors were unwilling to commit to the project (Haukaas, 2016). Again, the Rosebud Sioux encountered insurmountable challenges. Without a large energy user nearby to off-load its energy to, the North Antelope Highlands Wind Project stalled alongside its predecessor.

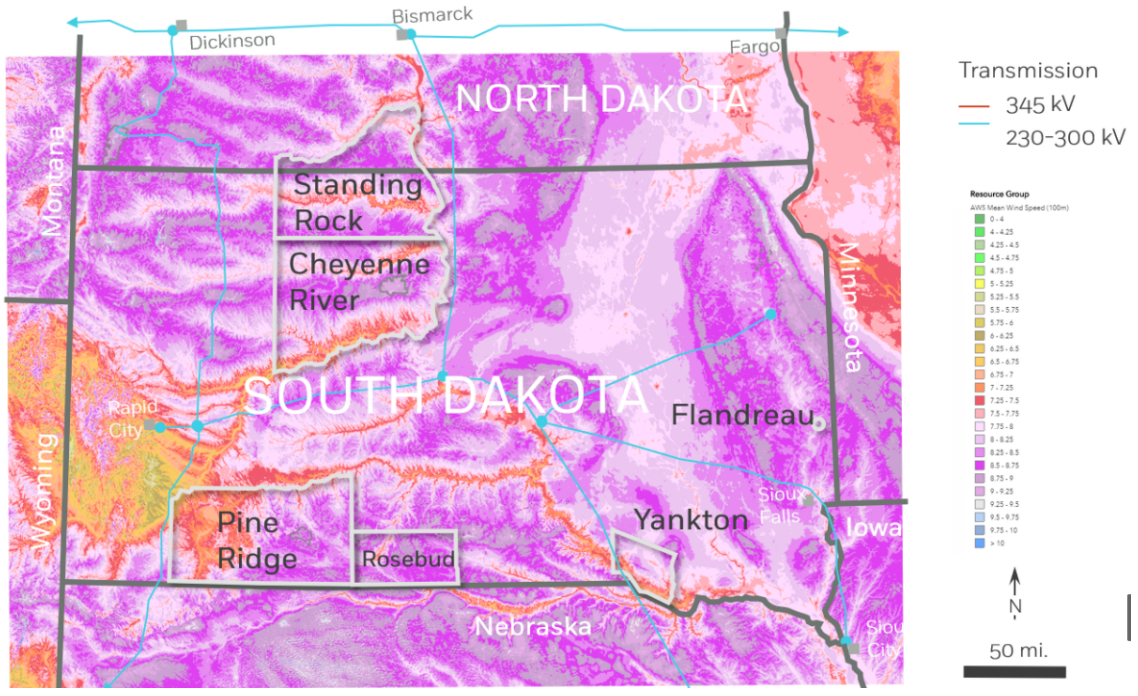
Understanding the potential economic and social benefits that developing wind energy has for the Rosebud Sioux Nation, the Tribe continues to seek development of its wind resource. Acting as a passive landowner leasing its land to developers failed the Tribe twice; now, the Rosebud Sioux are employing a new strategy as a member of the Oceti Sakowin Power Authority.

Oceti Sakowin Power Authority (OSPA) Case Background

The Oceti Sakowin Power Authority is "an independent, non-profit, governmental entity formed to jointly develop tribal renewable energy resources by financing, developing, constructing and operating power generation and transmission facilities for the wholesale market" (2015). A coalition of the Cheyenne River Sioux Tribe, Flandreau Santee Sioux Tribe, Oglala Sioux Tribe, Rosebud Sioux Tribe, Standing Rock Sioux Tribe, and Yankton Sioux Tribe, the OSPA seeks to combine the collective experience of each Tribe's efforts to develop renewable energy to create over 1000MW of wind energy on their tribal lands.

Currently, the OSPA is developing two projects totaling 570MW. The 120MW Pass Creek project lies on the Pine Ridge Reservation, and the 450MW Ta'Teh Topah project will be constructed on the Cheyenne River Reservation (Hunt, 2018; Kessler, 2018). The organization expects to continue development on other member tribes' lands following the completion of the Pass Creek and Ta'Teh Topah projects. Unlike the Rosebud Sioux, the OSPA owns the majority stake in its project development, reaping the revenues of the wind farms while retaining controlling interest. In order to secure investors, though, the OSPA must still find a buyer to offload its power to. Similar to the North Antelope Highlands project, finding a buyer and suitable transmission infrastructure are challenges the OSPA has yet to overcome.

Figure 4 | OSPA Wind Potential Map



Source: OSPA (n.d.)

Importantly, the OSPA is legally a non-profit corporation chartered by its member tribes under Section 17 of the 1934 Indian Reorganization Act. As a Section 17 corporation, the OSPA

gains certain privileges enabling it to compete with non-tribal businesses. Primarily, the OSPA is able to take on liability in the form of debt or loans, and because of its corporate status, liability incurred by the OSPA does not transfer to its member tribes (MacCourt, 2010). Additionally, the OSPA can enter into land-lease agreements up to 25 years without BIA approval. Furthermore, each member tribe has empowered the OSPA to execute business contracts without further tribal oversight (Clancy, 2018). By pre-approving the OSPA's decisions, member tribes enable the OSPA to enter contractual agreements and operate independently of tribal administrative turnover and differences. In essence, the coalition operates as a standard business in that it can enter contractual agreements without deferring to tribal authorities, take on liability without incurring debt for the member tribes, and issue bonds to secure debt financing (OSPA, n.d.; MacCourt, 2010). Moreover, the OSPA owns the majority stake in a joint-venture partnership called 7G Renewable Energy with a wind developer, Apex Clean Energy. Because Apex is a non-tribal entity, the joint-venture qualifies for the Federal Production Tax Credit (OSPA, n.d.; MacCourt, 2010).

Data Collection Methodology

This study follows an approach that has not been in previous research on Native American energy development. In order to explore how the barriers to development manifest at each step in the project process, the study utilizes a novel comparative framework drawing from a previous study by Masterson (2009), with technical additions from the American Wind Energy Association (AWEA) framework for wind energy development. According to Masterson (2009), the four preliminary steps to wind energy development are:

- A wind resource assessment

- An ethnographic study
- An ecological study
- The 'courting' of private investors

Comparatively, the AWEA outlines its ten steps to wind energy development (Napier, 2012):

- Understanding your wind resource
- Distance from existing transmission lines
- Securing access to land
- Establishing access to capital
- Identifying reliable power purchaser or market
- Addressing siting and project feasibility considerations
- Understanding wind energy's economics
- Obtaining zoning and permitting expertise
- Establishing dialogue with turbine manufacturers and project developers
- Securing agreement to meet O&M needs

Synthesizing both methodologies, the study determined the steps most relevant for comparing the Rosebud Sioux and OSPA projects. This comparative five-step process will be the framework for analyzing the successes and challenges each project faced.

1. Wind Resource Assessment: In order to develop a wind farm, the site must meet minimum wind speed and spatial requirements.
    a. Wind Potential: For a utility-scale site to be feasible, annual average wind speeds must exceed approximately 5.8 m/s (American Wind Energy Association et al., n.d.). Proper metering equipment must be implemented over the course of several years to ensure the site's wind potential. Technical reports from the National Renewable Energy Laboratory (NREL) illustrate the wind potential across tribal lands.

b. Access to Land: Turbines require space, and an appropriate amount of available land must be secured to develop a wind farm. It is estimated that one square kilometer can support 4MW of wind energy (Denholm et al., 2009).

2. Project Permitting: Numerous permits must be obtained to develop energy resources on tribal lands (Masterson, 2009).

   a. Ethnographic Study: To receive necessary permits indicating no cultural sites will be impacted by development, the project site must be surveyed for any culturally significant landmarks or archeological sites.

   b. Ecological Study: To receive approval from the National Environmental Policy Act (NEPA) and Endangered Species Act (ESA) reviews, the project site must be surveyed for protected wildlife that may be damaged as a result of on-site construction and operation of the wind turbines and relevant infrastructure (MacCourt, 2010).

3. Transmission Infrastructure: Relevant transmission infrastructure must be taken into account when proposing development plans for energy development on tribal lands. Due to many tribal lands' geographic isolation from major urban centers, project sites often lack access roads and necessary energy infrastructure. To construct a project, the costs of constructing utility roads and interconnecting energy infrastructure must be included in the project financing proposal (MacCourt, 2010).

4. Power Purchase Agreement (PPA): The project developer must secure a buyer to off-load the project's generated electricity. Potential buyers often include utilities and cities. The PPA includes the buyer's promise to purchase the power at a specific rate, the seller's

promise to deliver a certain amount of power, and the length of the contract. The PPA is a key document in securing financial backing from investors, as investors often require power purchasing contracts of approximately 20 years to be in place before investing (MacCourt, 2010).

5. Securing Financing: As most tribes do not have the capital to independently develop a wind farm, they must partner with a third-party investor to finance the project (Bronin, 2013; Greenhowe, 2013; Jones and Necefer, 2013; Kronk Warner, 2012). To do so, the tribe must first have a long-term power purchase agreement with a buyer to off-load the power. With a PPA in place, the tribe and investor can agree to royalty fees if the tribe wishes to lease the project land, or equity financing if the tribe owns the project (MacCourt, 2010; Shahinian, 2008).

By evaluating the North Antelope Highlands and OSPA projects through these steps, each project is broken down into the processes leading to their respective accomplishments. Overall, the study framework effectively provided a comparative lens for the case study analysis; the five steps were relevant to each project, and are also applicable to other tribal projects. The Wind Resource Assessment, Project Permitting, and Transmission Infrastructure steps provided background to the project, while the Power Purchase Agreement and Securing Financing steps allowed for analysis of the projects' strategic differences.

To analyze each project, the study uses three sources of data. Foremost, official publications from the Rosebud Sioux and OSPA regarding their projects provide an in-depth understanding of the accomplishments and challenges from the tribal officials' perspective. Additionally, technical reports from NREL provide feasibility data. Finally, peer-reviewed

literature on the legal and economic processes for securing contractual agreements are used to further analyze the challenges of each step.

Results

The results are presented as a step-by-step comparison of each project's approach, successes, and challenges.

Table 1 | Summary of Wind Energy Development Strategies

		Rosebud Sioux	OSPA
Wind Resource Assessment		• 190MW planned	• 570MW planned; Over 1000MW expected
Project Permitting		• Environmental Assessment • Ethnographic Assessment • Federal Aviation Administration Permit	• In Progress
Transmission Infrastructure		• 115kv substation in Mission, SD	• 120MW capacity on existing transmission line • Oahe Hydroelectric Dam
Power Purchase Agreement		• Basin Electric (unsuccessful) • MISO (unsuccessful) • WAPA (unsuccessful)	• Selling into SPP, assuming a buyer • No buyer yet
Securing Financing	**Ownership Strategy**	• Land-Leasing	• 51% ownership stake in joint-venture 7G Renewable Energy
	Funding	• Outside Investor • $33,000 per MW to Tribe + 3.5% gross revenue	• Monetizing the PTC at 80% value for Tax Equity Investments • Issuing tax-exempt bonds

Wind Resource Assessment

Rosebud Sioux

The North Antelope Highlands Wind Project lies on 11,000 square acres two hours south of Pierre, South Dakota. All of the land is legally held in trust for the Rosebud Sioux Nation by the Federal Government, meaning the Federal Government owns the land and its development rights. As such, any decision to lease the land must be approved by the Bureau of Indian Affairs (BIA). Without such approvals, any lease agreement is invalid (Haukass, 2016).

The Rosebud Sioux worked with EAPC Wind Energy to install three meteorological towers on the project site. The towers collected wind data for multiple years before being analyzed by V-bar, a wind meteorological group. The analysis determined the project site to have the potential for a 190MW wind farm, with a net capacity factor of 47%. These projections assumed the use of approximately 127 General Electric 1.6MW turbines with a calculated average wind speed at 80 meters of 8.5m/s (Haukass, 2016).

OSPA

The OSPA project spans six tribes' lands in South Dakota. Together, the lands hold the potential to generate 83,157MW of wind power (NREL, n.d.).[4] The OSPA coalition currently seeks to harness over 1,000 megawatts of the lands' wind energy potential and has plans in place to develop the first 570MW (Kessler, 2018). The 450MW Ta'Teh Topah project will be developed on the Cheyenne River Reservation in northern South Dakota and the 120MW Pass Creek project on the Oglala Sioux's southern Pine Ridge Reservation. Together, the two projects

[4] Across the six reservations, there is a total of 83,157MW in wind energy potential. Individually, the Cheyenne River Reservation has 24,294MW potential; Pine Ridge 24,273MW; Standing Rock; 23,324MW; Rosebud Sioux 7,543MW; Yankton Sioux 3,703MW; and Flandreau 20MW (NREL, n.d.).

expect to have a 50% net capacity factor and generate 2.5 million MWh of electricity annually (Kessler, 2018).

Although technical wind potential reports are not yet publically available for the Ta'Teh Topah project, wind resource data is available for the Pass Creek project. The Pass Creek project has wind potential ranging from class 3 to 5, with approximately half of viable land categorized as class 4 with speeds of 7-7.5m/s (Office of Indian Energy and Economic Development, 2010). The joint-venture formed by the OSPA and Apex Clean Energy, 7G Renewable Energy, is in the process of collecting wind data. Overall, the project anticipates up to 35 turbines being constructed (Hunt, 2018).

Project Permitting

Rosebud Sioux

The Rosebud Sioux completed all flora and fauna data gathering, as well as the cultural and archeological study. The Tribe completed the ecological study in 2011 and filed for an Environmental Assessment by the BIA at the cost of $150,000. The BIA was expected to complete the review within nine months of filing and issue a permit. The Tribe noted concern of a single eagle nesting outside the project site and potential infringement on the endangered Whooping Crane habitat, but concluded that the project was far enough west of the Missouri River to be of no environmental concern. (Haukass, 2016). Additionally, the Federal Aviation Administration determined the project to be safe for air navigation (Haukass, 2016).

Alongside Citizens Wind, the Rosebud Tribal Historical Preservation Office completed the ethnographic review in October 2015 that covered 5,928.87 acres of project land. Seventy-three culturally significant sites were found on the project land. Twenty-six of the sites were

considered eligible for nomination to the National Register of Historical Places, and located directly in proposed turbine or access road locations (Haukass, 2016). As a result of these findings, the review recommended an "Adverse Effect" for the historical sites under the proposed project plan. The review recommended that an on-site monitor be present during construction at these locations with stop-authority in case any culturally significant burials were unearthed. After reviewing the investigation, though, the head of the Rosebud Sioux's Tribal Historic Preservation Office issued a recommendation of "No Adverse Effect" for the project in entirety, while noting any construction would be immediately stopped if archeological resources were to be discovered (Haukass, 2016).

OSPA

7G Renewable Energy, the OSPA and Apex Clean Energy's joint-venture, is in the process of completing its archaeological and ecological surveys for the Ta'Teh Topah and Pass Creek projects by 2021 (Hunt, 2018). So far, 7G has contracted Western EcoSystems Technology, Inc., to conduct avian surveys (Hunt, 2018).[5] Additionally, Apex is assisting the OSPA with federal permitting such as the National Environmental Policy Act (NEPA) (Kessler, 2018).

Transmission Infrastructure

Rosebud Sioux

The North Antelope Highlands project relied on a 115kV substation in Mission, South Dakota, to connect the project with the grid operated by the Western Area Power Administration

[5] Avian surveys are essential to minimizing the environmental impact of wind turbines. Western EcoSystems Technology, Inc., specializes in creating development strategies that promote avoidance of avian species while promoting conservation efforts (n.d.).

(WAPA). According to a study by Excel Engineering of the Mission substation, the substation has several limiting factors that would restrict the project's output from a maximum of 210MW to 190MW. In order to exceed 190MW, the project would need to construct additional transmission lines (Haukass, 2016).

In order to connect to WAPA's transmission infrastructure, the Rosebud Sioux filed an interconnection request in January, 2009. WAPA approved the request, and the two parties signed a Large Generator Interconnection Agreement in August, 2014, for 190MW. The agreement yielded a $2.4 million interconnection cost for the project (Haukass, 2016).

Despite securing the interconnection agreement, Citizens Wind placed the interconnection into suspension in August 2014 while it sought a Power Purchase Agreement (PPA). The agreement could be placed in suspension for up to three years before the scheduled payments towards the $2.4 million began, or the Agreement terminated. (Haukass, 2016). As no development has begun, the agreement has terminated.

OSPA

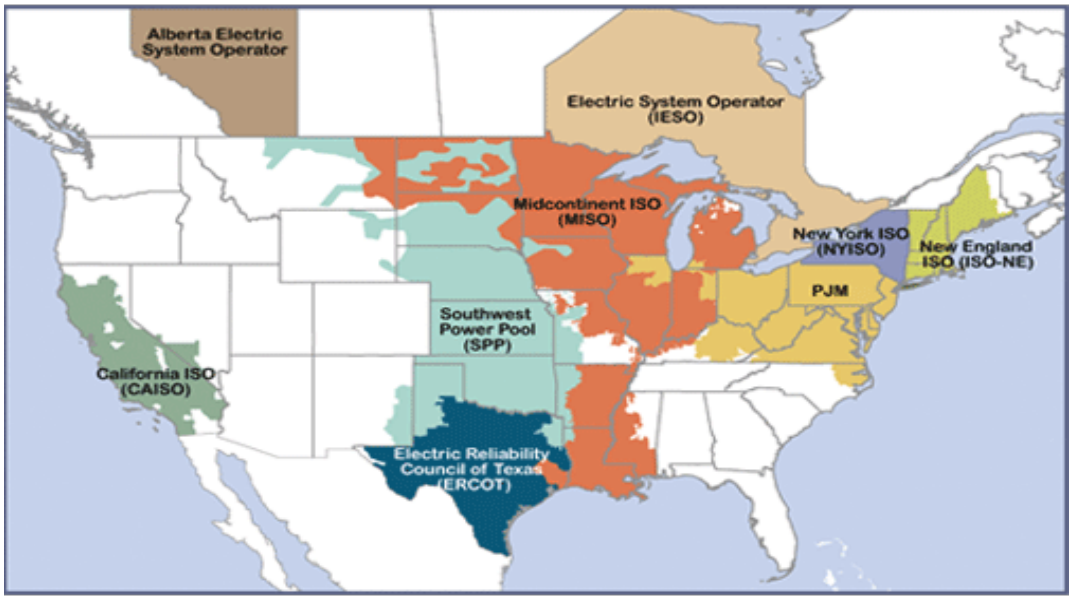
The OSPA selected the Pine Ridge and Cheyenne River Reservations as the first for wind energy development due to their proximity to transmission lines (Robertson, 2019). The Pass Creek project intends to utilize a transmission line running through the Pine Ridge Reservation operating 120MW under capacity (Robertson, 2019). Meanwhile, the Ta'Teh Topah project is located near the Oahe Dam, a hydropower station connected to transmission lines (Robertson, 2019). Currently, the OSPA has interconnection requests in place with the Southwest Power Pool for the two projects (Kessler, 2018).

Power Purchase Agreement (PPA)

Rosebud Sioux

The North Antelope Highlands Wind Project struggled to secure a PPA, citing minimal local load growth as the main impediment. One potential buyer, Basin Electric, experienced slight load growth due to increased oil drilling in North Dakota's Bakken oil field. While exact details of Basin Electric's requests for proposals (RFP) to take on power are private, the winning price is cited at approximately $24 per MWh. Due to the project size, the North Antelope Highlands project was not able to compete with larger developers and did not win the Basin RFP (Haukass, 2016). The project also sought to transfer power east into the Midcontinent Independent System Operator (MISO), but crossing from the local Regional Transmission Organization - the Southwest Power Pool (SPP) - into another added approximately $11 per MWh in costs which made the project uncompetitive (Haukass, 2016).

Figure 5 | Regional Transmission Organizations and Independent System Operators



Federal Energy Regulatory Committee (n.d.)

The project also sought to offload electricity directly to the Western Area Power Administration (WAPA). However, WAPA does not have the authority to enter into agreements exceeding five years, which is crucial for projects to secure financial backing (Bordeaux, 2012). As such, no agreement was made.

OSPA

The OSPA will sell its power into the Southwest Power Pool (SPP) (Kessler, 2018). However, the coalition has not yet identified any specific buyers for the generated electricity. Due to the scale of the project, though, project officials believe the project's competitive costs and positive local impact will attract many buyers interested in green energy (Kessler, 2018).

Securing Financing

Rosebud Sioux

In 2007, the Rosebud Sioux awarded a request for proposals to develop the North Antelope Highlands project to Citizens Wind, a subsidiary of Citizens Energy Corporation. The estimated $3,000,000 predevelopment costs were to be financed by the project developer. Additionally, the Rosebud Sioux planned to act as a passive landowner and charge a development fee of approximately $100,000 per megawatt to the project's eventual owner, with the fee being split between the Tribe and Citizens Wind (Haukass, 2016). With a $1,500,000 award from the Department of Energy to assist in the development costs, the Rosebud Sioux garnered a 33/67% split. This agreement earned the Rosebud Sioux $33,000 per megawatt and Citizens Wind $66,000 (Bordeaux, 2). The Tribe intended to use the money to purchase one, two, or three turbines and gain all profits above the 3.5% fee on gross revenue streams from those turbines (Haukass, 2016). Meanwhile, the investor would earn 96.5% of gross revenue

from the project in addition to the Production Tax Credit. Moreover, as the majority owner, the investor would retain all project control throughout the contract duration (MacCourt, 2010).

The contractual agreement between the Rosebud Sioux and Citizens Wind assumed an investor bought the project. However, without a secured PPA, investors were unwilling to invest in the project, resulting in the stagnation of the project beyond Citizens Wind's five-year exclusive rights contract. Currently, the project remains undeveloped (Haukass, 2016).

OSPA

To finance the project, the OSPA and Apex Clean Energy partnered to form a joint-venture, 7G Renewable Energy. The OSPA holds a 51% stake in 7G, with Apex holding 49% (OSPA, n.d.). As majority owners of the project, the OSPA will reap dividends of their own wind farm, rather than receiving land lease royalties. By issuing tax-exempt bonds, 7G expects to intake more capital in earlier phases of the project's development, enabling the project to begin construction earlier (Kessler, 2018). The bonds will be backed by the credit of the project's Power Purchase Agreement (PPA) with a buyer. To achieve their development goals, though, 7G still requires financing from outside investors.

As a joint-venture, 7G is subject to federal tax laws, making the partnership eligible for the Federal Production Tax Credit (PTC) (MacCourt, 2010). The OSPA intends to attract tax equity investors by monetizing the PTC at 80% value, or $19.20/MWh if completed by 2021 (Kessler, 2018). The rate would decrease to 60%, or $14.40/MWh, should the project be delayed until 2022 (Kessler, 2018).

In order to secure an investor, the project must first win a PPA from a buyer. While the project intends to sell its power into the Southwest Power Pool, finding a buyer to off-load that energy is still a top priority for the OSPA to attract investors. With a long-term PPA, the OSPA

expects investors to be attracted to the scale and potential of their clean energy project (Kessler, 2018).

Discussion

In this section, the similarities and differences between each project's development strategies will be contextualized and evaluated. Specifically, the discussion will explore each project's strategy to address the challenges of overcoming the Bureau of Indian Affairs (BIA) inefficiencies, securing financing, tax incentive ineligibility, and internal tribal delays.

Table 2 | Strategies in Response to Development Barriers

	Rosebud Sioux	OSPA
BIA Inefficiencies	● The BIA must approve any lease agreement	● Does not rely on the BIA for leases up to 25 years
Securing Financing	● Land-leasing to outside investors ● Investors need a secured buyer to invest ● Project not at market competitive scale	● 51% majority ownership in the project ● Monetizing the PTC at 80% value to attract tax equity investors ● Issuing tax exempt bonds ● Project scale expected to attract investors
Tax Credit Ineligibility	● Ineligible under tribal ownership; eligible under investor ownership	● Eligible as a Section 17 chartered corporation in a joint-venture with a non-tribal entity
Internal Delays	● Delays collecting permitting reports	● Pre-authorization from member tribes to act on their behalf

Wind Resource Assessment

The Rosebud Sioux and OSPA differ on their access to land, but approach the wind resource evaluation similarly. Foremost, as both entities seek to develop wind energy resources on tribal lands, the BIA is the legal administrator of the land (Leventhal, 1985). Due to the trust relationship between the Federal Government and Indian lands, any lease or development agreement must be overseen by the BIA (Haukass, 2016). For the North Antelope Highlands project, the Rosebud Sioux are thus unable to enter lease agreements without the consent of the BIA.[6] The Tribe successfully negotiated a lease agreement with the developer, but the BIA only partially agreed to the agreement (Haukass, 2016). As a result, the project stalled.

However, the OSPA is legally able to enter lease agreements for up to 25 years without BIA oversight (MacCourt, 2010). This key difference lies in how each tribal entity operates: the Rosebud Sioux as a tribe,[7] and the OSPA as a Section 17 tribal corporation. Under Section 17 of the 1934 Indian Reorganization Act, tribes are legally able to incorporate themselves and gain certain privileges enabling them to compete with non-tribal businesses. With regards to land leasing, Section 17 corporations are able to enter lease agreements of up to 25 years without approval from the BIA (MacCourt, 2010). As such, the OSPA can enter agreements with developers independently and begin construction on their expected timeline without delays from

[6] The legal details of the Rosebud Sioux's leasing abilities are inconsistent. In order to conduct business competitively, the tribe incorporated itself under Section 17 of the 1934 Indian Reorganization Act (Haukass, 2016). Typically, Section 17 Corporations are legally allowed to enter lease agreements up to 25 years without oversight from the Secretary of the Interior (MacCourt, 2010). However, the Rosebud Sioux's 1937 corporate charter by-laws specifically state that the Tribe cannot enter into lease agreements beyond 10 years (Department of the Interior, 1937). This contradicts the Rosebud Sioux's official report on the North Antelope Highlands Wind Project that they cannot enter lease agreements without BIA oversight. Despite this inconsistency, this study defers to the Tribe's expertise in the matter and assumes that the Rosebud Sioux cannot enter lease agreements without BIA approval.

[7] See footnote 6

BIA approvals. Due to this independence, the OSPA is more likely to attract contractors and investors.

While the Rosebud Sioux and OSPA's operating status impacts their land leasing capabilities, both projects approach gathering wind data through the same process. In each case, tribal officials worked with the project developer to set up meteorological towers to collect multi-year wind data for the project area. An independent company then analyzed the data and determined the wind quality and project feasibility. For the North Antelope Highlands Wind Project, Pass Creek project, and Ta'Teh Topah project, the assessments illustrate high-quality wind potential.

Project Permitting

Both projects have undertaken similar permitting processes. While extensive data exists for the North Antelope Highlands Wind Project relative to the OSPA projects, the process detailed by the Rosebud Sioux of working with archeological and ecological councils to ensure the land's cultural preservation is mirrored by the OSPA as the framework for its own projects (Robertson, 2019). Although the Rosebud Sioux successfully obtained all necessary permits, the project report notes that the loss of a tribal official for three years due to tribal elections delayed site data collection reports (Haukaas, 2016).

Transmission Infrastructure

Each project struggles with issues of transmission, and proximity to pre-existing transmission infrastructure largely dictates the projects' success. The North Antelope Highlands Wind Project expected to interconnect with WAPA's 115kV substation in Mission, South

Dakota, and had an interconnection agreement in place. Similarly, the Pass Creek project intends to connect with a 120MW transmission line running through the Pine Ridge Reservation, and the Ta'Teh Topah project expects to interconnect with transmission lines running from the Oahe Dam north of Pierre, South Dakota (Kessler, 2018). For each of these projects, transmission did not prove to be a significantly limiting factor to its overall success, though the maximum output of the North Antelope Highlands and Pass Creek projects are limited by existing transmission capacity.

Notably, the OSPA discontinued a planned project on the Rosebud Reservation due to the Tribe's internal administrative complications. The same under-capacity transmission line that runs through the Pine Ridge Reservation continues through the Rosebud Sioux Reservation, and the OSPA had intended to develop one 60MW project on each. However, because the plans for the Rosebud project fell behind those of the Pine Ridge project, the OSPA chose to develop all 120MW on the Pine Ridge Reservation (Robertson, 19). The OSPA's actions demonstrate a clear commitment to transmission accessibility as the key factor in determining site feasibility, at least until enough capital exists to construct new transmission infrastructure.

Power Purchase Agreement (PPA)

The largest barrier to both projects is securing a PPA from a buyer. The Rosebud Sioux's official project report details its unsuccessful efforts at securing a PPA with WAPA, Basin Electric, and East Coast buyers. The Tribe cites little load growth to be the primary factor in not securing a buyer; there are few large population centers near the reservation, and the only large-scale buyer, Basin Electric, sought larger generation capacity and a lower cost (Haukass, 2016). Unlike the Tribe's prior Owl Feather War Bonnet Project where BIA delays cost the Tribe its

PPA, the Rosebud Sioux did not secure a potential buyer and thus did not submit an agreement to the BIA for review.

The OSPA hopes to achieve a different result in finding a buyer. The coalition expects to sell its power into the SPP, but still must find a buyer to offload the electricity (Kessler, 2018). It remains unclear how the OSPA will find a buyer, as they are geographically removed from large population centers and are targeting a market identical to the Rosebud Sioux's project. However, the OSPA's gigawatt generation capacity provides it more market competitiveness than the Rosebud Sioux's 190MW capacity.

According to Lyle Jack, chairman of the OSPA, electric buyers seek large projects (Robertson, 2019). Jack claims that buyers are looking for projects in the 500 to 1000MW range, rather than 100-200MW (Robertson, 2019). These ranges align with the two studied projects, and Jack's claims coincide with the study's findings. The North Antelope Highlands project failed to find a buyer due to economy of scale competition as larger clean energy projects offered Basin Electric more competitive rates (Haukass, 2016). The OSPA, however, expects to be able to compete with other large-scale renewable energy projects for buyers like Basin Electric. With development plans in place for 570MW and future plans to exceed one gigawatt of clean energy generation, the OSPA will be economically competitive within the region where the Rosebud Sioux were not.

Securing Financing

Project ownership is a crucial difference between the projects with significant financial implications. The North Antelope Highlands Wind Project operated under a traditional land-lease structure, with the investor paying $33,000 per megawatt to the Tribe and $66,000 per megawatt

to Citizens Wind. Additionally, the Tribe would receive 3.5% of the project's gross revenue stream, and would not be liable for operation or maintenance costs (Haukaas, 2016). While this model succeeds in guaranteeing capital for the Rosebud Sioux, it exposes the Tribe to additional risk as well. Primarily, the investor has no obligation to maintain the project's infrastructure after the contract potentially leaves the PTC-ineligible Tribe with an ageing and inoperable wind farm. Additionally, depending on the terms of the contract, the investor may have the right to sell the project to a separate entity, thus compromising the Tribe's control further (MacCourt, 2010).

The OSPA, on the other hand, opted to take an active ownership role in their project. The OSPA owns a 51% share in their joint-venture with Apex Clean Energy, 7G Renewable Energy, granting the OSPA majority ownership rights (Kessler, 2018). In this model, the OSPA is responsible for every aspect of the project from siting permits to tax equity agreements. The OSPA would reap the revenues of its own project and share them with Apex, and be responsible for all project fees, maintenance, operation. As the OSPA owns the project, control remains in tribal hands, and the OSPA can partner with tribal contractors and educational programs as it sees fit. However, the model also exposes the OSPA to risk if the OSPA cannot finance the project or its debts. But, because the OSPA's liabilities are not transferable to its member tribes, the risk of the OSPA failing does not impact the member tribes from a legal or financial perspective. As such, with a large-scale project competitive with non-tribal developments, the OSPA has mitigated many risks associated with tribal partnerships while positioning itself as a viable and attractive investment opportunity.

Securing financing for the OSPA projects lies in its eligibility for the Production Tax Credit (PTC). As referenced previously in the "Contextualizing Barriers to Tribal Wind Energy Development" section, investors are economically incentivized to partner with non-tribal entities

in order to increase total revenue via the PTC (Shahinian, 2008). Previous studies have shown that, largely because of tribes' tax-exempt status, return on investment for tribal wind farms is 2% compared to 12% on non-tribal wind farms (Mills, 2006). For an investor, partnering with the Rosebud Sioux would be fiscally disadvantageous regardless of a PPA.

The OSPA, however, is employing a novel strategy to make their project eligible for the PTC. As a Section 17 corporation wholly owned by tribes, the OSPA is a tax-exempt entity like the Rosebud Sioux. By partnering with a non-tribal entity, Apex Clean Energy, in a joint-venture to create 7G, the OSPA created a taxable entity (MacCourt, 2010). With their 51% stake in 7G, the OSPA owns a PTC-eligible wind energy development venture. This legal loophole of creating a tribal entity two-steps removed from the tribe reaps significant economic and legal benefits.

Most importantly, 7G qualifies for the PTC and thus is economically competitive with non-tribal projects. In order to secure financing, 7G intends to monetize the PTC at an 80% rate to attract tax equity investors, assuming development is underway before 2022 (Kessler, 2018). Essentially, 7G will offer $1.00 of tax credits for $.80 of capital investment, resulting in a 25% return on investment for the investor.[8] The transaction takes place within a legally binding partnership, meaning the investor plays a role in the larger project; in the case of the OSPA, the investor will be a passive minority partner (Heighley et al., 2019). Typically, tax equity investors prefer large projects due to the transaction's liabilities and complexity, thus situating the OSPA for success. By monetizing the PTC, though, 7G creates an equity gap by losing 20% of their expected tax credit revenues. In order to make up the difference, the OSPA must secure other

[8] To read more about tax equity financing, see Heightley, M. P., Marples, D J., & Sherlock, M. F., (2019), Tax Equity Financing: An Introduction and Policy Considerations [PDF], *Congressional Research Service*.

financing measures such as traditional loans, grants, or other tax incentives. In the case of the OSPA, issuing tax-exempt bonds is a likely solution to the equity gap.

As a Section 17 corporation, the OSPA can legally issue tax-exempt bonds (MacCourt, 2010). The coalition intends to take advantage of this, backing their bonds solely with the credit of the PPA (Kessler, 2018). Not only will this form of debt financing fill the equity gap from the PTC tax equity transaction, but issuing bonds will supply the OSPA with much-needed capital during the project's early stages.

For both projects, securing investors remains difficult until a PPA has been agreed to with a buyer. The Rosebud Sioux's inability to find a buyer to off-load the power from the North Antelope Highlands project ultimately resulted in the project stagnating. The OSPA, meanwhile, is optimistic about their efforts to find a third-party investor due to their unique status as a Section 17 corporation and the project's large scale.

Limitations & Future Steps

Three key factors limit the scope of this study. Foremost, due to time constraints and availability of Rosebud Sioux and OSPA officials, tribal officials have not yet commented on the study's findings. As such, the study relies on literature published by tribal officials, the Federal Government, scholars, and media sources to evaluate the successes and failures at each step in the respective projects. Conducting interviews with tribal officials involved in either project is a key area for this study to expand in the future; having the insight of informed officials will provide credibility and support to this study's findings.

Additionally, because the OSPA is currently in the process of developing its projects, limited information is available about its developments. While news sources provide insight into

the Pass Creek project, and to a minor extent the Ta'Teh Topah project, these reports are unofficial and do not encompass the entirety of the OSPA's 1000MW plan. As official reports are released throughout the development process of the full project plan, the study will be able to analyze the strategies undertaken by each entity more specifically.

Finally, the occurrence of COVID-19 impacted access to literature, and by extension the research literature, behind the study. Although many articles and reports are available online, the study was unable to consider the content of numerous books in its literature review due to the closure of libraries in the Spring of 2020. As a result, the study was unable to synthesize a full range of previous works throughout the literature review and instead focused on peer-reviewed publications, government reports, and technical studies.

Conclusion

The comparison between the Rosebud Sioux's North Antelope Highlands Wind Project and the Oceti Sakowin Power Authority (OSPA) project reveal key strategic differences in overcoming barriers to wind development on tribal lands. With regards to the Bureau of Indian Affairs' (BIA) inefficiencies, financing struggles, tax ineligibility, and internal tribal disagreement, the Rosebud Sioux opted for a project ownership structure and development strategy that exposed them to potential delays from the BIA, reliance upon outside investors, and internal tribal discord. Additionally, as a minority stakeholder in the project, the Rosebud Sioux were left vulnerable to the project owner's future plans and did not have a strategy in place for the wind farm once the contract with the investor expired. However, the Rosebud Sioux's strategy guaranteed the Tribe financial royalties and a percentage of the project's revenue stream, were it successful.

On the other hand, the OSPA's ownership structure and project strategy protect them from BIA inefficiencies and tribal disagreement. Furthermore, creating a joint-venture with Apex Clean Energy to form 7G Renewable Energy qualifies the project for the Federal Production Tax Credit (PTC). The OSPA's ownership stake in 7G granted them controlling interest in the project, ensuring tribal control. However, the OSPA's reliance on tax equity financing exposes the coalition to risk, given the unknown future and longevity of the PTC. Although risks to the OSPA exist, these liabilities do not transfer to the member tribes, further empowering the OSPA's strategy. Yet, numerous questions remain. Primarily, how successful will the OSPA model be? How important is the production tax credit to the OSPA's success? Finally, if successful, is the OSPA model replicable elsewhere, or are the geographic factors enabling the coalition's success unique to the OSPA? This study's novel comparative framework sets the groundwork for these future areas of study.

Importantly, numerous aspects of the OSPA's strategy are accessible to other tribes seeking to develop wind energy. The OSPA's strategy demonstrates the advantages of tribal incorporation under Section 17 of the 1934 Indian Reorganization Act. Similarly, it shows the benefits of tribal corporations forming a joint-venture with a non-tribal entity. While these strategies require careful planning, research, and legal oversight, they are short-term solutions to overcoming the challenges of BIA oversight and tribes' tax-exempt status. However, transmission infrastructure proved to be a limiting factor for both the OSPA and the Rosebud Sioux projects, and will continue to be a challenge for the foreseeable future. The case study analysis shows that a key barrier to tribal wind energy development is not the wind resource nor the Tribes' capabilities; it is the undeveloped infrastructure required to *affordably* transmit generated electricity from tribal lands to buyers. While the OSPA hopes to construct this

infrastructure itself, they should not have to. The right to the best available energy infrastructure is one of four components to energy justice. The United States Government, "as trustee for Indian lands," is "obligated to manage those lands for the welfare of tribes and their citizens" (Grogan et al., 2011). The Rosebud Sioux and OSPA, as well as previous unsuccessful tribal efforts, have committed time and money to creating economic and educational opportunities in renewable energy for their respective members. Now, the Federal Government must uphold its commitment to the welfare of the tribes it administrates.

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