EMPOWERING INDIGENOUS COMMUNITIES IN A SUSTAINABLE ENERGY TRANSITION: MICROGRIDS FOR ENHANCED RESILIENCE

by

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ABSTRACT

Empowering Indigenous communities in sustainable energy transition:
The role of microgrids for enhanced resilience

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Indigenous communities face disproportionate energy challenges, including high costs and limited access to reliable power, which exacerbate existing socioeconomic disparities. For the Spokane Tribe of Indians, these challenges are particularly acute, with energy usage predominantly centered on heating during harsh winters. Frequent power outages further strain community resilience, highlighting the urgent need for sustainable and reliable energy solutions.

Microgrids present a transformative opportunity to address these issues. As localized energy systems, microgrids operate independently or alongside traditional grids, offering enhanced reliability, reduced emissions, and increased community control over energy resources. This thesis examines the intersection of energy justice, microgrid technology, and Indigenous self-determination, focusing on the Spokane Tribe's Children of the Sun microgrid project. This study explores how microgrids can enhance resilience and energy sovereignty in Indigenous communities by analyzing historical contexts, regulatory frameworks, and community-led energy strategies.

By employing both qualitative and quantitative methodologies, including survey data and policy analysis, this study provides actionable insights into the benefits and challenges of microgrid implementation. It highlights the potential of microgrids not only as technical solutions but also as catalysts for addressing intergenerational energy disparities and promoting equity. Ultimately, this research contributes to broader discussions on energy justice and sustainable development, offering a framework for replicable and culturally sensitive energy strategies in Indigenous and other overburdened communities.

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Introduction

Indigenous communities are exposed to disproportionately high energy costs. Native American communities are located on or near reservations, often remote, where resource access is unreliable or nonexistent. The Spokane Tribe of Indians (STOI) community energy usage is primarily heating (41%) and heating and cooling combined (21%), reflecting the need for warmth during frequent winter power outages. Microgrids present a promising solution to address those challenges.

Microgrids—localized and community-enhanced energy systems capable of operating independently or alongside the traditional power grid—address energy access barriers by facilitating lower-emission energy generation and providing a more resilient and reliable electrical system. Microgrids can be optimized to meet Indigenous communities' unique energy demands and constraints while promoting sustainability and energy security. Like many Tribal communities, Spokane tribal members often face the environmental and health consequences of conventional energy generation methods—such as burning coal, oil, natural gas, or uranium—while missing out on corresponding benefits like lower rates, community development, and reliable power access. (Raimi & Davicino, 2024, p. 4). As the adverse effects of climate change intensify, the resilience offered by microgrids becomes increasingly critical. Microgrids mitigate vulnerabilities to extreme weather events and other climate-related disruptions by providing localized, reliable energy systems, making them an essential component of sustainable energy strategies.

This study focuses on understanding how microgrids can enhance energy resilience and equity in Indigenous contexts, particularly in the Spokane Tribe. It examines the role of microgrids in bridging the gap between the technical and social dimensions of the energy transition. Specifically, this research explores the impact of microgrids on the resiliency and

reliability of energy systems for Indigenous communities during their transition to renewable energy. It also investigates how implementing microgrids in historically overburdened communities, such as the Spokane Tribe, can address intergenerational energy disparities while serving as a model for sustainable and resilient energy infrastructure in other Indigenous contexts. Successful microgrid projects require collaboration among various stakeholders, including state energy entities, utilities, tribes, banks, and suppliers. This is particularly important as Indigenous communities have historically had reasons to distrust government and corporate intentions, emphasizing the need for respectful and mutually beneficial partnerships.

Indigenous communities, emphasizing climate change, sustainability, and sovereignty, present a compelling case for tailored approaches to energy transition. Addressing these unique requirements necessitates collaboration among stakeholders, including state energy entities, utilities, tribes, banks, and suppliers. Respectful and mutually beneficial partnerships are critical, given the historical distrust of government and corporate intentions in tribal contexts.

This study employs the energy justice framework to bridge the gap between the technical and social dimensions of the energy transition. Central to this research is the active participation of Spokane Tribal community members, focusing on amplifying their voices and understanding their lived experiences. By integrating culturally informed methodologies and prioritizing meaningful community engagement, the study seeks to provide actionable insights for advancing equitable energy solutions that align with Indigenous populations' values, needs, and aspirations.

Energy justice seeks to overcome barriers to energy access, focusing on communities that lack reliable and equitable energy resources. The Spokane Tribe of Indians, a sovereign Native American nation, exemplifies active leadership in this domain. Their engagement with community, state, and federal community partners underscores the critical role tribal nations play

in shaping the discourse and practice of energy justice. Their involvement is crucial to the remediation of systemic inequities.

In alignment with these efforts, Washington State's Clean Energy Transformation Act (CETA) underscores a commitment to energy justice by mandating that 30% of the benefits from the renewable energy transition be directed toward overburdened communities, including Indigenous populations. Similarly, the Climate Commitment Act (CCA) introduces policies to reduce carbon emissions while creating opportunities for investor-owned utilities to strengthen or establish meaningful partnerships with tribal nations. These legislative measures encourage utilities to address historical inequities by fostering equitable relationships through meaningful dialogue and collaboration. By prioritizing fairness in the distribution of environmental benefits and burdens, these efforts aim to protect vulnerable communities and promote sustainability, ensuring that the transition to renewable energy reflects principles of equity and justice.

Energy justice, a central theme of this study, is deeply interconnected with the efforts of tribal nations to secure equitable access to energy resources. The Spokane Tribe of Indians, a sovereign Native American nation, significantly advances this framework through collaborative engagement with community, state, and federal entities. The Spokane Tribe's leadership in pursuing energy sovereignty is a powerful example of how Indigenous nations can assert control over their energy futures. This vision is embodied in the development of the Children of the Sun microgrid, a groundbreaking initiative demonstrating the Tribe's commitment to sustainability, resilience, and self-determination.

The Children of the Sun microgrid in Wellpinit, WA, is a testament to the Spokane Tribe's energy sovereignty. While the project benefits from a technical partnership with Avista Corporation, it is firmly rooted in the Tribe's vision and leadership. Designed to enhance energy resilience, reduce dependence on fossil fuels, and prioritize community-driven solutions, the

microgrid reflects a bold assertion of the Tribe's autonomy in addressing systemic inequities. This collaboration highlights the potential for meaningful partnerships between tribal nations and utilities when Indigenous priorities lead such efforts. The success of the Children of the Sun microgrid underscores how tribal leadership and collaborative innovation can reshape energy systems, offering valuable lessons for equitable and sustainable energy transitions.

This thesis will explore the historical contexts, regulatory frameworks, and the Spokane Tribe's specific experiences with microgrid projects. It will examine ownership models, benefits, challenges, and funding mechanisms supported by surveys and data analysis. By focusing on how microgrids can enhance energy resilience among Indigenous populations and address intergenerational disparities, this study contributes to broader discussions on environmental justice and Indigenous rights. Indigenous communities, focusing on climate change, sustainability, and sovereignty, present a compelling case for addressing their specific requirements in the context of energy transition.

Literature Review

Historical and Cultural Context

Since time immemorial, many Indigenous people have lived sustainably, maintaining a reciprocal relationship with the land and water (Dobson, 2021, p. 42). However, since first contact, colonial government trust policies have had devastating impacts on Indigenous communities. These policies have often deprived Indigenous people of the social, political, cultural, and economic agency needed to sustain their kinship ties with the land and water. As a result, many Indigenous communities have struggled to uphold traditional practices that value reciprocity (Dobson, 2021, p. 49; Waters, 2004, pp. 10–11).

Colonial powers from Europe and other regions imposed their rule on Indigenous peoples worldwide, disrupting unique cultures and traditions to the detriment of their lifeways (Deloria, 1988, p. 654). For Native Americans and First Nations people of North America, this history reflects a specific form of colonization rooted in Eurocentric ontologies, manifest destiny, and what Karl Marx termed 'primitive accumulation' (LaDuke, 1999, pp. 27–30; Marx & Engels, 1967, p. 3).

Despite generations of trauma and colonial marginalization, Indigenous peoples are now being called upon to share their knowledge and sustainable practices to help address the climate crisis. This irony highlights the renewed recognition of Indigenous wisdom in tackling global environmental challenges.(Cajete, 1999, p. 8; Cajete, 2020, p. 7; Menzies, 2006, pp. 239–241). Native American sustainability practices are valid knowledge systems. Western science, recognizing the climate crisis through undeniable evidence, actively collaborates with Indigenous communities (Ramos, p 18, 2022). This collaboration, converging sciences, involves integrating traditional ecological knowledge into practical strategies for mitigating anthropogenic climate change, such as incorporating Indigenous fire management techniques in forest

conservation and leveraging conventional agricultural practices to enhance biodiversity (Turner, 2008, pp. 162–177).

The United States government coerced Native Americans into the Western ways of living to the detriment of Indigenous lifeways. In its colonial mechanisms where development for development's sake has been prized, the inherent flaws of these systems are now manifesting as significant societal harms (Curley, 2021, p. 5; Mann, 2007, p. 173; Waters, 2004, p. 219). Many Native Americans have been coerced to leave behind their traditional, self-sustaining ways of life and join the wage-earning workforce, a stark shift imposed upon them (Corntassel & Spak, 2010, p. 137; Curley, 2019, pp. 78–79). Intrusion upon ancestral homelands for various forms of resource extraction represents one of the many intersectional and intergenerational traumas experienced by Native Americans across North, Central, and South America (LaDuke, 1999, p. 90; Owen et al., 2023, pp. 203–204; "Spokane Tribe of Indians of the Spokane Reservation Grand Coulee Dam Equitable Compensation Settlement Act," 2004).

Eurocentric ideals of progress, characterized by industrialization and resource extraction, have often disregarded ecological balance and Indigenous knowledge systems. The evolution of energy in America, particularly from the colonial and industrial perspective, reflects a 'fire culture,' where combustion—first of wood, then coal, and later fossil fuels—became the foundation of energy production and technological growth (French, 2017, p. 147). The continued dependence on fossil fuel combustion has led to significant environmental degradation, with emissions - mainly carbon dioxide—being the primary drivers of the greenhouse effect and the resulting climate crisis. While methane is a more potent greenhouse gas, carbon dioxide's vast abundance and long atmospheric lifespan, primarily driven by human emissions, make it the primary driver of global climate change (Ruane, 2024, p. 50). This unchecked reliance on fossil

fuels and resource extraction contributes to the worldwide climate crisis and has profound social and cultural consequences. Nowhere is this more evident than in the histories of Native American communities, where colonial powers exploited both the land and its people. Native American reservations, often established on lands rich in valuable resources, became sites of extraction and displacement, further entrenching patterns of environmental and cultural degradation.

Native American reservations are rich in uranium, rare metals, and oil, resources that are highly valuable to Western society. These places that Native Americans were forced to inhabit, often not in their ancestral homelands, unfortunately, had significant reserves of coal, uranium, and oil. On the Diné nation, this was especially true. In 1934, the U.S. government and private corporations helped establish the current Diné Nation government, partly to legitimize agreements that allowed corporations to extract resources from ancestral homelands (Curley, 2023). These duplicitous dealings served several purposes: primitive accumulation, coercion from subsistence living to wage labor, oil, coal, and uranium extraction, and genocide of the Native Americans and their lifeways.

The agencies historically responsible for overseeing Native American affairs often prioritized external economic interests at the expense of Indigenous well-being. Many Native American governments were modeled after colonial structures, where leaders were frequently selected for their alignment with Western systems over traditional governance practices(Simpson, 2014, p. 107). However, this alignment often reflected a pragmatic survival strategy, as Indigenous leaders adopted Western systems to navigate colonial pressures and protect their communities. This adaptation underscores the survivorship that remains central to Indigenous resiliency, reflecting their ability to preserve identity and community strength despite imposed governance systems (Curley, 2023; Waters, 2004, p. 237). To understand the enduring strength of

Indigenous communities in the face of persistent colonial challenges, it is essential to critically examine how Indigenous governance systems have navigated and interacted with nonIndigenous entities. Honest reflection and open analysis can uncover the complex realities of these interactions, particularly the mistrust that has arisen from historical patterns of exploitation and inequity.

This mistrust is rooted in a long history of abuse at the hands of the U.S. government, where profit was often prioritized over Indigenous rights and well-being. A stark example of this is the actions of the Bureau of Indian Affairs (BIA), which has been accused of exploiting its role as a steward of Native interests for personal and corporate gain. The BIA's mismanagement of coal contracts on Northern Cheyenne lands during the 1970s, as detailed in *The AMAX War Against Humanity* (1977), reflects an era of aggressive resource extraction at the expense of tribal communities. The BIA illegally contracted reservation lands to corporations, creating what Winona LaDuke (1999) described as "National Sacrifice Areas"—regions exploited for resource extraction with devastating consequences for tribal members. It took 15 years of legal battles before Congress finally voided the contracts, but the damage had already been done. LaDuke reported that the Northern Cheyenne reservation was left with 60% unemployment, substance abuse, violence, and a profound sense of powerlessness (p. 90). This pattern is emblematic of the broader experiences of Native communities under colonial governance. These systemic inequities are further compounded by the challenges of the current energy landscape, where outdated infrastructure and bureaucratic hurdles threaten to undermine progress.

Energy Transition and Indigenous Impacts

As the energy transition unfolds, the grid is facing the limits of its capacity. Washington's CETA outlines ambitious goals for greenhouse gas neutrality and renewable energy standards (RCW 19.405). However, these initiatives must contend with the reality that the electrical grid

system—essentially unchanged for the past century—requires significant modernization (Lovins & Lovins, 2001, p. 277). Transmission line congestion, antiquated distributed energy systems, and protracted approval processes for new infrastructure significantly impede progress. (Cagnano et al., 2017, p. 14, 2020, p. 5; NARUC, 2019, p. 9).

Native American communities do not always welcome technological developments and infrastructure. They are footholds into the reservation. Distributed energy resources represent non-emitting sources of power generation and curtailment of electrical load curves (Lightner et al., 2020) and do not need the additional transmission buildout. This approach encompasses demand-side management strategies, encompassing various technologies, including smart thermostats, electric vehicles, and battery energy storage systems (Avista, 2023, p. 34).

Artificial intelligence offers transformative potential for optimizing energy management systems by enhancing efficiency, reducing waste, and integrating renewable energy sources. These advancements play a critical role in addressing the climate crisis through improved resource allocation and emissions reduction (Blaauwbroek et al., 2015, p. 6; Chen et al., 2022, p. 2). However, the growing demand for data storage and processing driven by AI presents significant challenges. Data centers, which often require energy on the scale of entire cities, raise critical concerns about their environmental and economic impacts, particularly for tribal communities (Ruan et al., 2023, p. 6). These facilities can strain local energy grids, leading to increased greenhouse gas emissions from 'peaker plants'—power plants that operate during periods of high demand and are typically less efficient and more polluting than base-load plants.

The repercussions of such energy demands disproportionately affect marginalized communities. For example, households with limited financial resources may struggle to afford adequate cooling during extreme heat events, exacerbating energy inequities (Lee & Byrne, 2019, p. 6). For tribal communities already navigating energy insecurity, these pressures

compound existing vulnerabilities, creating a multifaceted challenge that intersects with environmental, economic, and social dimensions.

Addressing these challenges requires a dual focus: leveraging AI to enhance sustainable energy solutions while implementing policies and practices that minimize the environmental footprint of data centers. For tribal communities, this means advocating for equitable access to clean energy technologies, ensuring that the benefits of AI-driven optimization are not overshadowed by the burdens of increased energy demands (Zhou et al., 2023, p. 2).

. Resource extraction hurts the people, land, and water and leaves no benefit to the Native American communities that they impact. Resource extraction on Native lands often results in significant social and environmental challenges. The establishment of 'man camps,' temporary housing for workers, leads to increased violence against women, children, and Two-Spirit individuals, a grave concern (Tordimah, 2021, p. 4).

The disproportionate vulnerability of Native American women to sexual violence is a critical issue underscored by data on their elevated rates of victimization. Research, including the comprehensive analysis conducted by Condes (2021), indicates that Native American women are twice as likely to experience rape or sexual assault as women of other racial backgrounds (Condes, 2021). Notably, over 40% of these assaults are perpetrated by strangers, a figure significantly higher than the 26% observed across other groups. Furthermore, Native American women are more likely to endure physical injuries during such assaults, with 47% requiring medical attention compared to 34% among other races. This disturbing pattern points to structural and systemic factors that uniquely position Native American women at higher risk, necessitating a deeper examination of the sociocultural and economic dynamics that exacerbate this vulnerability (Tordimah, 2021, p. 14).

A critical contributor to this heightened risk is the presence of "man camps," temporary housing settlements established for workers in resource extraction industries. Condes (2021) highlights a strong association between these camps and rising rates of sexual violence, domestic abuse, and human trafficking in surrounding regions, particularly in resource-rich areas such as the Bakken oil fields in North Dakota. The influx of transient, predominantly male labor forces in these camps has been linked to environments where local Native American communities face heightened exposure to violence. For example, near the Fort Berthold reservation, nearly 20% of sex offenders have failed to register, compared to a statewide average of 4-5%. This stark disparity underscores the adverse impact of extractive industry practices on Native American women, with man camps contributing to social conditions that facilitate exploitation and violence, further marginalizing already vulnerable populations.

While infrastructure development can introduce benefits such as improved access to roads and electricity, it simultaneously poses the risk of disrupting Indigenous communities by bringing non-Natives onto their lands (Curley, 2021a). This dual nature of infrastructure projects potentially benefiting the community and unbalancing the environment and flow of life underscores the need to consider both their positive and negative impacts on Indigenous populations. Sovereignty is vital for tribes as it represents the ability to self-determinate what happens within their community. Treaties have guaranteed tribes their sovereignty. Tribes have the status of nations and should have the right to determine what happens in their communities. Sovereignty is fundamentally undermined when perceived benefits from infrastructure bring harm the community would choose to protect itself against.

The energy transition allows many liminal communities to see equitable changes in energy systems. The transition from traditional energy sources to renewable energy offers a pivotal opportunity for historically underserved and overburdened communities to hold utility

companies accountable for incorporating equity considerations into their operations and decision-making processes (Szulecki & Overland, 2020, pp. 5–6). In conjunction with the statues, Indigenous voices will be heard and given reverence, which are critical components of energy sovereignty. In the past, utilities' integrated resource plans took care of energy procurement (Szulecki & Overland, 2020, pp. 6–7). They were concerned with the ratepayers' reliability or long-term capacity needs for 10 to 20 years. The new IRPs will consider equity when they plan for the ratepayer's energy needs.

The transition to renewable energy disrupts traditional energy planning paradigms and demands a heightened focus on equity and environmental justice. Recognizing this need, Washington State has implemented measures to identify and prioritize communities disproportionately impacted by carbon emissions. A key example is the Washington Department of Health's cumulative impact analysis, which pinpoints areas most burdened by environmental and health disparities, including tribal reservations. By leveraging tools such as the Environmental Health Disparities map, which ranks communities on a scale from 1 to 10, Washington ensures that those scoring 9 or 10—or located within census tracts containing tribal lands—are classified as highly impacted. This approach aims to equitably distribute the benefits of the energy transition while alleviating these communities' environmental and health burdens (Revised Code of Washington 19.405.140 – Department of Health—Cumulative Impact Analysis, 2019).

Regulatory Considerations

As Washington transitions toward a sustainable energy future, the Clean Energy Transformation Act (CETA) is a cornerstone in rectifying decades of inequity and environmental harm. Enacted in 2019 (19.405 RCW), CETA mandates that utilities prioritize equity and sustainability, focusing on communities historically burdened by fossil fuel pollution, excessive

energy costs, and systemic neglect. These "forgotten" communities—pushed to the margins of traditional energy planning—have faced environmental degradation, economic hardship, and health disparities as the price of industrial progress. Being "forgotten" in this context means their needs were overlooked in policy decisions, their voices were excluded from planning processes, and their access to affordable and reliable energy was deprioritized.

CETA sets ambitious goals to transform Washington's energy landscape. By 2030, the state aims to achieve a greenhouse gas-neutral energy profile, with utilities progressively phasing out carbon-intensive sources to reach 100% renewable energy by 2045. Tribal communities considered vulnerable and impacted populations under CETA, are a key focus of these efforts. The law requires utilities to acquire renewable energy while ensuring that the benefits of the transition are directed toward those most affected by fossil fuel use and climate change. In addition, CETA introduces provisions that address the high energy burden carried by underserved communities, where households often spend a disproportionate share of their income on energy costs. This financial vulnerability, coupled with the long-term health impacts of pollution, underscores the importance of centering equity in energy planning (19.405 RCW:

WASHINGTON CLEAN ENERGY TRANSFORMATION ACT, 2019).

Complementing CETA is Washington's Climate Commitment Act (CCA), enacted in 2021 under Chapter 70A.65 RCW. Together with the Social Cost of Greenhouse Gases (SCGHG), these tools form a pivotal strategy for reducing greenhouse gas emissions and achieving net-zero emissions by 2050 (Raja, 2024, pp. 29–30). The CCA establishes a marketbased cap-and-invest program, introducing progressively declining caps on emissions and creating financial incentives for reduction through trading allowances. By compelling polluters to reduce emissions over time, the CCA addresses environmental externalities, creating a more accountable system for managing pollution (Dennison & Club, 2024, p. 8).

While the CCA focuses on regulating emissions directly through caps and market mechanisms, the SCGHG introduces an innovative cost-based approach. Integrated into clean energy planning under RCW 80.28.405, the SCGHG assigns a monetary value to the societal damages caused by greenhouse gas emissions, embedding environmental costs into energy pricing. This mechanism discourages reliance on carbon-intensive energy sources, making them more expensive and less competitive. Together, these complementary strategies work to align Washington's energy systems with environmental sustainability while driving down emissions and encouraging innovation in clean energy technologies (Dennison & Club, 2024, p. 13).

Washington's energy profile is already dominated by renewables, with hydroelectricity from its vast network of dams playing a significant role. However, CETA ensures that this clean energy foundation is expanded and made equitable. For communities like Washington's tribal nations, who have endured the environmental and social costs of fossil fuel use, the law demands that their needs and contributions be prioritized. CETA and CCA collectively offer a framework to dismantle the inequities of the past while building an inclusive energy future. By integrating equity into energy planning and policy, Washington demonstrates how ambitious environmental goals can go hand-in-hand with justice and community empowerment.

Federal Energy Initiatives

Federal initiatives such as the Energy Policy Act of 2005 (EPAct) have been pivotal in shaping renewable energy adoption, enhancing grid resilience, and advancing microgrid technologies. These policies provide a framework for addressing energy justice by prioritizing equitable access and community participation. Programs like the Low-Income Home Energy Assistance Program (LIHEAP) complement microgrid policies by facilitating energy access and affordability for low-income households. Similarly, weatherization programs aim to improve energy efficiency in residential and commercial buildings, reducing energy burdens for

vulnerable populations. These measures highlight the federal government's role in supporting equitable energy transitions.

The Clean Air Act (CAA), first enacted in 1963 and significantly amended in 1970 and 1990, stands as one of the world's most comprehensive air quality laws (Burt, 2012, p. 430). The Act's 1970 amendments introduced the National Ambient Air Quality Standards (NAAQS), limiting pollutants harmful to public health and the environment. Later amendments addressed pressing issues like acid rain, ozone depletion, and hazardous air pollutants while streamlining compliance mechanisms for stationary sources (Ross et al., 2012). These stringent emissions regulations intersect with microgrid policies by incentivizing cleaner energy sources to meet air quality standards. For example, microgrids incorporating renewable energy can significantly improve local air quality while enhancing grid resilience.

The Justice40 initiative further underscores the compounded challenges faced by historically overburdened communities, such as the Spokane Tribe. According to the Justice40 CESJT screening tool, Spokane tribal members rank in the 93rd percentile for projected wildfire risk and the 96th percentile for median income disparities, highlighting environmental and economic vulnerabilities. Additionally, a 77th percentile ranking for PM 2.5 levels reflects ongoing air quality concerns exacerbated by the fact that 62% of tribal members rely on woodburning for heating (STOI Strategic Energy Plan 2024-2034, 2024, p. 63). These challenges align closely with the thesis focus on energy equity, emphasizing the critical need for sustainable, resilient solutions tailored to Indigenous and rural communities' unique needs.

Microgrid technologies offer a path forward by addressing these vulnerabilities and fostering intergenerational energy equity. By integrating renewable energy sources, microgrids reduce reliance on fossil fuels and create opportunities for community-driven energy planning. Federal programs like the Inflation Reduction Act and the Infrastructure Investment and Jobs Act provide additional resources for implementing microgrid systems, opening doors for funding and technical support in marginalized communities. These laws represent a critical opportunity to align federal investments with energy sovereignty and justice goals.

This study explores how microgrids can serve as a transformative tool for achieving energy equity and resilience in Indigenous and underserved communities through the interplay of these federal policies, programs, and funding mechanisms. By examining best practices and addressing key challenges, this research contributes to the broader discourse on the intersection of energy policy, technology, and justice.

These initiatives underscore the federal government's commitment to supporting equitable energy transitions. Federal policies are helping to lay the foundation for a cleaner, more inclusive energy future by fostering innovation, addressing systemic barriers, and prioritizing community engagement.

Tribal Initiatives

In 2019, the Spokane Tribe successfully implemented a solar energy initiative, equipping 23 residential homes designated for elders and nine community facilities—including the tribal longhouse, administrative headquarters, and a fish hatchery—with solar panels.

Longstanding challenges in managing Indian energy resources, including shortcomings in the Bureau of Indian Affairs (BIA) management processes, inadequate data for resource ownership and lease tracking, and delays in project approvals, have been documented (GAO, 2015, p. 18). The Office of Indian Energy and Economic Development provided capacitybuilding

grants, but their effectiveness remained unknown due to a lack of tracking and evaluation. To address these issues, the U.S. Government Accountability Office recommended establishing clear goals and performance metrics to improve the effectiveness of tribal energy resource management (GAO, 2022, p. 18). Similarly, the Department of Energy, which faced initial challenges operationalizing its newly formed Office of Indian Energy, began operations in 2011 with appointed leadership and allocated funding. Since its inception, the DOE office has directed over $114 million into more than 200 tribal energy projects to enhance energy development and sovereignty in Indian Country.

Federal legislation is critical in supporting Indigenous communities in building energy microgrid infrastructure by addressing funding gaps, fostering energy sovereignty, and reducing systemic barriers (DOE, 2023). The Indian Tribal Energy Development and Self-Determination Act (ITEDSA), part of the Energy Policy Act of 2005, empowers tribes to manage energy development through Tribal Energy Resource Agreements (TERAs). These agreements streamline permitting processes, reduce bureaucratic delays, and enable tribes to negotiate and oversee energy projects, fostering local decision-making and self-determination. Similarly, the broader Energy Policy Act of 2005 provides financial and technical assistance for renewable energy projects integral to microgrid systems. The act supports feasibility studies, resource assessments, and partnerships, reducing the upfront costs and complexities of tribal microgrid development.

Recent legislation, such as the Inflation Reduction Act of 2022, has introduced transformative provisions that directly benefit tribes. Through direct pay mechanisms, tribes can access tax credits for renewable energy projects without needing tax liability, ensuring equitable participation in clean energy initiatives. The IRA also allocates substantial funding for grid resilience and renewable energy, aligning with the objectives of microgrids to improve reliability

and reduce vulnerability to outages. Similarly, the Bipartisan Infrastructure Law includes significant investments in grid modernization and clean energy development, with targeted grants for underserved and remote areas directly benefiting tribal lands where centralized grid access is often limited. These laws promote public-private partnerships and provide tribes with the resources to integrate microgrids into broader infrastructure networks.

State Initiatives

The regulatory landscape of Washington State was examined based on the analysis of the compliance standards of the Clean Energy Transformation Ace and the Climate Commitment Act, which were passed in 2019 and 2021, respectively. The research focused on Avista's service territory. Understanding the regulatory aspects and enforcement of these laws by the Utilities and Transportation Commission was essential. These standards provided a baseline for planning microgrids. This narrower research focus enabled a more precise analysis.

A case study of the STOI and Avista's collaborative planning efforts for the Children of the Sun microgrid project in Wellpinit, Washington, was conducted to evaluate the intersection of community-driven energy planning and state-level regulatory compliance. Initiated in response to the Cayuse Mountain wildfire of 2016, this project aimed to enhance energy resilience and sovereignty by addressing vulnerabilities in critical infrastructure. With tribal direction and technical support from Sazan Environmental Services (SES), hypotheses about the microgrid's specifications and scale were developed. This led to a discussion of the system's technical design, including solar photovoltaic arrays, battery energy storage, and advanced control systems. CETA is Washington State's plan to have a carbon-neutral electricity supply by 2045. Utilities must develop plans that include steps to help everyone, including low-income households, and ensure power reliability. This Act supports using microgrids, smaller power grids that can operate independently and use renewable energy to make the larger grid more reliable and robust.

CETA encourages microgrids by asking for renewable energy and energy storage, essential for microgrids to be part of the utilities' plans. The CCA helps microgrids by promoting reduced greenhouse gas emissions and investing in clean transportation and climate projects, which can benefit from microgrids, especially in communities that need more support.

The Clean Buildings Performance Standard aims to make buildings more energyefficient, which might increase the use of microgrids to meet energy goals. Finally, by reviewing their impact on energy use and emissions, the State Environmental Policy Act (SEPA) ensures that environmental factors are considered in big projects like microgrids. Depending on their environmental effects, this can help or hinder microgrid projects.

Washington State defines energy justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income concerning the development, implementation, and enforcement of environmental laws, rules, and policies." This comprehensive approach to defining energy justice aims to cover the spectrum of issues, from participation and fairness in the procedural aspects to addressing historical injustices and ensuring equitable energy distribution and recognition outcomes.

Washington State's definition of energy justice emphasizes addressing disproportionate environmental and health impacts in all laws, rules, and policies with environmental impacts by prioritizing vulnerable populations and overburdened communities, ensuring the equitable distribution of resources and benefits, and eliminating harm (RCW 80A.02.010, 2021).

Unlike the more widely recognized frameworks that explicitly outline the four tenets of energy justice—procedural, distributive, restorative, and recognition justices—Washington State's approach incorporates these elements without distinctly categorizing them. This necessitates a careful translation process to align the state's vernacular with the established frameworks used in broader energy justice discussions.

Energy Justice

Energy justice draws from numerous disciplines to promote tangible benefits for communities historically overburdened or faced barriers to accessing energy services. It operates under the broader climate justice framework and emphasizes the rights and needs of all users in energy systems. Historically, the benefits of traditional energy systems have disproportionately excluded Black and Indigenous communities, among others. The transition to clean, renewable energy presents an opportunity to establish a new standard of service in which benefits and risks are equitably shared.

Adopting CETA facilitates the equitable distribution of benefits by prioritizing the wellbeing of vulnerable communities disproportionately affected by environmental hazards. This policy positions the state as a leader in initiatives such as clean energy funding and communitybased renewable energy projects, ensuring historically marginalized groups benefit from the transition to sustainable energy systems. This systemic shift addresses historical injustices while fostering inclusive policies that advance sustainability and enhance community well-being.

(Raja, 2024, p. 41).

While policies like CETA aim to address historical inequities and foster sustainability, many marginalized communities continue to face disproportionate challenges, including high energy burdens and the risk of energy poverty. Energy burden refers to the percentage of household income spent on energy bills. Marginalized communities, often with lower incomes, typically pay a significantly higher proportion of their income on energy costs than more affluent households (Al Kez et al., 2024, pp. 3–4). This creates an undue financial burden, making it difficult for these communities to afford other necessities. Low-income households can be labeled as having a severe energy burden compared to those with higher-income households,

contributing to a disproportionate energy burden (Huang et al., 2023). Energy poverty refers to the inability of households to afford adequate and reliable energy(Al Kez et al., 2024, pp. 2–5). Marginalized communities are often at a greater risk of experiencing energy poverty due to unemployment, lower wages, and systemic barriers that limit their access to modern energy solutions (Drehobl et al., 2020, p. 10). Lack of access to reliable energy can have severe health and safety implications(Al Kez et al., 2024, pp. 8–9). Inadequate heating and cooling can lead to health problems, particularly among vulnerable groups like older adults, children, and those with medical conditions. Moreover, households may resort to unsafe practices, such as using stoves for heating, which increases the risk of carbon monoxide poisoning or fires(Drehobl et al., 2020, p. 13).

Energy justice serves as a framework to critique existing paradigms of energy distribution, challenging the normative assumptions about how energy systems operate and who benefits from them. It encompasses various dimensions, including distributive justice (fair allocation of energy resources and costs), procedural justice (equitable participation in decisionmaking processes), and recognition justice (acknowledgment of marginalized communities and their specific needs) (Heffron & De Fontenelle, 2024, p. 12)The framework's flexibility allows it to be applied to different contexts, reflecting the priorities and perspectives of those employing it. While its manifestations may vary, energy justice consistently addresses inequities and promotes inclusivity in energy systems.

The tenets of energy justice are procedural, distributional, recognition, and restorative justice. These principles, developed by scholars and legal practitioners, aim to address inequities in energy systems. Energy justice emerged as an extension of climate justice, reflecting the interconnectedness of energy and climate issues. This alignment stems from the fact that while energy justice focuses on energy systems, its ultimate concern is people and their right to a

sustainable and equitable future. By addressing systemic injustices, energy justice seeks to create a better tomorrow for marginalized communities, ensuring that the benefits and burdens of energy transitions are shared equitably.

Procedural justice, one of the core tenets of energy justice, addresses who has a seat at the decision-making table and whose voices influence outcomes. The concept originates from philosophical theories, particularly John Rawls's *A Theory of Justice* (1971), which emphasized fairness in processes to ensure equitable decision-making. In the 1980s, Tom R. Tyler expanded the concept through empirical research (Maus, 2013; Tyler, 2003, pp. 284–285). In his 1992 essay *The Politics of Recognition*, Charles Taylor argued that the misrecognition of cultural identities perpetuates inequalities and harms individuals' sense of dignity and self-worth.

Recognition of justice is rooted in the work of philosophers Charles Taylor and Nancy Fraser, who highlighted the critical role of cultural identity in achieving social equity. In his 1992 essay *The Politics of Recognition*, Taylor posited that the misrecognition of cultural identities perpetuates inequalities and undermines individuals' dignity and self-worth. Building on this foundation, Fraser expanded the concept by linking recognition with redistribution, asserting that justice requires economic equality and the acknowledgment of diverse identities.

Distributional justice focuses on the equitable allocation of benefits and burdens across different groups, particularly in addressing systemic inequities. Philosophers like Jeremy Bentham and John Stuart Mill explored distributional concerns through utilitarian principles, emphasizing maximizing happiness. However, critics argued that this approach often neglected marginalized groups. Karl Marx critiqued capitalist systems for perpetuating unequal distributions of wealth, advocating for the redistribution of resources to achieve equality and meet fundamental human needs. In the context of environmental justice, distributional justice highlights the disproportionate exposure of marginalized communities to environmental harms

(e.g., pollution) and their limited access to benefits such as clean air and water. This framework ensures that historically excluded groups are prioritized in efforts to achieve equity.

Restorative justice has significantly contributed to addressing harm and fostering reconciliation.

Many Indigenous cultures, such as the Maori in New Zealand and First Nations in Canada, practiced restorative principles long before the term was formalized (Wallsgrove, 2022, pp. 142–143). These practices emphasized repairing harm, restoring relationships, and reintegrating offenders into the community rather than focusing solely on punishment.

In the 1970s, dissatisfaction with punitive justice systems led to formalizing restorative justice in Western legal frameworks. A pivotal development was the introduction of victimoffender reconciliation programs (VORPs) in Canada and the United States, which facilitated dialogue and mutual understanding between victims and offenders (Wallsgrove, 2022, p. 13). Early advocates, such as Howard Zehr in *Changing Lenses* (Zehr , 1990), called for shifting the focus of justice from retribution to restoration.

Restorative justice principles have since extended beyond criminal justice into areas like environmental and energy justice (Wallsgrove, 2022, p. 148). In these contexts, energy justice's restorative arm aims to address historical injustices, repair harm caused to disproportionately affected communities, and create equitable energy frameworks for the future.

Energy justice provides a critical lens for understanding and addressing the disparities in energy access and the burden marginalized communities face. While policies like CETA represent significant progress, ongoing systemic barriers must be addressed. Centering community participation, integrating equity-focused frameworks, and prioritizing sustainable, inclusive policies will be essential in ensuring that the benefits of clean energy reach everyone, particularly those historically excluded from these advancements.

Microgrids

A microgrid is a localized energy system that operates in parallel with or independently (islanded) from the primary grid. This flexibility allows microgrids to provide reliable energy access, particularly in underserved communities, and to mitigate the social and economic challenges faced by Named Communities. Typically, a microgrid consists of key components such as controllers, energy loads, battery energy storage systems, and generation sources integrated with inverter technology. These components enable seamless connection and disconnection from the primary grid. Importantly, microgrids are designed to meet the specific needs and constraints of the communities they serve, addressing challenges such as limited financial resources, workforce availability, or time constraints.

Microgrids are multifaceted systems with varying configurations, yet most share several key components, including advanced control mechanisms. These control systems serve as the operational core of the microgrid, leveraging machine-learning algorithms and artificial intelligence to replace traditional manual load-balancing (Nassif et al., 2022, p. 13). These systems ensure operational stability and efficient load management by calculating energy demand and generation needs within microsecond intervals. Additionally, advanced controls enable microgrids to comply with primary grid standards, such as voltage regulation and interconnection reliability, even during islanding events (NERC, 2023, p. 12). Excess energy generated within the microgrid can also be transferred back to the primary grid, optimizing resource utilization.

A critical factor in microgrid planning and operation is understanding load—the electricity demand placed on the system by residential, commercial, or industrial users(Lightner et al., 2020, p. 30). Measured in watts (W), the load reflects real-time or forecasted energy needs and determines the infrastructure required to meet demand. For instance, the University of

California, San Diego (UCSD) microgrid supports research laboratories, dormitories, and data warehouses while integrating renewable energy sources to enhance sustainability and reduce emissions (Sreedharan et al., 2016, p. 711). Similarly, hospital microgrids prioritize reliability and resilience, ensuring the uninterrupted operation of essential systems, such as ventilators, medical refrigeration, and communication networks, during emergencies like blackouts or natural disasters (Nassif et al., 2022, p. 13).

Microgrids offer critical solutions for enhancing energy reliability, sustainability, and resilience, particularly in disaster-prone or underserved regions. By integrating distributed energy resources, they can operate independently of the primary grid in island mode, providing uninterrupted power during outages or grid failures (Nassif et al., 2022, p. 15). This capability underscores their value in addressing modern energy challenges while promoting sustainable energy transitions.

Microgrids have demonstrated their critical role in enhancing energy resilience and reliability during emergencies. After Hurricane Maria devastated Puerto Rico in 2017, solarpowered microgrids were installed in schools, which doubled as emergency shelters and community hubs, restoring electricity to remote areas during prolonged outages. Similarly, during the 2019 Public Safety Power Shutoffs in California, microgrids provided essential power to hospitals and fire stations, ensuring uninterrupted energy supply amid wildfire threats. Another notable example is the Borrego Springs microgrid in California, which utilized solar panels, battery storage, and backup generators to maintain power for residents during a major transmission line failure, underscoring the ability of microgrids to support disaster-prone regions.

These examples highlight the versatility and scalability of microgrids in addressing energy sovereignty, equity, and environmental sustainability. Microgrids foster technical innovation and advance the broader goals of energy justice by tailoring their design to local

needs and leveraging distributed energy resources. Effective microgrid planning involves analyzing load demands across various contexts to align capabilities with expected consumption and potential surges, ensuring resilience, efficiency, and equitable energy delivery.

A battery energy storage system (BESS) is a fully integrated configuration designed to store electrical energy for later use, playing a vital role in stabilizing modern energy systems. Its versatility lies in its ability to manage load demand by storing excess energy during periods of high renewable generation and releasing it during shortages, ensuring that intermittent sources like solar and wind meet reliability standards (Arabkoohsar, 2023, pp. 21–22). Surplus energy from renewable sources is often curtailed without adequate storage solutions, reducing overall system efficiency and sustainability.

BESS technology continues to evolve, with vehicle-to-grid (V2G) technology emerging as a complementary innovation (Arabkoohsar, 2023, pp. 16–18). Electric vehicles (EVs) equipped with V2G capabilities function as "batteries on wheels," allowing stored energy to be discharged back into the grid or used to power homes and devices during peak demand (Deguenon et al., 2023, p. 9). This transformative integration not only enhances grid flexibility but also expands the utility of EVs beyond transportation, contrasting sharply with the singular functionality of internal combustion engine (ICE) vehicles. By supporting load management, grid stability, and renewable energy integration, V2G technology represents a significant advancement in distributed energy resource management (Arabkoohsar, 2023, p. 539).

Consumer-owned utilities (COUs) and investor-owned utilities (IOUs) are actively implementing microgrid projects across Washington State, offering valuable insights into integrating distributed energy resources. For example, Snohomish Public Utility District (SnoPUD), a COU, has developed a microgrid project in Arlington, WA, showcasing locally governed utilities' potential to advance energy resilience and sustainability (Washington State

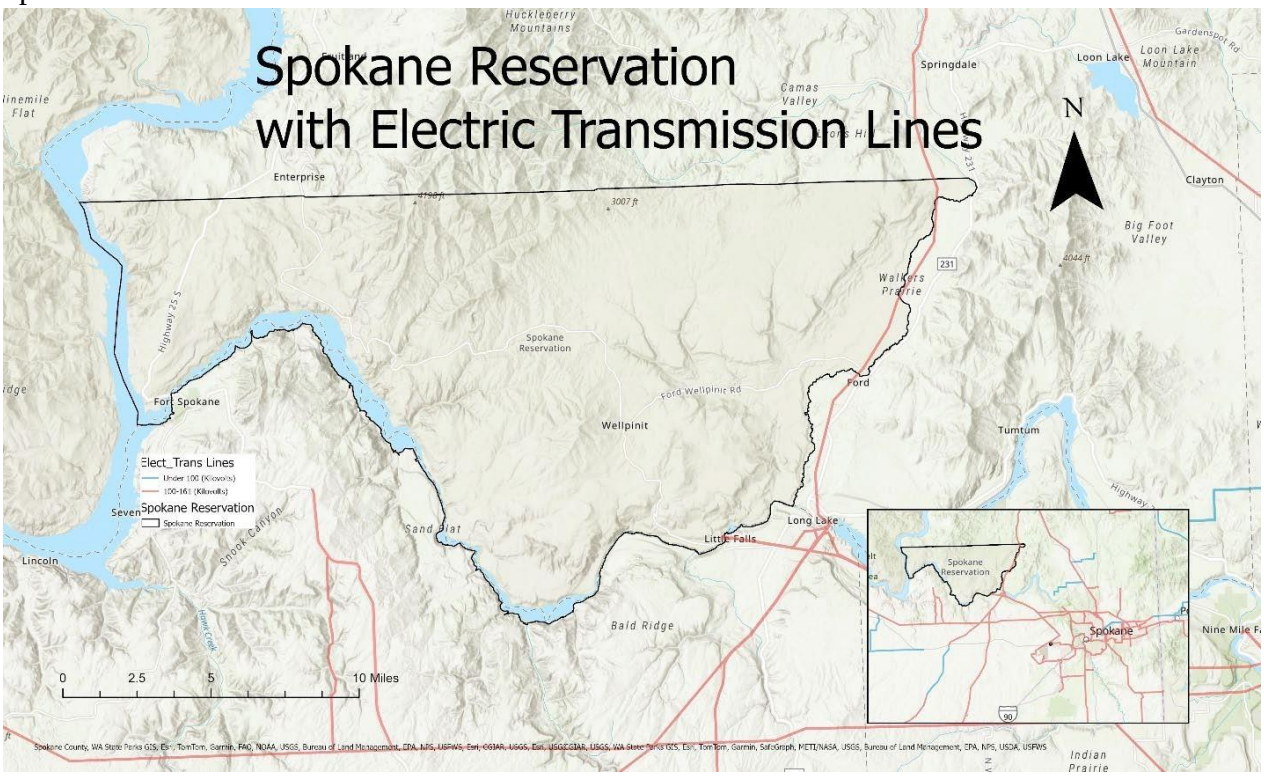
Department of Commerce, 2017). While COUs like SnoPUD operate under local governance structures, they must still comply with state laws similar to those governing IOUs. However, unlike IOUs, which the Utilities and Transportation Commission regulates, COUs adhere to regulations administered by the Washington State Department of Commerce, reflecting their distinct operational frameworks. (*Chapter 19.405 RCW: WASHINGTON CLEAN ENERGY TRANSFORMATION ACT*, 2019).

The SnoPUD microgrid features advanced components, including control systems, a photovoltaic (PV) solar array, a 1.2 MWh BESS, an inverter, and a V2G system (Kirschen & Keerthisinghe, 2022). Designed for flexibility, the microgrid can operate independently in island mode or parallel with the primary grid, generating and exporting power when connected.

SnoPUD also plans to construct a remote grid control center at the microgrid site, enhancing its ability to manage grid operations during large-scale outages. Suppose a blackout affects a significant portion of the primary grid. In that case, the control center will enable the microgrid to support grid restoration efforts, demonstrating its potential to improve regional resilience and reliability.

Figure 1

Spokane Tribe of Indians Reservation with Electric Transmission Lines



Note. The Spokane Reservation with no transmission data to respect the tribal community. Esri ArcGIS Living Atlas "*US Transmission*"

Children of the Sun Microgrid

In 2021, the STOI Energy Taskforce, in partnership with Sazan Environmental Services (SES), initiated the planning process for the Children of the Sun microgrid (Wynecoop, 2024, p. 1). This effort was motivated by the severe Cayuse Mountain wildfire of 2016, which destroyed 14 tribal homes and disrupted power and water supplies. The fire exposed significant vulnerabilities in the community's energy infrastructure and emphasized the need for greater energy resilience during emergencies (STOI Strategic Energy Plan 2024-2034, 2024, p. 5).

To integrate community-driven insights, the tribal government hosted a microgrid workshop in January 2021, where participants identified goals, such as enhancing energy resilience and autonomy for critical facilities. Additional priorities included workforce

development, cost savings, and reducing carbon emissions. SES developed a survey to refine these goals further, conducted in early 2023 (Wynecoop, 2024, p. 7). Key objectives included improving energy resilience, providing education and training opportunities, and reducing energy costs. Community input directly informed the Strategic Energy Plan (SEP), which integrates the microgrid project into a broader strategy for sustainable energy development.

The partnership between STOI and Avista Corporation was strengthened through previous collaborations, such as energy audits of tribal facilities and the Children of the Sun Solar Initiative (COSSI). Spearheaded by the Spokane Indian Housing Authority (SIHA), COSSI involved the installation of approximately 650 kilowatts (kW) of solar PV systems across tribal facilities and residences. Launched in response to the Cayuse Mountain wildfire, the project included solar installations on 32 buildings, such as the Tribal Administrative Building, Senior Center, and Fish Hatchery, as well as residential homes. These efforts laid the groundwork for Avista's subsequent energy audits and grid hardening projects, which became a foundation for the microgrid partnership (STOI Strategic Energy Plan 2024-2034, 2024, p. 12).

The Children of the Sun microgrid enhances energy resilience for critical facilities, including the Senior Center, Longhouse, Tribal Administration Building, and Health Clinic. These facilities were prioritized for maintaining essential community services during emergencies (STOI Strategic Energy Plan 2024-2034, 2024, p. 46). The microgrid system provides one week of energy autonomy during crises such as wildfires and includes 92 kW of solar PV capacity, 532 kWh of battery energy storage, and advanced microgrid controls (Wynecoop, 2024, pp. 1–3). The Tribal Administration Building and Health Clinic are particularly critical, as their uninterrupted operation ensures public health and governance during emergencies.

Methodology

This study examines the collaboration between STOI and Avista on the Children of the Sun Microgrid project. The research uses numerical data analytics, project scope, experiential insights, and community needs to guide its approach. It aims to identify replicable microgrid components that could be implemented in other Indigenous communities to enhance energy resilience and reliability. This section outlines the mixed-methods framework employed in this study, which integrates quantitative and qualitative approaches. A survey was conducted among Spokane tribal members to assess their perceptions of the clean energy policies, challenges, and overall community impact (see Appendix A for survey questions). Avista's contributions are documented in planning materials such as the Clean Energy Implementation Plan (CEIP) and the Integrated Resource Plan (IRP), which provide key insights into the project's development. Additional perspectives from public reports and technical publications enrich the analysis, complementing the community's views with broader corporate and technical contexts. The methodology is structured around three key areas: the goals of the STOI, the resilience and reliability of microgrid systems, and Washington's equity policies analyzed through a tribal lens. (Avista, 2023)

Survey

The survey process began with an initial meeting with the Special Projects Manager of the Spokane Tribe. This meeting was important in establishing a foundation for collaboration and understanding, access to information, and boundaries to respect. The Special Projects Manager not only provided valuable insights into the tribe's organizational structure but also recommended a follow-up conversation with the Planning and Economic Development Manager, who had more detailed knowledge about the microgrid project and related initiatives.

During my subsequent meeting with the Planning and Economic Development Manager, I presented the primary objectives of my study, which focused on exploring the impacts of microgrid systems on energy resilience and sustainability within the Spokane Tribe. This included an explanation of the survey component, designed to capture community perspectives on energy access, reliability, and potential benefits of implementing renewable energy technologies. The meeting was critical in aligning my research objectives with the tribe's priorities and ensuring cultural and contextual relevance.

Securing the necessary permissions for the study involved navigating the complexities of tribal governance protocols. The Planning and Economic Development Manager facilitated this process by outlining the necessary steps and approvals to engage with tribal members and access relevant project data. Their guidance ensured that my research adhered to the IRB's ethical and respectful collaboration standards.

Once permissions were secured, the Planning and Economic Development Manager provided detailed insights into the microgrid project, including its technical specifications, projected benefits, and implementation challenges. These insights were critical for contextualizing the study and identifying specific focus areas in Wellpinit. Additionally, they shared information about the tribe's broader climate action plan, which outlines strategies for reducing greenhouse gas emissions and enhancing energy sustainability. This plan highlights the Spokane Tribe's commitment to addressing climate change through innovative energy solutions and community-driven approaches.

Further, the Planning and Economic Development Manager introduced the Strategic Energy Plan, emphasizing the Spokane Tribe's long-term objectives for economic development, environmental stewardship, and community resilience. Incorporating this plan into the research framework was designed to align closely with the tribe's overarching vision, serving as a lens to

examine how the microgrid project contributes to broader efforts in achieving energy sovereignty and sustainable development. During preliminary discussions, tribal leadership emphasized incorporating cultural sensitivity and fostering community engagement. Research activities were thus tailored to reflect the community's values and priorities. Input from tribal leaders informed the study design, resulting in a collaborative approach that respected the tribe's knowledge and lived experiences. These early engagements laid a strong foundation for a research process that was both inclusive and informed, ensuring consistency with the Spokane Tribe's long-term goals.

A survey was developed as a key research instrument to gather detailed insights into the project's perceived benefits, challenges, and community impact. Employing random sampling to ensure broad representation, the survey was distributed through physical QR codes displayed in Wellpinit and promoted via social media platforms. This dual distribution strategy facilitated diverse participation, with each method contributing approximately half of the responses. The survey was designed to capture a comprehensive range of perspectives, incorporating Likertscale questions, multiple-choice options, and open-ended responses tailored to the study's objectives.

Conducted from August 22 to November 25, 2024, the survey engaged 54 members of the Spokane tribal community in Wellpinit and social media outreach. Each method contributed approximately half of the responses. Although demographic data was not collected, its inclusion in future surveys could provide valuable participant insights and enhance the depth of analysis.

This approach provided qualitative and quantitative data, offering meaningful insights into the microgrid project's technical, social, cultural, and environmental dimensions while supporting the Spokane Tribe's vision for sustainable energy development. The survey aimed to recruit 100 participants; however, 53 responses were collected. Although the smaller sample size limited the depth of statistical analysis, the responses provided valuable insights into the research

questions. The data were analyzed using descriptive statistics to identify key trends and patterns in the relationships between STOI community members and energy.

The survey questions were organized into three categories to address key aspects of the study comprehensively. The first category, Energy Access and Reliability, examined experiences with energy sources' availability, affordability, and reliability, including any service interruptions. The second category, Energy Efficiency, and Home Infrastructure explored the condition of homes, the implementation of energy efficiency measures, and participants' awareness or use of such measures. The final category, Knowledge, and Engagement with Energy Policies, assessed understanding of energy-related policies, involvement in decisionmaking processes, and access to information about energy resources and programs.

Results

This section presents the study's findings, divided into two categories: results from the Spokane Tribal Community Energy Survey and insights from the non-survey analysis based on Avista's 2023 Biennial Conservation Energy Implementation Plan (Avista, 2023) and the Spokane Tribe of Indians' 2024 Strategic Energy Plan (STOI Strategic Energy Plan 2024-2034, 2024). The survey findings capture perspectives directly from the community, while the nonsurvey analysis examines data from these key documents to provide contextual insights. These complementary data sources offer a comprehensive framework for understanding the research context.

Survey Responses

The survey was administered and distributed over social media at Wellpinit, WA. The participants numbered 54 and were anonymous. There were 24 questions in the survey. One question was omitted because it had zero participation engagement: “Do you trust your energy utility company?” No one answered, “Do you trust your energy utility company? " See the responses grouped together in 3 categories: Energy Access and Reliability, Energy Efficiency and Home Infrastructure, and Knowledge and Engagement with Energy Policies below.

Table 1

Energy Access and Reliability

Question	Options	Responses	Total Responses
Do you use natural gas in your home?	Yes	40	54
	No	14	
Who is your natural gas provider?	Avista	18	39
	PSE	12	
	Pacific Power	8	
	Other	1	
Have you experienced a gas shut-off due to financial difficulties in the past 12 months?	Yes	18	39
	Maybe	4	
	No	17	
Do you have electricity in your home?	Yes	53	54
	No	1	
Who is your electricity provider?	Avista	32	52
	PSE	10	
	Pacific Power	10	
Have you had your electricity shut off due to financial difficulties in the last 12 months?	Yes	22	53
	Maybe	3	
	No	28	
How many emergency blackouts have you experienced in the last 12 months?	More than once	23	53
	Once	19	
	None	11	

Note. Responses suggest a significant energy burden and inadequate reliability, highlighting challenges in consistent access to dependable electricity services.

Table 2

Energy Efficiency and Home Infrastructure

Question	Options	Responses	Total Responses
What type of home do you live in?	Single-family	39	52
	Multifamily	13	
Is your home insulated?	Definitely yes	29	53
	Probably yes	13	
	Might or might not	3	
	Probably not	7	
	Definitely not	1	
Could your home use more/better insulation?	Strongly agree	13	44
	Somewhat agree	20	
	Neither agree nor disagree	8	
	Somewhat disagree	2	
	Strongly disagree	1	
Do you drive a vehicle?	Yes	52	54
	No	2	
What type of vehicle do you drive?	Gas	29	52
	Electric	9	
	Hybrid	14	
Do you have internet access in your home?	Definitely yes	40	53
	Probably yes	7	
	Might or might not	2	
	Probably not	1	
	Definitely not	3	
Do you have smart devices in your home?	Definitely yes	28	47
	Probably yes	8	
	Probably not	2	
	Definitely not	9	
Do you feel like you need more information about energy savings in your home?	Definitely yes	18	50
	Probably yes	26	
	Might or might not	4	
	Probably not	2	

Note. The data suggest potential for expanding distributed energy resource infrastructure Which could enhance community resiliency and reliability.

Table 3

Knowledge and Engagement with Energy Policies

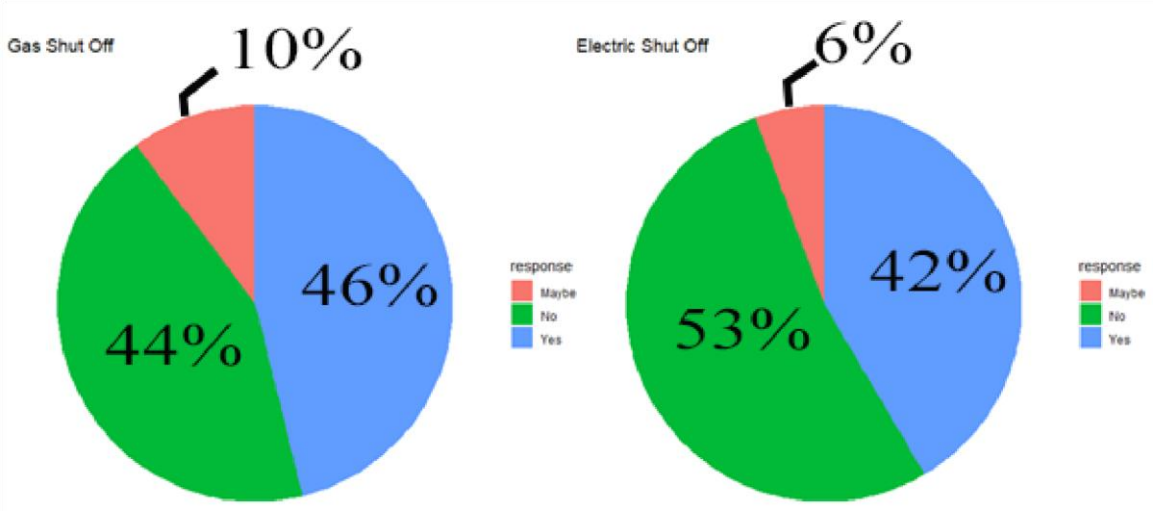
Question	Option	Responses	Total Responses
Do you know anything about the Clean Energy Transformation Act (CETA)?	Definitely yes	7	51
	Probably yes	20	
	Might or might not	8	
	Probably not	8	
	Definitely not	8	
Do you know about the Climate Commitment Act (CCA)?	Definitely yes	10	51
	Probably yes	14	
	Might or might not	9	
	Probably not	9	
	Definitely not	9	
Do you think these laws will help provide reliable energy to your community?	Definitely yes	14	36
	Probably yes	17	
	Might or might not	4	
	Probably not	1	
Are you aware of energy assistance programs in your community?	Definitely yes	16	50
	Probably yes	17	
	Might or might not	9	
	Probably not	5	
	Definitely not	3	

Note. Tribal members show moderate awareness of Washington's clean energy laws, with optimism toward conservation, energy relief, and a resilient sovereign energy future.

Of those who said they have electricity, 41% responded that they have had their power shut off due to financial difficulties in the past year. Of those who said they had gas in their homes, 46 % said they had shut their gas off due to financial difficulties. Households Reporting Electricity Access, Natural Gas Usage, and Electrical Shut-Offs in the Past Year. This seems to be on par with the STOI study finding that 63% of respondents indicated struggles with the escalating cost of energy derived from finite sources (STOI Strategic Energy Plan 2024-2034, 2024, p. 64).

Figure 2

Service Shut-Off Due To Financial Difficulties



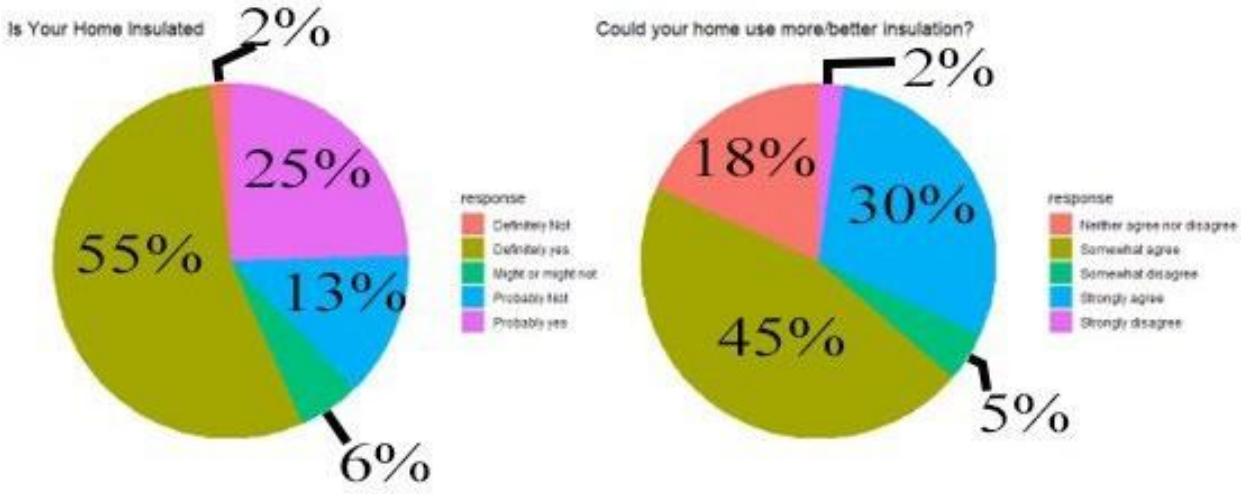
Note. Energy shut-offs reported by many suggest significant household energy burdens

Two survey questions - ‘Could your home use more or better insulations?’ (61% responded affirmatively, while 6% responded negatively) and 'Is your home insulated?' (78% responded affirmatively, while 15% responded negatively)—align with findings from the STOI Strategic Energy Plan (2024-2034), which identified affordable and low-maintenance energy options as top community priorities (STOI Strategic Energy Plan, 2024, p. 63).

Additionally, among respondents who drive vehicles, 44% reported owning new energy vehicles. This aligns with Avista’s 2023 Transportation Electrification Plan Annual Report, which found that EV ownership in their Washington service territory increased by 50% over the past year (Avista Corporation, 2024).

Figure 3

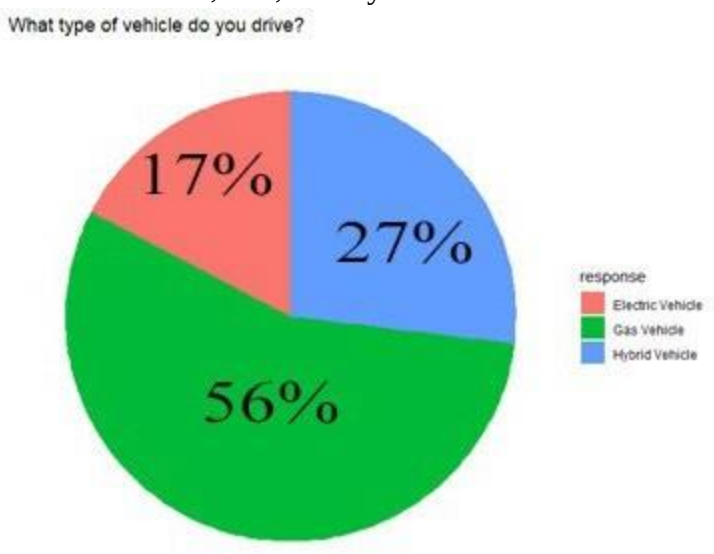
Community Perspectives on Home Insulation and Improvement Needs



Note. The data implies respondents recognize their homes are insulated, though many see room for improvement in insulation quality to enhance energy efficiency.

Figure 4

Vehicle Ownership Trends: Electric, Gas, and Hybrid Preferences



Note. The data highlights the STOI community's significant adoption of new energy vehicles

These findings highlight the community's interest in improving residential energy efficiency and adopting sustainable transportation options. Building on these insights, this study will conduct an energy justice analysis of the planning process, examining how these priorities are integrated into decision-making and resource allocation.

Energy Access and Reliability

The survey included questions to assess community members' access to natural gas and electricity and the reliability and affordability of these services. Results indicate that 73% of respondents use natural gas in their homes, suggesting that natural gas energy access may not be widespread. However, this figure does not fully reflect challenges related to affordability and reliability, particularly for households relying on other energy sources. Among investor-owned utilities, Avista supplied energy to 43% of respondents, followed by Puget Sound Energy (34%) and Pacific Power (20%). Despite the availability of natural gas, many respondents reported service interruptions over the past 12 months, often due to financial difficulties. These findings

underscore a persistent affordability gap, highlighting the need for targeted interventions to improve energy reliability and support vulnerable households.

Access to reliable electricity remains a significant concern, with 42% of respondents experiencing electricity shut-offs due to financial difficulties in the past year and 46% reporting emergency blackouts. Avista served the largest share of respondents (62%) among the three primary utilities, followed by Puget Sound Energy and Pacific Power (19%). These findings reveal dual challenges: affordability and infrastructure resilience. Addressing these issues requires strategic efforts to enhance energy reliability and mitigate low-income households' financial burdens.

Home Infrastructure and Energy Efficiency

Energy efficiency is a vital demand-side resource, reducing reliance on additional energy generation or costly market purchases—both increase financial burdens on ratepayers. In addition to cost savings, energy efficiency mitigates carbon emissions and enhances grid stability, making it an essential component of sustainable energy strategies. However, its implementation often conflicts with traditional utility business models prioritizing energy sales revenue. Regulatory commissions have introduced performance-based incentives and decoupling policies to address this misalignment, enabling utilities to earn profits by achieving energysaving targets. These initiatives align utility objectives with broader public interests, including affordability and environmental responsibility.

Survey results provided insights into respondents' housing characteristics and energy practices, revealing significant variability in energy efficiency potential across housing types. Most respondents (74%) lived in single-family homes, while 26% resided in multifamily dwellings, such as apartments or duplexes. The housing stock included a diverse range of structures, with half of all homes being wood-framed, followed by manufactured homes (19%)

and mobile homes (11%). The type of home determines the energy efficiency needs, as different structures require specific treatments to improve energy performance. These tailored solutions ultimately involve varying costs that must be accounted for. The variability in housing types underscores the importance of addressing structural differences in energy efficiency strategies. Among these factors, home insulation emerged as a critical area for improvement, directly influencing energy performance and associated costs.

Home insulation emerged as a critical area for improvement. While 56% of respondents reported their homes were well-insulated, 46% acknowledged the need for insulation upgrades, particularly in older or less durable housing types like mobile and manufactured homes, which are often associated with higher energy burdens.

Additionally, 62% of respondents reported using smart devices such as thermostats, WiFi-connected water heaters, and heat pumps, reflecting a growing awareness of energy management technologies. However, the accessibility and affordability of these technologies remain significant concerns, particularly for lower-income households. These findings underscore the complex relationship between housing infrastructure, energy efficiency, and the equitable adoption of emerging technologies, highlighting the need for targeted strategies to promote energy efficiency across diverse housing types.

Knowledge and Engagement with Energy Policy

Tribal members with a strong understanding of energy policies are uniquely positioned to contribute valuable insights and identify opportunities to advance their communities' energy goals. Improving access to information can empower members to actively shape their energy self-determination, particularly as funding opportunities under the Inflation Reduction Act and Infrastructure Investment and Jobs Act remain time-sensitive.

Survey results revealed that 79% of respondents had internet access, highlighting a significant opportunity to expand energy policy education through digital platforms. Awareness of key legislation, however, remains moderate; 43% of respondents reported some awareness of the Clean Energy Transformation Act, and 44% were somewhat familiar with the Climate Commitment Act. Despite this awareness, skepticism persists: 15% of respondents believed these laws might or would not improve energy reliability in their communities. This skepticism underscores the importance of targeted educational efforts to bridge knowledge gaps and address community concerns about the tangible benefits of energy policies. As awareness and engagement grow, the tribe is poised to tackle challenges and embrace opportunities in the energy transition.

Discussion

Applying Energy Justice Frameworks

Procedural justice in energy planning emphasizes stakeholders' equitable and inclusive participation in decision-making processes. In 2023, the Spokane Tribe of Indians exemplified these principles by partnering with the Sazan Group and Spark Northwest to administer a strategic energy planning survey (STOI Strategic Energy Plan, 2024, p. 63). This survey invited tribal members to provide input on critical energy issues, including energy reliability, heating during outages, and resource access. By prioritizing community perspectives and addressing specific challenges, the STOI reinforced its commitment to transparency and equitable participation, fostering trust and alignment with procedural justice principles.

Building on these efforts, the Spokane Tribe established the Energy Task Force in 2021 to coordinate energy initiatives across departments and leadership while preserving sovereignty and cultural heritage. The task force requested proposals (RFPs), selecting key partners to support the development and implementation of energy strategies. This approach underscores the Tribe's commitment to thoughtfully integrating community priorities into sustainable energy planning.

Avista Corporation demonstrated its commitment to procedural justice through its partnership with the Spokane Tribe, particularly in tangible community improvements such as the Children of the Sun microgrid. In 2022, Avista collaborated with the Tribe to design a microgrid supporting critical emergency services in Wellpinit, Washington (Avista, 2023, p. 22). This partnership expanded in 2023 when Avista contracted with the Washington State Department of Commerce to develop a grid resiliency solution tailored to the Tribe’s needs. These efforts included energy audits, technical assistance, and funding for energy efficiency improvements in tribal facilities, advancing equity goals by addressing specific community challenges (Avista, 2023, p. 25).

Restorative Justice and Environmental Stewardship

Restorative justice emphasizes healing and reconciliation by addressing historical harms and fostering collaborative solutions to restore relationships and resources. While Avista did not explicitly engage in formal restorative justice initiatives, its collaborative efforts with the Spokane Tribe embodied these principles through actions that sought to repair past environmental and cultural damages.

One notable example is Avista's purchase of 3,308 acres of land for joint management with the Tribe's Wildlife Mitigation Program and the Bonneville Power Administration (BPA). This initiative aimed to preserve critical wildlife habitats while aligning with the Spokane Tribe's long-standing commitment to environmental stewardship and cultural preservation (UNCUT, 2019). By working together to protect natural resources, Avista and the Tribe demonstrated a shared dedication to restoring ecosystems impacted by decades of colonial dam construction and industrial land-use practices. These projects mitigated environmental degradation and reinforced the Tribe's sovereignty and their role as stewards of ancestral lands.

The collaboration extended beyond environmental efforts as a foundation for rebuilding trust between the Tribe and a historically extractive utility system. Acknowledging the harms caused by previous development, including displacement and ecological destruction, Avista's actions represented a step toward addressing the inequities experienced by the Tribe. Although not framed as a formal restorative justice program, these initiatives reflected key restorative principles by emphasizing partnership, accountability, and a shared vision for sustainability.

Moreover, the purchase and co-management of land signaled an important shift in how utilities engage with Indigenous communities. By actively involving the Spokane Tribe in decision-making and management, Avista reinforced the importance of inclusion and equity in environmental planning. This approach serves as a model for how restorative justice can be

operationalized in partnerships between Indigenous nations and potential energy collaborators, addressing the practical aspects of resource management and the deeper, intergenerational impacts of historical injustices.

Through these efforts, Avista's collaboration with the Spokane Tribe exemplifies how restorative justice principles can be informally integrated into utility practices, promoting healing and reconciliation while fostering mutual respect and sustainable resource management.

Recognition Justice in Planning

Recognition justice involves respecting marginalized communities' unique identities, histories, and rights by ensuring their meaningful participation in decision-making processes. Historically, Indigenous voices have been excluded from energy development, as Nancy J. Owens noted in her critique of systemic exclusion in tribal energy projects (Owens, 1979). Owens highlighted how energy policies often sidelined tribal leadership, failing to address their unique cultural values and priorities.

Avista's collaboration with the Spokane Tribe exemplified recognition justice by actively involving the Tribe in energy planning and prioritizing their needs. The Children of the Sun Microgrid represents a direct effort to address these historical inequities. By providing clean, reliable energy to critical facilities, such as the Senior Center and Health Clinic, the microgrid enhances community resilience and energy autonomy while reducing dependence on external providers.

Aligned with the Indian Tribal Energy Development and Self-Determination Act of 2005, the microgrid underscores the importance of tribal sovereignty in resource management. Avista's approach integrated recognition justice by ensuring the Spokane Tribe directly benefited from energy development projects, advancing sustainability, and addressing systemic exclusions.

Distributional Justice in Resource Allocation

Distributional justice ensures equitable access to energy resources and the fair distribution of benefits, particularly for marginalized communities. Avista's 2023 Biennial Clean Energy Implementation Plan (BCEIP) highlights several examples of distributional justice in its partnership with the Spokane Tribe. Through energy audits and technical assistance for tribal buildings in Wellpinit, Avista improved energy efficiency and reduced energy burdens for critical facilities (Avista, 2023, p. 30; STOI Strategic Energy Plan 2024-2034,2024, p. 13). These audits identified key opportunities for upgrades that resulted in measurable energy savings and cost reductions for the Tribe.

Building on these efforts, the Named Communities Investment Fund (NCIF) provided resources for energy efficiency upgrades in administrative facilities. The Tribe's Equity Advisory Group identified these priorities and utilized a results-based accountability framework to align investments with the community's specific needs (Avista, 2023, p. 25). These projects reflect Avista's commitment to equitable energy access and sustainable development by addressing systemic inequities and prioritizing tribal-led energy goals.

The Spokane Tribe is showing how renewable energy projects can transform communities by balancing sustainability, economic growth, and cultural values. They are leading the way for other Indigenous communities by building energy sovereignty while tackling challenges like funding and regulations. Their efforts prove that clean energy transitions can support self-determination, resilience, and climate goals at both local and national levels. This underscores the importance of not just including communities in decision-making but doing so in a way that respects their needs, values, and aspirations. Such engagement reduces the risk of resistance and enhances the legitimacy and success of energy initiatives like the Children of the Sun microgrid project.

The microgrid project itself, which includes the installation of a Battery Energy Storage System near the Wellpinit trading post, represents a targeted investment in resilience. This system is designed to enhance the Tribe's capacity to withstand energy disruptions, particularly in emergencies, and aligns with broader goals of improving energy independence. However, while the technical aspects of the project are impressive, the passage emphasizes the need to go beyond immediate resilience measures. Efforts must continue to focus on capacity-building within the Tribe to reduce reliance on external expertise like that provided by Avista. Building local expertise and resources is vital to fostering long-term self-determination and ensuring that the Tribe can independently sustain and expand its energy management initiatives.

Equally important is aligning these energy projects with the Tribe's cultural values, such as incorporating traditional ecological knowledge and energy goals, like achieving carbon neutrality. Such alignment ensures that the investments are technically adequate and reflect the community's broader aspirations, such as equitable access to energy resources, sustainability, and sovereignty. If executed thoughtfully, the partnership between Avista and the Spokane Tribe has the potential to serve as a model for addressing intergenerational energy inequities. This collaboration demonstrates how energy initiatives can balance investments in infrastructure and capacity-building with the need to address imbalances in decision-making power. Fostering equitable partnerships empowers communities to navigate historical and systemic inequities while advancing resilience and self-determination.

Implications

The Children of the Sun microgrid project represents a pivotal step toward enhancing community resilience, fostering economic development, and advancing energy sovereignty. The microgrid ensures the continuity of essential operations during blackout events by connecting critical infrastructure, such as emergency services, the health clinic, and the administrative

building. These efforts address the Tribe's long-standing vulnerabilities to power outages while aligning with broader sustainability and energy security goals outlined in the STOI Strategic Energy Plan (2024-2034, p. 8).

In addition to bolstering resilience, the microgrid creates opportunities for economic growth by leveraging renewable energy infrastructure. Goal 1 of the Spokane Tribe's Strategic Energy Plan envisions integrating electric vehicle (EV) charging stations as a future enhancement to the project (STOI Strategic Energy Plan 2024-2034, 2024, p. 7). These stations can attract visitors to tribal lands, increasing foot traffic and stimulating economic activity in the downtown area (Zheng et al., 2024, p. 7). This influx of visitors supports local businesses, creates job opportunities, and reinforces the Tribe's leadership in sustainable energy practices.

The establishment of EV charging stations positions the Spokane Tribe as a regional leader in clean transportation infrastructure, advancing the broader shift toward sustainable mobility. These stations attract visitors and businesses and foster partnerships with neighboring communities, local governments, and private companies. This collaboration builds a connected and resilient energy network while showcasing the Tribe's commitment to climate action and innovation.

Complementing these transportation initiatives, the Tribe's investments in renewable energy infrastructure, such as microgrids and energy efficiency projects, enable it to achieve multiple long-term benefits. These projects reduce reliance on external energy providers, alleviate household financial burdens, and lower energy insecurity. The resulting savings can be reinvested in additional renewable energy initiatives, such as expanding solar installations or battery storage, creating a self-sustaining economic and environmental benefits cycle. These efforts align with state and federal clean energy goals, including those outlined in the Inflation Reduction Act, opening pathways for grants and partnerships to support further innovation.

Central to the success of these energy initiatives is the Tribe's commitment to workforce development. By equipping tribal members with specialized skills, the Spokane Tribe ensures its community can fully engage with and sustain these renewable energy projects. Workforce development initiatives are a cornerstone of the Spokane Tribe's energy planning efforts, creating immediate job opportunities while building capacity to manage and expand renewable energy projects. According to the Comprehensive Economic Development Strategy and Sustainable Community Master Plan, economic development is a central goal for the Tribe, focusing on job training in construction, operations, and maintenance (STOI Strategic Energy Plan 2024-2034, 2024, p. 8). Training programs equip tribal members with specialized skills in operating and upgrading renewable energy systems, such as microgrids and battery energy storage.

These programs address current workforce demands while preparing for future advancements in renewable technologies (STOI Strategic Energy Plan 2024-2034, n.d., p. 13). By tailoring training to the needs of younger generations and mid-career professionals, the Tribe ensures inclusivity while fostering sustained economic growth and self-sufficiency. Integrating workforce development with projects like the Children of the Sun Microgrid enhances the Tribe's ability to attract clean energy investments and advance its long-term vision of energy sovereignty and resilience.

Together, these initiatives—spanning clean transportation infrastructure, renewable energy investments, and workforce development—illustrate how sustainability and economic growth can work hand in hand. The integration of these efforts exemplifies the Tribe's ability to create innovative solutions that align with its values of self-determination and resilience. The Children of the Sun microgrid serves as a model of Indigenous-led energy innovation, demonstrating how renewable energy projects can promote community resilience while addressing broader state and national climate objectives. These strategic investments underscore

the importance of equitable and inclusive energy transitions, paving the way for a more sustainable and self-sufficient future.

Recommendations for Future Research

Future studies should aim to increase the sample size to ensure broader representation and mitigate potential biases. A more extensive and diverse dataset would enhance the accuracy of insights into community needs and perspectives. For example, the high number of respondents reporting ownership of new energy vehicles suggests potential sampling biases that a more extensive dataset could address. Additionally, incorporating demographic information in future efforts could provide valuable insights into participant characteristics, allowing for a more nuanced analysis of community energy practices.

Future research should also consider utilizing the PRiSM model for project capital assumptions. Developed by Avista, PRiSM is an Excel-based tool that integrates advanced optimization applications, such as Gurobi Optimizer and What's Best!, to improve resource planning efficiency. As Avista's long-term planning tool, PRiSM supports decisions by modeling generic generation resources and optimizing scenarios. Incorporating this tool into future studies could refine capital planning and ensure alignment with evolving resource needs.

On one hand, incorporating PRiSM into future research offers significant advantages. As a proprietary tool developed by Avista, PRiSM provides valuable insights into the company's long-term planning processes, offering researchers a detailed understanding of resource allocation and optimization strategies. This transparency could enhance the technical rigor of capital planning and align future studies with practical industry standards.

However, reliance on PRiSM comes with potential drawbacks. There is a risk of overvaluing quantitative data while overlooking the lived experiences and cultural priorities of the communities impacted by energy planning decisions. Without robust community

engagement, researchers may inadvertently reinforce systemic inequities or miss critical nuances that cannot be captured through technical modeling alone.

A phenomenological approach might advocate for a hybrid strategy that balances these perspectives. Researchers can ensure that technical analyses are grounded in the realities of those most affected by anchoring the methodology in the real-world contexts of impacted populations and incorporating tools like PRiSM. Phenomenology emphasizes understanding phenomena as they are experienced by individuals, suggesting that any use of PRiSM should be paired with meaningful dialogue with community members. This approach allows the model to inform technical aspects of capital planning while ensuring that community input shapes its assumptions and outputs.

Future research could harness PRiSM's strengths without compromising equity or cultural values by grounding its application in tribal members' real-world experiences. This middle path integrates the practicality of pragmatism with the critical awareness of systemic power emphasized by critical theory.

Establishing long-term relationships with the community is critical for fostering trust and engagement. Researchers should prioritize culturally appropriate communication and involve tribal leaders at every stage of the research process. For example, regular consultations and integrating community feedback into project designs could mitigate mistrust and lead to more meaningful data collection.

Expanding the scalability of the STOI microgrid model is another promising avenue for future research. Lessons learned from the STOI project, such as integrating cultural values and fostering community engagement, could inform the development of similar projects in other Indigenous communities. Additionally, investigating policy support and addressing barriers, such as funding

limitations and regulatory challenges, will be essential for the broader adoption of microgrid technologies.

The success of the STOI microgrid highlights the potential for achieving energy sovereignty in diverse Indigenous communities. For instance, a remote Alaskan village has successfully implemented a microgrid with solar arrays, significantly reducing its reliance on diesel generators and demonstrating the adaptability of microgrid systems to different environmental contexts (Francklyn, 2022). Replicating such approaches in other communities could empower Indigenous populations to reduce energy burdens, enhance resilience, and increase their autonomy in energy decision-making.

Conclusion

The Spokane Tribe's Strategic Energy Plan exemplifies the power of community-driven energy initiatives that respect cultural values and historical contexts. Through innovative projects like the Children of the Sun Microgrid, the Tribe has demonstrated a forward-thinking approach that bridges sustainability with self-determination. Integrating modern technology and traditional ecological knowledge reflects a comprehensive strategy to address energy justice while strengthening sovereignty.

While the plan has achieved notable milestones, challenges remain, particularly in resource constraints, survey participation, and data availability. Addressing these issues in future efforts will provide opportunities to enhance the scalability and replicability of Indigenous-led energy solutions. Expanding the incorporation of demographic data and utilizing advanced tools like Avista's PRiSM model could refine planning processes and support the development of more nuanced, data-driven strategies. These efforts will also help identify and mitigate systemic barriers, such as funding limitations and regulatory hurdles, that often impede the broader adoption of microgrid technologies in marginalized communities.

Furthermore, the success of the Spokane Tribe's energy initiatives serves as a blueprint for other Indigenous and underserved communities navigating similar challenges. Lessons learned from integrating community engagement, cultural values, and technical expertise highlight the transformative potential of microgrids to advance energy equity, resilience, and environmental sustainability. These projects reduce reliance on external energy providers and generate economic opportunities, such as job creation and clean energy investments, fostering long-term community well-being.

By aligning their energy goals with state and national climate objectives, the Spokane Tribe underscores the critical role of Indigenous leadership in shaping equitable energy transitions. Their efforts demonstrate that achieving energy sovereignty is a possibility and a necessity in the broader movement toward environmental justice. The Spokane Tribe’s approach, rooted in inclusivity and innovation, provides a replicable framework for fostering sustainability, resilience, and economic growth in other communities.

Ultimately, this study contributes to the growing body of knowledge advocating for energy justice to rectify historical inequities and empower marginalized populations. By centering Indigenous perspectives and addressing systemic challenges, the Spokane Tribe’s initiatives highlight the path forward. In this future, energy systems are not only sustainable but also equitable, inclusive, and resilient.

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