

PROJECT TITLE: Resilience and Prosperity in Rural Northern Wisconsin

TOPIC AREA: Area 1

REGION OF INTEREST: Midwest

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TEAM MEMBER ORGANIZATIONS: State of Wisconsin Office of Sustainability and Clean Energy, State of Wisconsin Office of Rural Prosperity (ORP), Wisconsin Economic Development Corporation (WEDC), muGrid Analytics, Bayfield County and Towns, Villages and Cities in Bayfield County, Wisconsin, Red Cliff Band of Lake Superior Chippewa, Cheq Bay Renewables, Slipstream

PROJECT LOCATION(S): 28 Cities, Villages and Towns in Bayfield County, Wisconsin; Red Cliff Band of Lake Superior Chippewa

RURAL OR REMOTE AREA(S) THAT WILL BE RECEIVING TECHNICAL OR COMMUNITY BENEFITS: Red Cliff Band of Lake Superior Chippewa Indians – population 1403, Towns, Villages and Cities in Bayfield County, Wisconsin (Known collectively herein as “Bayfield County”) including the City of Bayfield – pop. 584, Town of Bayfield – pop. 787, Town of Barksdale – pop. 745, Town of Barnes – pop. 823, Town of Bayview – pop. 512, Town of Bell – pop. 355, Town of Cable – pop. 177, Town of Clover – pop. 261, Town of Delta – pop. 315, Town of Drummond – pop. 544, Town of Eileen – pop. 722, Town of Grand View – pop. 508, Town of Hughes – pop. 471, City of Iron River- pop. 768, Town of Kelly – pop 436, Town of Keystone – pop. 373, Town of Lincoln – pop. 251, Town of Mason – pop. 289, Village of Mason – pop. 101, Town of Namakagon – pop. 316, Town of Orienta – pop. 164, Town of Oulu – pop. 560, Town of Pilsen – pop. 216, Town of Port Wing – population 156, Town of Russel – pop. 1553, Town of Tripp – pop. 244, Town of Washburn – pop. 554, City of Washburn – pop. 2051. The population density of this area is 11 people per square mile.¹

CONFIDENTIALITY STATEMENT: None

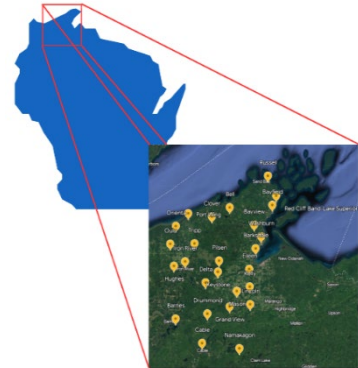
COST SHARE WAIVER STATEMENT: As a tribal government, the Red Cliff Band qualifies for the 20% special cost share. Bayfield County and the Towns in Bayfield County also qualify for the 20% special cost share as local units of government. The State of Wisconsin also qualifies for the 20% cost share as a state government. Upon approval, the tribal and government entities listed will equitably share and commit to the cost share needed.

¹ [U.S. Census Bureau QuickFacts: Bayfield County, Wisconsin](#)

MISSION & OBJECTIVES

This Resilience and Prosperity in Rural Northern Wisconsin Project will deliver clear and measurable benefits to remote and rural communities in far northern Wisconsin and create a framework to replicate benefits supporting energy access and resilience for other rural communities across the state. Wisconsin has a substantial rural character, with 26 percent of the state's population residing in rural communities. These rural communities face a unique set of challenges relating to future planning, increasing infrastructure costs on a per capita basis, and a disproportionate energy burden by percentage of income.

As a rural area in northern Wisconsin, located on the shores of Lake Superior, the communities comprising Bayfield County (which includes all the towns, villages, and cities in the county) and the Red Cliff Band of Lake Superior Chippewa's sovereign territory have already demonstrated their commitment to clean, resilient power with small municipal microgrid projects. This innovative proposal seeks to expand the current pilot microgrid projects into community-wide strategic electrification, alternative energy, and resilient power deployments as a replicable model that will be utilized to create a pipeline of similar projects in rural communities across the state. The project will support these communities in the clean energy transition with the following objectives:



- Bolster public and private vehicle electrification with fleet vehicle EV conversion and installation of a charging infrastructure network throughout the community to reduce the energy burden to community members
- Support this EV charging infrastructure plus building electrification through the proliferation of solar-plus-storage microgrids at critical facilities to improve grid performance and resilience
- Increase carbon efficiency of large municipal maintenance vehicles such as plow trucks by converting from diesel fuel to compressed natural gas (CNG) to reduce emissions

This project uses a wide variety of energy technologies, referred to collectively as Distributed Energy Resources (DER.) The Project will utilize solar photovoltaics (PV), battery energy storage systems (BESS), electric vehicle supply equipment (EVSE) and intelligent control systems to integrate all components into microgrids capable of operating with, or independent from, the electric grid. By installing 18 microgrids, equitably dispersed throughout the County and on Tribal lands, this project will demonstrate how a county-wide approach can reduce carbon emissions, increase energy security, and reduce energy burden. In addition, the Project will utilize CNG fueling to demonstrate carbon reduction, energy efficiency improvements, and monetary savings in the county's critical heavy-vehicle plow truck fleet, a sector not yet available for electrification. Conversion to CNG will reduce wheel to wheel CO₂ emissions by 25%, and substantially improve air quality with reduced NO_x and soot emissions. Costs will be reduced by 75% by reducing diesel consumption, a major portion (24%) of all energy used in County facilities (BTU equivalent) and 36% by dollar.

DEMONSTRATION PLAN

Rural Wisconsin is disproportionately at risk for direct impacts from climate change. These impacts result in decreased agricultural production, instability for rural jobs and small businesses, and loss of revenue from outdoor recreation. Wisconsin's agriculture and tourism industries, which are concentrated in rural parts of the state, contribute nearly \$95 billion dollars to the state's economy and face the greatest risks of climate change impacts. Further, Northern Wisconsin is frequently blanketed with up to six months of snow cover and Bayfield County is the northernmost county in Wisconsin. Average winter temperatures have risen, creating wetter and heavier snows with increased levels of snowpack. The current 2022 season has seen record snows, increased electric outages, stronger and more frequent winds, as well as strained snow removal equipment and human capacity. In addition, the remoteness of this area results in higher electric costs, increased travel times, reduced availability of equipment and services, and reduced capacity to compensate for these shortcomings.

This Project will increase resilience in critical services throughout the participating communities. Five highway garages will have resilient microgrids and EV charging to support fleet vehicles. Community Resilience Hubs will be established in six towns dispersed throughout the County providing heat, shelter, and charging of electronics. Red Cliff will have two microgrids established in essential tribal facilities - their Health Clinic and new Transportation Building. The transportation sector will advance the transition to electrification via public charging infrastructure, and the essential County plow fleet will reduce emissions and costs with CNG.

Preliminary Development Plan and Timeline:

The development plan includes five components which run concurrently:

- 1) Bayfield County Microgrid Implementation and CNG Plow Trucks
 - a. Bayfield County 5 Highway Garage Microgrids (Solar, BESS, EVSE)
 - b. Bayfield County CNG Fueling Station and 2 Plow Trucks
- 2) Bayfield Towns Microgrid Implementation
 - a. Bayfield Towns - 5 Town Halls & Garages Microgrids (Solar, BESS, EVSE)
 - b. Town of Port Wing - 5 Sites including WWTP (110kW Solar, BESS, EVSE)
- 3) Red Cliff Band Microgrid Implementation
 - a. Red Cliff Health Clinic Microgrid, 300kW Solar, BESS, EVSE
 - b. Red Cliff Transportation Building, (Solar, BESS, EVSE)
- 4) Workforce Development – see Investing in the American Workforce section
- 5) Community Engagement – see Community Benefits Plan section

Timeline

Phase 1: Detailed Project Planning; Q4 2023 – Q2 2024

Phase 1 will launch the project planning phase for all microgrid implementation projects. Many of the proposed implementation projects already have feasibility studies in place, and these will form the basis of the initial design and requirements. For projects that do not have a previously existing feasibility study, one will be conducted to develop preliminary designs and project architectures. Detailed design and interface requirements will be documented during this phase

to prepare for a smooth final engineering process in Phase 2. All microgrids will reach their 30% design milestone by June 2024. Relationships with local utilities and their interconnection procedures will be established. A planning study will be conducted for the CNG fueling and conversion project to finalize siting and design requirements.

The team will work with the communities to develop an operations plan to guide construction, ongoing maintenance, and upgrades. Planning for training will be included, prioritizing a local workforce. Organizers will develop microgrid operation and maintenance training and guidelines, as well as make a plan for renewable energy and microgrid certification, as well as trade training for local community members. Job requisitions for the Energy Specialist positions will be posted for both Bayfield County and Red Cliff governments and interviews will be conducted with the intention of identifying and onboarding in the beginning of Phase 2. The Project will begin detailing and executing the community benefits plan as outlined below.

Phase 2: Project Development, Permitting, and Financing; Q1 2024 – Q3 2024

Final engineering for all microgrid implementations, as well as for the CNG refueling station, will be completed by the winter of 2023-2024. The interconnection applications will be filed as soon as possible during final engineering. A request for proposal (RFP) for the construction will be posted in spring 2024. Contractor selection and contracts will be signed in the summer of 2024. RFPs may be combined for each community or split out by project. Long lead equipment items (including CNG plow trucks and fueling) will be identified in final engineering and ordered as soon as the contractors are in place.

Interested community members will be enrolled in any training programs necessary as designs are finalized and contractors engaged. Community engagement activities will continue as outlined in the Community Benefits Plan section below.

Phase 3: Installation, Integration, and Construction; Q3 2024 – Q3 2025

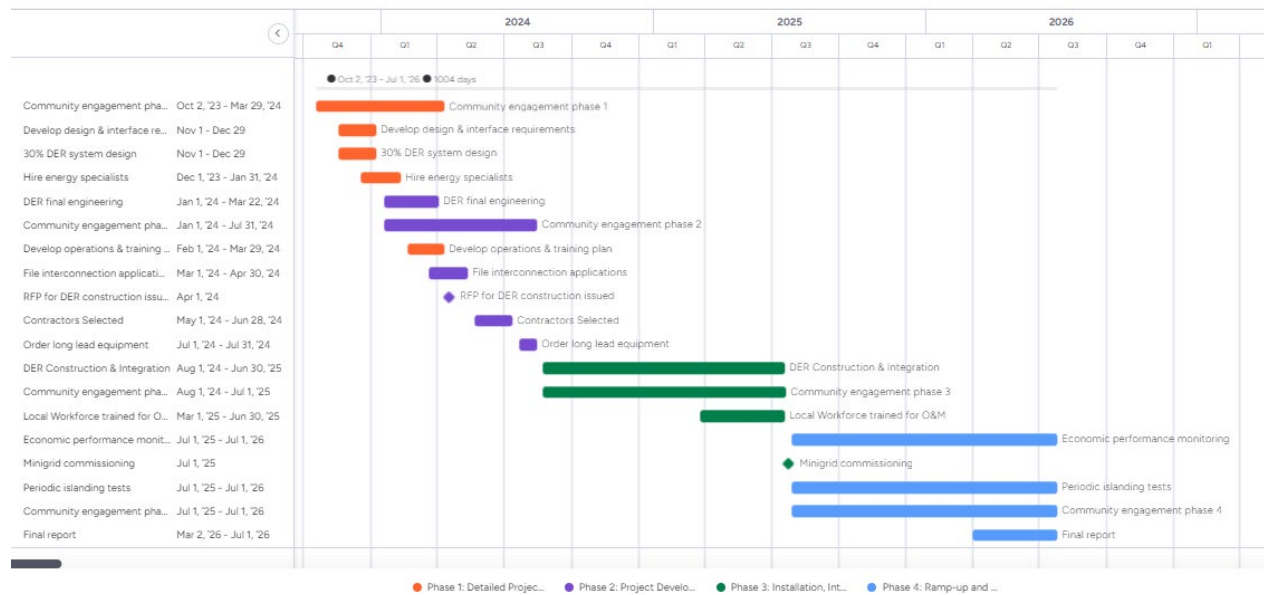
Construction of the microgrid systems and CNG refueling station will be conducted after final contractors are selected and final engineering completed. The microgrids will be commissioned in summer 2025. Previously identified community members will be engaged during construction and trained for operations and maintenance. Community engagement activities will continue as outlined in the Community Benefits Plan section below.

Phase 4: Ramp-up and Sustained Operations; Q3 2025 – Q3 2026

A trained local workforce will operate and maintain the DER systems, including any periodic testing of islanding capability. The systems will be monitored along with market conditions and utility bills paid to verify economic savings to the communities. These data will be reported monthly throughout the first year of operation to ensure project success.

A report will be generated detailing key design, engagement, and operational processes to enable other communities to replicate this process, along with lessons learned that will be helpful in future projects.

A comprehensive timeline is shown below:



Risks

Supply chain disruptions remain an ongoing concern as some electrical distribution system components need to be scheduled as far as 52-weeks out. This could create a disruption to the planned timing. Additionally, inflation could increase the price points for project estimations. This project team already navigates successfully through similar risks on distributed energy projects and can implement lessons learned for future projects.

DOE Funding Impact

This DOE funding is paramount to project success. Multiple nearby communities will be united by the unique opportunity to work together throughout this project, creating a regional approach to EV charging, electrification, and resilient power support to rural communities.

Sustainability Plan

All of the DER projects proposed herein will be analyzed for economic benefits to the communities. Based on the preliminary results provided in existing feasibility studies, these projects will be able to sustain themselves during the operations and maintenance phase based on their economic savings projections, provided that the capital cost for the project is bolstered by the DOE funding.

Additionally, the team will perform data analysis to identify rural and remote communities across Wisconsin with significant energy resiliency challenges and energy burden concerns. Using the findings of the process evaluation and this data review, Slipstream will work with ORP on how to develop a pipeline of microgrids across the state and provide support to future installations. This will include a guide on microgrid installation best practices and considerations for areas to prioritize across the state and in individual counties.

MANAGEMENT AND ORGANIZATION

Bayfield County and the Red Cliff Tribe have been working successfully with Cheq Bay Renewables and muGrid Analytics on various renewable energy projects in Wisconsin since 2018.

Team Principals

Lead Project Manager (LPM): Amy Simpkins, CEO, muGrid Analytics

muGrid Analytics, a woman-owned small business, has the technical expertise and analytical software to design and implement optimized solar plus storage systems and controls. They have been supporting DER projects in Wisconsin for over five years, including the largest BESS installation (1MWh) in Wisconsin to date.

Business Lead: Maria Redmond, Director, Office of Sustainability and Clean Energy

The OSCE staff members assigned to this program have historically served as the lead in over \$85 million federally awarded energy programs. The OSCE will work collaboratively with the partner organizations to collect data, monitor progress, manage the reporting, serve as a central point for financial management and analyze any data generated through the process.

Demonstration Site Project Manager: Mark Abeles-Allison, Bayfield County Administrator

Bayfield County is an experienced leader in the clean energy transition. Bayfield was the first county in Wisconsin to receive a commendation from Governor Evers in February 2020 for achieving 100% carbon-free electricity in all county-owned facilities.

Demonstration Site Project Manager: Morgan Gerck, Red Cliff Band of Lake Superior Chippewa
Red Cliff has been studying the feasibility of clean energy projects since 2018.

Project Manager/Community Support: William Bailey, President, Cheq Bay Renewables (CBR)
Bill Bailey has experience in solar development, financial analysis, team organization and management. His involvement as a volunteer continually demonstrates his commitment to the community and the environment.

Technical Principal: Travis Simpkins, PhD., CTO and Founder, muGrid Analytics (muGA)

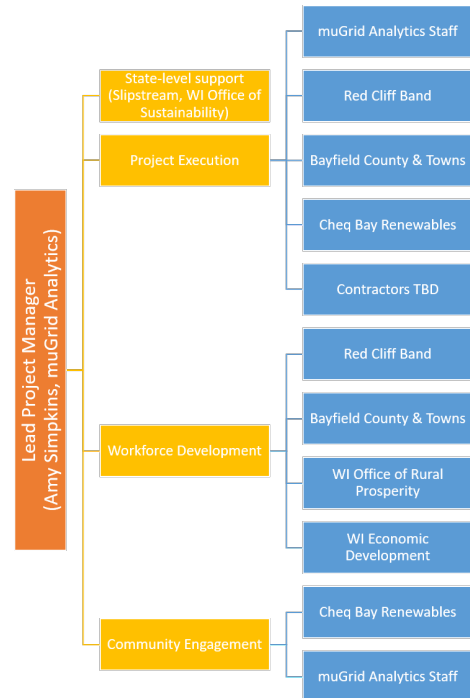
Dr. Travis Simpkins holds multiple diverse degrees in financial, electrical, and computer engineering, ideally suited to the demands of performing techno-economic analysis of the demonstration sites included in this proposal.

State-Level Community Support: Beth Haskovec, Director, Office of Rural Prosperity (ORP), WI

The Office of Rural Prosperity at the Wisconsin Economic Development Corporation (WEDC) will lead community outreach efforts utilizing the Bayfield County project as a demonstration project to create a pipeline of similar projects across rural Wisconsin.

Technical Community Support: Maddie Koolbeck, Senior Researcher, Slipstream

Slipstream is a 501(c)(3) nonprofit dedicated to accelerating climate solutions. Slipstream has deep experience with process evaluation, data analysis, and microgrid design.



COMMUNITY BENEFITS PLAN

Supporting Meaningful Community Engagement

The project team will employ various methods to engage the local communities throughout the course of the project. These methods will seek input, perform outreach, provide information, address input and concerns, and engage the community. These methods may include:

- **Supporting Rural Communities with Statewide Effort:** Connect small communities to state-level resources, align small projects with statewide objectives, and build capacity of rural communities across the state of Wisconsin to implement clean energy projects.
- **Public Meetings and Presentations:** Hold a series of public meetings and presentations to introduce the renewable energy project to the local community, such as informational presentations and Q&A sessions, where community members can provide feedback.
- **Community Surveys:** Conduct online and in-person surveys to gather community feedback on the project, gauge community sentiment, gather information about community needs and priorities, and assess the potential impacts of the project.
- **Site Visits and Tours:** Offer opportunities for community members to visit the project sites and learn more about the technology and construction process. This can include guided tours, information kiosks, and other forms of interactive engagement.
- **Educational Programs:** Develop educational programs and materials to help the community better understand the technology behind the renewable energy project. This can include school presentations, science fairs, and workshops for students and educators.
- **Public Relations:** Utilize traditional and social media channels to communicate project updates and engage with the community. This can include email updates, newsletters, social media posts, and other forms of digital or local media outreach.
- **Community Advisory Boards:** Establish community advisory boards or committees if they do not yet exist to provide ongoing input and guidance on the project. If an energy advisory board or committee exists, engage this group to leverage and complement their current community building efforts. This can help ensure that the project is aligned with the needs and priorities of the local community.
- **Continuous Feedback:** Throughout the project, provide ongoing opportunities for community feedback and engagement via a dedicated email address, contact form, a physical dropbox sited near the project or other accessible method to identify and address concerns in real-time and ensure that the project is meeting the needs of the community. The project team will ensure community members have access to a variety of formats to provide feedback.

Investing in the American Workforce

Building multiple DER projects across several communities will offer many good-paying construction jobs as well as permanent facility jobs. This transition to clean, distributed energy includes engaging the current energy workforce and ensuring that their skills transfer when transitioning from fossil fuels to renewable energy jobs.

The Red Cliff Tribe faces staffing recruitment and retention challenges due to its remote location and has struggled to maintain adequate personnel for essential services. The proposed project will help the Tribe achieve capacity in this area, and will provide recommendations for small-scale

microgrid installations that will increase grid resilience and reduce the impacts of power disruptions. Collectively, these objectives will support technical education and workforce development opportunities for tribal members, resulting in good-paying local jobs and steady employment.

This funding will directly provide for two full time clean energy specialist positions, one at Bayfield County and one at Red Cliff. With these leaders in place, the local communities will have regional strategists engaged to build up a skilled workforce. This funding will also provide training opportunities for the local workforce to expand and transition their skills to the clean energy economy. This training will be prioritized for an inclusive workforce, including Red Cliff tribal members and residents of Justice40 tracts in the area.

Advancing diversity, equity, inclusion, and accessibility

Bayfield County and the Red Cliff Reservation are located on the extreme northernmost point of Wisconsin along the windswept shores of Lake Superior. Due to the ongoing effects of climate change and an increased prevalence of lake-enhanced severe weather events, the area experiences frequent energy disruptions from downed power transmission lines caused by Lake Superior's legendary gales and extraordinary ice and snow loads. Because of its isolated geography and relatively limited service base, power restoration to this area following outage events is often challenging for regional utility providers who must focus first on upstream energy distribution infrastructure serving larger population centers. Understanding the efficacy of how renewable energy systems in this area could be achieved would provide a significant buffer against future power disruption to the community by offsetting energy deficits with self-generated power capacity. This also supports the Red Cliff Tribe's goals of increased energy sustainability and progress toward eventual energy sovereignty.

The Bayfield County Highway Department serves all the residents and visitors of the county. During a snowstorm or other severe weather event, the county operations are the first responders, clearing snow, downed trees and debris causing water backups. The highway system is the veins and arteries of the community, allowing for smooth and efficient transportation of people, goods and services. To have a secure and efficient Highway Department is part of Bayfield County's Comprehensive Plan and is primary to this project.

Contributing to the Justice40 Initiative

According to Climate and Economic Justice Screening Tool, there are two census tracts and the lands of the Federally Recognized Red Cliff Tribe that are identified as disadvantaged in and immediately adjacent to the project area. This Project will directly support those disadvantaged communities through the deployment of the microgrids, improving energy resilience and lowering energy costs. The technologies used in this project will create benefits to air quality in these areas and support jobs and training to improve employment opportunities.