North Dakota Transmission Authority

North Dakota Industrial Commission

BIL 40101(d) Application

Project Title: Next-Generation Grid Resiliency

Applicant: Otter Tail Power Company

Date of Application: November 20, 2023

Amount of Grant Request: $4,432,088

Total Amount of Proposed Project: $11,177,647

Duration of Project: 2 years

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TABLE OF CONTENTS

Please use this table to fill in the correct corresponding page number.

Applicant Description

Applicant: Otter Tail Power Company
Entity Type: Electric Grid Operator, Electricity Generator, Transmission Owner or Operator, and Distribution Provider
Corporate Structure: Corporation; parent company of Otter Tail Power Company is Otter Tail Corporation
Number of North Dakota customers served: 59,153
Average population of North Dakota towns served: 382
MWh delivered or sold annually in Noth Dakota: 2,296,189 MWh
Distribution Line (primary and secondary) in North Dakota: 3,684 miles
Transmission Line (primary and secondary) in North Dakota: 2,816 miles

Otter Tail Power Company (OTP) has been providing electricity to rural and tribal communities since 1909. Our vision is growth and success—for our company and the rural communities we serve. We collaborate and prosper through responsible, resourceful action, while balancing community, economic, and environmental commitments. Our customers have trusted us to power their lives for more than a century. As our customer needs continue to evolve, we evolve as well by transitioning to new technologies to help us deliver reliable, cost-effective, and environmentally responsible power for decades to come.

Our company and our employees are reflections of the rural areas and customers we serve. We live, work, and invest in our communities alongside our customers. Our service area has an average population density of two customers per square mile. Rural households have a median energy burden of 4.4%, compared to the national burden of 3.3%. Rural low-income households are even worse off, shouldering an average energy burden of 9% - almost three times greater than the burden faced by their higher-income counterparts.[1] Today, electric outages have a disproportionate impact on rural communities due to the extended response time for our crews to locate the outage and make repairs. This means that improved grid resiliency, like those enabled through this grant, will have a direct, outsized impact on improving energy equity for citizens in these rural communities. Access to funding through this grant will allow us to deploy the latest grid technology to continue investing in improved resiliency and reliability but do so much more cost effectively and with less impact to customer rates.

Project Description

We're excited to propose **Next-Generation Grid Resiliency (the Program)** for funding consideration by NDTA. The Program will provide increased awareness of grid conditions and enable new and more efficient processes, allowing us to reduce the magnitude and duration of grid outages caused by major disruptive storm and non-storm events. It will also increase grid and customer resiliency by reducing the frequency and impacts of grid outages. By taking

[1] Rural Data Resources for State Energy Planning and Programs. National Association of State Energy Officials. Published May 2020. www.naseo.org

advantage of grant funding, we can lower the costs of these grid modernization enhancements for customers and continue to provide low-cost energy access to disadvantaged and underserved rural communities. Lastly, these funds will help accelerate the maturation of new technology components leveraged to improve grid resiliency.

Four components make up Next-Generation Grid Resiliency: Pole Integrity, Preventative Vegetation Management (VM) with an Intelligent Vegetation Management System (IVMS), Drone and AI-Enhanced Transmission Line Inspections/Repairs, and Advanced Substation Assessments/Repairs. Each component includes assessment, prioritization of findings, completion of resulting mitigation work and a catalogue of future resiliency mitigation opportunities.

Pole Integrity – Pole integrity is a critical component in providing reliable and resilient electric service for our rural customers. We have ~50,000 transmission poles and ~80,000 distribution poles in North Dakota. Our distribution pole infrastructure is, on average, around 45 years old and our transmission pole infrastructure is, on average, around 50 years old. Additional testing and repair of poles would make the pole infrastructure across our territory more resilient to weather events. Through this grant, we will increase the number of wood poles inspected by over 60%, prioritize most critical poles for inspection, expand pole data collection, and remediate defective poles. Expanded data collection, such as soil type, soil condition, treatment type, and pole material, will inform future pole integrity programs and improve the economics of future investments. This will allow us to install the right pole in the right place at the right time, improving integrity today and in the future through smart pole management.

A recent innovation in pole integrity is the deployment of spatial-based software, which will help shorten pole remediation timeframes as well as simplify and streamline all stages of geospatial data processing. Conducting spatial analytics at-scale helps our engineers and maintenance personnel visualize and explore clearance to ground/conductors, automatically detect asset risks (e.g., pole-lean, cable-sag) and non-compliant building structures in rights-of-way and identify and correct missing assets. Otter Tail will be using this spatial-based software as part of the project.

In addition, we have a large high-voltage transmission line in North Dakota that utilizes direct-embed galvanized steel structures that were first generation at the time of their installation. These structures are now over 20 years old, and the ground protectant and ground line condition should be inspected. This grant will allow us to assess the ongoing integrity of these structures critical to resiliency in North Dakota and make the most cost-effective mitigation actions that contribute to increased grid resiliency. Our partner, EXO, who is an industry leading steel pole inspection contractor utilizing the latest technology in the industry, will perform these inspections.

Preventative Vegetation Management and IVMS – Vegetation Management (VM) has a direct and pronounced effect on reliability and resiliency for North Dakota residents. Management of vegetation is complicated by the nature of vegetation ownership and other values it may bring

customers (i.e., weather protection, shading, and esthetic value). Our VM program currently operates on a roughly five-year cycle for distribution feeders (consistent with industry standards) and utilizes an annual inspection review process for transmission assets. We are focused on improving our current program to develop an optimal and more precise preventative trimming program for both transmission and distribution rights of way to achieve the best spend for the best resiliency. To accomplish this, we will invest in an Intelligent Vegetation Management System (IVMS). Applying data analytics and modeling to vegetation management allows us to transform the way we approach vegetation management, ultimately improving our resiliency. Access to grant funding will allow us to more affordably make the upfront investment required for an IVMS to then deliver ongoing reduction in disruptive events for our customers.

For IVMS, we will partner with AiDash, who provides utilities with satellite- and artificial intelligence-powered tools for managing geographically distributed assets. AiDash uses high-resolution, multispectral, and synthetic-aperture radar (SAR) data from the leading satellite constellations that are fed into its proprietary artificial intelligence (AI) models to make timely predictions for operation and maintenance activities. These AI models empower AiDash's applications like Intelligent Vegetation Management System (IVMS), which enable efficient planning, prioritization, execution, review, and audit of VM activities using satellite analytics at scale.[2] Rather than reviewing circuits cyclically for vegetation threats, IVMS predicts threats based on growth observed from satellite imagery and then empowers us to precisely target the most critical areas for trimming in a timely fashion. This eliminates the cost associated with inspecting non-threatened assets and allows us to reallocate funds to other areas of the network. This precise measurement and prioritization of vegetation management risks improves reliability beyond what is possible with traditional inspection and planning methods and technologies. Output from the AiDash tool will include a prioritization of VM activities that result in the highest resilience benefit. We will then address these prioritized concerns throughout the remainder of the project.

[2] Electric Utilities - AiDash

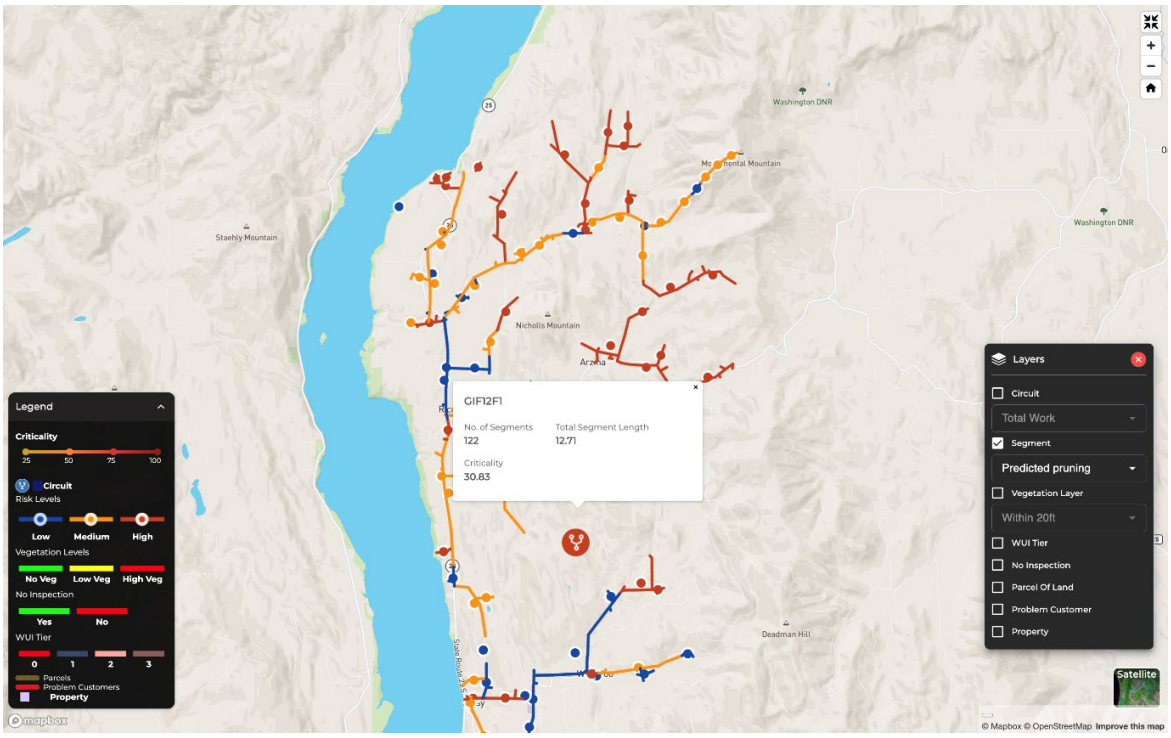


Image 1 – Illustrative IVMS: Segments Shown with Vegetation Risk Scores

Drone and AI-Enhanced Transmission Line Inspections/Repairs – Drone-based inspections are revolutionizing the way electrical infrastructure is monitored and maintained. Equipped with advanced sensors and cameras, drones can access hard-to-reach areas and can quickly and safely navigate complex structures, capturing high-resolution images and videos that provide valuable insights into the condition of the equipment. Drones also enable early detection of vegetation encroachment and emergency storm damage from snowstorms, tornados, or hail as well as other potential issues and hazards. Thermal imaging assessments and detailed visual inspections will empower us to make informed decisions, enhance operational efficiency, and ensure the uninterrupted flow of energy.[3] Through this grant, we will partner North Dakota-based ISight Drone Services (ISight) with PLP Services to utilize drones for electrical inspections of up to 750 miles of transmission lines (approximately 1/4 of our total miles of transmission lines in North Dakota), prioritizing the 540 miles of high voltage lines as they have potential impact beyond just our customers in North Dakota. This will provide an overall view of asset conditions and help identify resiliency concerns. The inspection results will also include an actionable list of these categorized resiliency concerns to help prioritize and support asset maintenance. We will then address these prioritized asset maintenance concerns in year two of the project. These concerns could include things such as loose hardware, broken or cracked cross arms, corrosion on hardware, chipped or failing insulators, etc. These concerns can then be prioritized based on the reliability/resilience benefits and corrective actions planned accordingly.

[3] Power Line Inspections – ISight Drone Services

In addition, our partners Exacter, Inc. and PLP Services have collaborated to create the world's first Partial Discharge (PD) detection deployed from a drone utilizing Exacter's first-generation Radio Frequency (RF) data collection technology. This technology is based on Exacter's existing PD systems which have historically been used from a helicopter or automobile. Together, PLP Services and Exacter have developed a first-of-its-kind method of equipping an industrial grade drone with the PD system enabling the collection of visual, thermal and PD data concurrently and enabling the identification of reliability concerns in a pre-failure condition. The Exacter system will be mounted on the ISight drone, and all survey data will be logged and mapped using GPS technology.[4]

Exacter technology is also at the forefront of pole fire mitigation because partial discharge current leakage from overhead equipment is the number one cause of pole-top fires.[5] In 2021, Exacter was commissioned in Colorado to a 200-mile section of line that was averaging 10 pole-top fires per year. After performing inspections, the utility has only experienced one fire in the last two years. In 2023 in Nebraska, Exacter was commissioned to inspect transmission lines experiencing multiple fires the previous year. Since that inspection, the Nebraska utility has not experienced any fires in the areas inspected.[6]

Unlike new construction that 1) takes time to plan, 2) is expensive, and 3) requires significant time to execute, this solution provides rapid remediation answers that will impact the grid immediately. Exacter's ability to patrol large swaths of line in very short amounts of time provides fast identification of exactly where future power outages are more likely to take place. This means we can go to specific locations to address equipment in pre-fail condition – and therefore prevent power outages before they occur. Working together, PLP Services, Exacter and ISight will use this technology on a subset of transmission lines, focusing on areas that will have the most positive impact downstream for consumers. They will perform the transmission line assessment using patented technology and a multi-step process of problem identification and on-site verification of findings. By combining the capabilities of Exacter and ISight, we can uncover even more opportunities to improve resiliency for rural North Dakota customers. Once assessments are complete, we will begin mitigation work based on the prioritized findings.

Advanced Substation Assessments/Repairs – The fourth element of Next-Generation Grid Resiliency is Advanced Substation Assessments/Repairs. Working with Exacter, we will precisely identify and map failing hardware at distribution substations across North Dakota over a period of 2-3 months. Exacter will perform ~250 substation inspections using its ultrasonic technology that identifies partial discharge deterioration in the form of arcing, current leakage or tracking on substation components. During these inspections, Exacter will assess each substation utilizing scanning equipment to identify if hardware is malfunctioning and in need of repair. Inspection results will include an actionable list of categorized concerns to help prioritize and support asset maintenance. As an example, in a trial of a handful of substations around our

[4] Exacter | Transmission (exacterinc.com)
[5] CIGRE Releases Survey Results on Pole Fire Causation and Mitigation | T&D World (tdworld.com)
[6] Exacter

headquarters, Exacter was finding an average of one issue per substation. Each item found through the Exactor technology is a direct mitigation of a future failure and resiliency concern for customers. These issues included things such as failing insulators, transformer pre-failure, arrester, and bushing pre-failures. After the assessment, we will deploy work teams for fast replacement of problematic equipment. This remediation work will run, at a minimum, through the two-year duration of the project. We will address these prioritized asset maintenance concerns throughout the remainder of the funding period. In addition, we will also purchase substation scanning equipment for ongoing use by our technicians. We will then scan each substation on an annual basis for continuous reliability or resiliency improvements and preventative maintenance. Substations are the heart of the delivery system, and this component of the Program will ensure optimal reliability and resilience of these critical components.

The four components of Next-Generation Grid Resiliency work together to improve resiliency for rural customers across North Dakota. Through this grant, we will be addressing the top causes of outages, according to the Edison Electric Institute 2022 reliability survey. This includes #1 vegetation (20%), #2 overhead equipment (14%) and #3 weather, not lightning (9%). The Program also addresses outages caused by overhead conductors, which account for another 5% of outages. Combined, these four causes account for 48% of outage caused for all interruptions.[7] We are targeting a 10%-15% improvement in SAIDI[8] over the two-year duration of the program. We will also track and report the number of VM, substation and transmission line mitigations and the associated avoided customer minutes of interruption by preventing those future interruptions.

[7] Edison Electric Institute, 2022 Reliability Survey Report. Published September 2023.

[8] SAIDI System Average Interruption Duration Index. It is the minutes of non-momentary electric interruptions, per year, the average customer experienced. eia.gov

USA Total Number of Outage Causes, Average Number of Outage Causes, and Average Percentage of Outage Causes for All Interruptions.

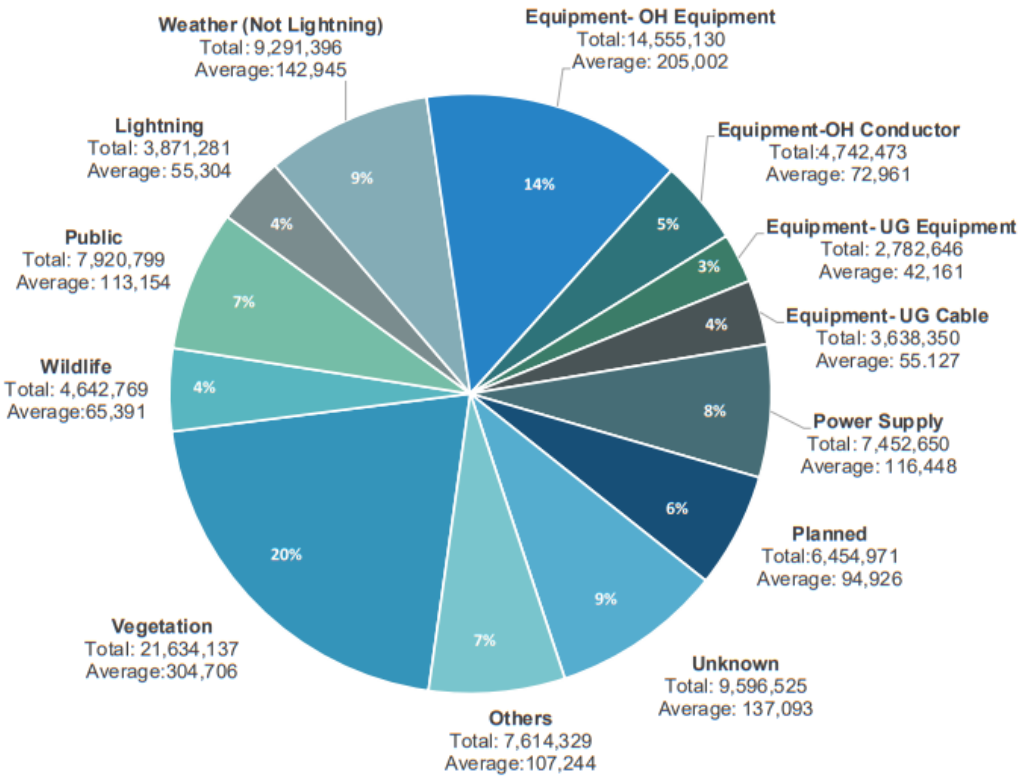


Image 2 – USA Total Number of Outage Causes, Average Number of Outage Causes, and Average Percentage of Outage Causes for All Interruptions.[9]

Cost/Benefit Analysis – Next-Generation Grid Resiliency is expected to reduce the frequency and/or the magnitude and duration of grid outages. We are estimating SAIDI and CAIDI to improve 10% over the lifetime of the program. Through the DOE's Interruption Cost Estimate (ICE) Calculator and the Estimated Value of Reliability Improvement formula[10] and the Estimated Value of Reliability Improvement formula we determined the customer cost benefit of the Program. With the estimate of improving SAIDI and CAIDI by 10%,[11] we are expecting to provide an estimated net benefit of $30M.

Background and Experience – We've recently deployed several significant transmission and generation projects. These complex projects have informed our processes for selecting contractors, securing access to equipment, and ensuring supply chain readiness for future projects. The program components are generally part of our regular business practices, and we

[9] Edison Electric Institute, 2022 Reliability Survey Report. Published September 2023.
[10] https://icecalculator.com/home
[11] The calculation included an estimated component lifetime of 25 years, weighted for the average of each component relative to the total budget.

have access to the necessary labor, contractors, and suppliers to ensure project completion. Execution of the Program will require both our and vendor equipment. We have existing vendor agreements with partners who have demonstrated the required capabilities. These agreements can be expanded to support the anticipated program needs. We also have processes for the sourcing and screening of suppliers. Our suppliers are always ready to respond, especially during extreme weather events; this is ensured through our alliance agreements with many of our key suppliers. The vendors listed below have been trusted partners for many years. These relationships can be further expanded to support implementation of the Program.

Table 1: Vegetation Management and IVMS Contractors	
Vendor	**Experience Summary**
Carr's Tree Service[12]	Established in 1974 Carr's Tree Service is a member of the International Society of Arboriculture (ISA) and Tree Care Industry Association (TCIA) with ten ISA Certified Arborists on staff. Staff are highly skilled in all areas of the tree service industry and are certified line clearance tree trimmers.
Jacobsen Tree Experts[13]	Jacobsen Tree Experts has over 56 years of experience in utility line clearance and residential work, and 16 years in disaster response.
Central Applicators[14]	Central Applicators provides VM options for utilities, municipalities, counties, and townships. They invest in the latest innovations in herbicide applications and formulations, VM and restoration equipment, as well as best practices in the fields of invasive species control and utility arboriculture industry.
Davey Tree Group[15]	In business since 1880, Davey has become one of the largest employee-owned companies in North America and will provide vegetation management services.
AiDash[16]	AiDash is a vertical SaaS company enabling satellite-powered vegetation management and IVMS.
Asplundh[17]	As full-service utility partner, Asplundh brings experienced personnel, specialized equipment, innovative technology, and logistical resources to execute successful vegetation management programs. Asplundh has been in business for 95 years.
Wright Tree Service[18]	With a robust history dating back to 1933 and employee-owned since 2002, Wright Tree Service is one of the largest vegetation management contractors in North America. Wright Tree Service has more than 4,000 employees across 16 geographic divisions.

[12] https://www.carrstreeservice.com/contact/
[13] https://jacobsentree.com/
[14] https://www.centralapplicators.com/about
[15] https://www.davey.com/davey-resource-group/
[16] https://www.aidash.com/
[17] https://asplundh.com/
[18] https://www.wrighttree.com/

Table 2: Pole Integrity Contractors	
Vendor	**Experience Summary**
EXO[19]	EXO has spent decades developing best practices for every inspection method, material type, and repair technique executed on poles and towers. EXO offers engineering and technical expertise, inspecting steel poles, towers, and concrete & composite structures to diagnose and repair structural defects.
Thomasson Company[20]	A utility wood pole supplier, Thomasson Company has been in business for over 100 years. They have a National Women's Business Enterprise (WBE) Certification from Women's Business Enterprise National Council (WBENC).
Davey Tree Group[21]	Davey Resource Group, providing solutions to utilities for more than a century, uses cutting-edge technology to provide comprehensive joint-use pole management and GIS inventory and verification services in a timely manner.
Border States[22]	Headquartered in Fargo, ND, Border States is a distributer of underground cable/associated parts, distribution poles, overhead insulators/hardware, and more. Started in 1952, they are the sixth largest electrical distributor and one of the largest 100% employee-owned companies in the US.
National Strand Products, LP[23]	WBENC Certified World Class producer of Guy, Static/OHGW, Messenger and other types of stranded wire products used internationally for support, safety, and security.

Table 3: Drone and AI-Enhanced Transmission Line Inspections and Advanced Substation Assessments Contractors	
Vendor	**Experience Summary**
ISight Drone Services[24]	Since 2011, North Dakota-based ISight Drone Services provides remotely piloted vehicle operations to agricultural, critical infrastructure, wildlife management, insurance, and emergency services clients to unlock the value and efficiency of collecting data and imagery with unmanned aerial vehicles. ISight Drone Services has facilities/offices in Grand Forks, Fargo and Watford City, North Dakota (and Minneapolis, MN and Houston, TX) and are geographically positioned to provide timely support for inspection services for our service areas in North Dakota.
PLP Services[25]	PLP Services provides safe and reliable drone inspection services for utility assets including transmission and distribution power lines, substations, and generation facilities. By utilizing PLP's 70+ years of industry experience, their Inspection Services solution provides the expertise and knowledge needed to capture, analyze, and assess the condition of utility assets.

[19] https://exoinc.com/field-service-repair
[20] https://thomassoncompany.com/
[21] https://www.davey.com/davey-resource-group/
[22] https://www.borderstates.com/
[23] https://www.nationalstrand.com/
[24] https://isightdrones.com/about-us/
[25] https://plp.com/inspection-services

Exacter[26]	Exacter®, Inc. is an Industrial Internet of Things (IIoT) company that focuses on electric utilities worldwide. Exacter's multiple patents and algorithms create a platform technology for providing unique visibility into grid health, identifying areas of safety and system risk, and informing asset management and intelligence-based reliability initiatives.

Community Benefits – We've demonstrated a strong commitment to improving rural communities by engaging local stakeholders, bolstering workforce development programs, and making sustainability efforts that focus on reducing energy burden. Through these efforts, we have established successful relationships with tribal nations, community groups, local colleges and universities, non-profit organizations, and small businesses that deliver meaningful results to our communities. Our plan illustrates how Next-Generation Grid Resiliency incorporates the community-focused goals of the NDTA to 1) support quality jobs and workforce development; 2) advance diversity, equity, inclusion, and accessibility (DEIA); and 3) contribute to Justice40, economically disadvantaged and/or rural communities.

Approach to support quality jobs and workforce development

We're dedicated to creating quality jobs within the communities we serve and have existing programs for this purpose. Our employees receive competitive wages that exceed local average wages, healthcare benefits, paid time off, and retirement benefits and are protected under the National Labor Relations Act (NLRA). Employees can pursue advancement or reskill within our employee self-improvement program, which covers 80% of tuition and materials for approved post-high school training. We also attempt to fill 80% of management positions internally. We are planning for a 10% growth in line staff in preparation for continued focus on infrastructure programs as well as expectations of upcoming retirements throughout the company over the next few years. For line workers, as an example, this timeline allows us to advance new hires from apprenticeship to journeyman prior to retirement of existing journeyman workers. Through this grant, we will fund one new Reliability Engineer position, two two-year engineering internships, and one grant coordinator, for a total of four direct jobs created—a significant investment. We will also utilize OTP employees to implement the remediation work identified during assessments, for a total of eighteen Full Time Equivalent (FTEs) retained jobs, with the majority of these FTEs residing in North Dakota. A retained job is defined as an existing position that is now funded by the Program for which the wages or salaries are either paid for or will be reimbursed by the Program.[27] We will also have roughly two hundred lineworkers and staff trained to maintain the investments in resiliency made through this grant funding.

Indirect jobs are supported by this grant as well. Recruitment and retention of talent is paramount to ISight's ability to scale and operate effectively. ISight has been able to create a strong pipeline of talent from the University of North Dakota John D. Odegard School of Aerospace Sciences, providing quality, ready for work, employees – minimizing ISight's training

[26] https://www.exacterinc.com/about-us

[27] Calculation of job creation through recovery act funding. energy.gov

requirements and putting University of North Dakota graduates to work in a new and emerging industry to work in an exciting technology field headquartered out of North Dakota. To meet the needs of this project, ISight will be adding three new full-time employees to its roster. These three new employees will be matched with existing (retained) senior employees of ISight to mentor and train the new employees in the process of collecting utility data (poles, lines, and potential right-of-way data) that will be ingested by PLP and their robust analytics software to provide near-real time actionable data that can be used effectively by our engineers and staff. There will also be a new position at PLP Services, who anticipates hiring at least one additional data analyst to support the Program. Across our partners we anticipate a minimum of five indirect jobs created through the Program. Indirect jobs are defined as jobs created or retained at material suppliers, who make the materials used in the Program, or at central service providers, or an employee non-directly charged to the Program.[28] Furthermore, there are a minimum of thirty-six indirect Full-time equivalent (FTE) jobs retained through this grant funding (that is existing positions that will be funded by the Program for which the wages or salaries are either paid for or will be reimbursed by the Program).

Between direct and indirect jobs, we anticipate this grant to create nine positions and retain forty-four positions. Beyond these jobs, there will also be induced jobs resulting from this grant investment. An induced job is defined as a job created or retained elsewhere in the economy as a result of the Program that supports projects/activities not directly charged to supported projects/activities.[29] For example, our vendors will be indirectly supporting jobs in North Dakota communities as they travel across North Dakota to complete the inspection services. Based on the Economic Policy Institute employment multiplies for the US economy in the utility sector, the Program is expected to generate 18 induced jobs.[30]

Table 4:

Jobs Retention and Creation				
	Created	**Retained**	**Induced**	**Total**
Direct	4	18		22
Indirect	5	36	18	49
Total	9	54	18	71

We also have a strong history of labor support including an ongoing relationship with the International Brotherhood of Electrical Workers (IBEW), which represents about half of our employees. IBEW has approximately 775,000 active members and retirees who work in a wide variety of fields including utilities, construction, manufacturing, railroads, and government. As union members, the IBEW bargains collectively with employers over wages, benefits, and

[28] Calculation of job creation through recovery act funding energy.gov
[29] Calculation of job creation through recovery act funding energy.gov
[30] Updated employment multipliers for the U.S. economy | Economic Policy Institute (epi.org). Induced jobs includes jobs supported by respending of income from direct jobs and supplier jobs, as well as public-sector jobs supported by tax revenue. Based on 4 direct jobs created from the Program.

rights.[31] We recently redesigned our line worker apprenticeship program and are now using an IBEW offering for the program. In addition, vegetation management jobs are available throughout the year while other construction jobs tend to slow down in our region during the winter months. These stable VM jobs are compensated beyond prevailing local wages. Furthermore, two of our vegetation managements contractors, Asplundh and Wright Tree Service, are unionized. Overall, we share the federal government's goal of expanding accessibility to good paying, secure, and safe union jobs, particularly in support of our rural communities who often experience high rates of poverty.[32]

Our ties to post-secondary programs and employee involvement in multiple advisory committees at over a dozen area institutions of higher learning include North Dakota State College of Science, Bismarck State College, and others. We are in communication with multiple higher-education facilities in our region, primarily through participation in advisory committees, scholarships, resume reviews, and internships. In addition, the Otter Tail Power Company Foundation[33] connects with our rural communities to support young minds, invest in our current and future workforce, create vibrant culture and vital communities, improve health and human services, and protect our natural resources. In both 2021 and 2022, our Foundation provided $85,000 annually in educational grants to twelve area colleges enabling 50 students to gain access to post-secondary education scholarships. In 2024 the Foundation will work with local institutions of higher learning to expand diversity, equity, and inclusion efforts for scholarships to increase diversity within the energy industry.

Advance diversity, equity, inclusion, and accessibility (DEIA)

We expect and are committed to diversity, equity, and inclusion as part of who we are, what we value, and how we achieve individual, business, and community success. As part of this grant implementation, we will develop plans to incorporate our diversity, equity, inclusion, and accessibility goals into the project, with particular interest in partners who have a history of demonstrating success against these goals.

We recently took a closer look at our service area and company demographics and then built action plans for a diverse organization that better represents the demographics of our service area. This ensures we continue to be a company of employees with a variety of ideas, experiences, and perspectives. We then 1) began a four-part inclusive leadership series for all employees, focused on identities and culture, unconscious bias, the power of diverse teams, and culturally sensitive conversations; 2) began efforts to identify and participate in community career fairs where the population is more diverse than our broader service area; 3) relaunched our leadership development employee resource group called Otter Tail Women Networking and Integrating Talent (OWN IT) as we work to further diversify our management and executive teams; 4) reviewed our processes and training opportunities for recruiting, hiring, onboarding,

[31] BEW.org/Who-We-Are

[32] Across all races and ethnicities, U.S. poverty rates in 2019 were higher at 15.4 percent in nonmetro (rural) areas than in metro (urban) areas at 11.9 percent. USDA ERS - Chart Detail

[33] Foundation | Otter Tail Power Company (otpco.com)

and engaging employees to assist managers in attracting and retaining talented employees and 5) engaged recruiting firms that link our job openings to multiple channels targeted at reaching diverse candidates.

We know that diversity of thought and experience is critical to our ongoing success, providing our essential service, and being a great place to work. In 2023, we conducted DEIA training for all employees, with a goal of 95 percent completion. We are currently on track to attain this goal. Through the Program, we will also endeavor to increase the volume of work that will flow to minority enterprises including those that hold National Women's Business Enterprise (WBE) Certifications from Women's Business Enterprise National Council (WBENC). We will track the number of contracts and/or dollar value awarded to businesses that are principally owned by women, minorities, and/or veterans.

Contribute to Justice40 Initiative/Disadvantaged/Rural Communities

Part of our mission is to improve the quality of life in the areas in which we do business, including in disadvantaged communities. Approximately 8% of our North Dakota system is in a Justice40[34] area as demonstrated in the map below (Image 1). Furthermore, our service area has approximately 527 miles of lines, 8,500 distribution poles, 3,000 transmission poles, and 20 substations located within J40 communities in North Dakota.

[34] The Justice40 Initiative represents a goal of Federal Government that 40 percent of the overall benefits of certain Federal investments flow to disadvantaged communities that are marginalized, underserved, and overburdened by pollution. https://www.whitehouse.gov/environmentaljustice/justice40/

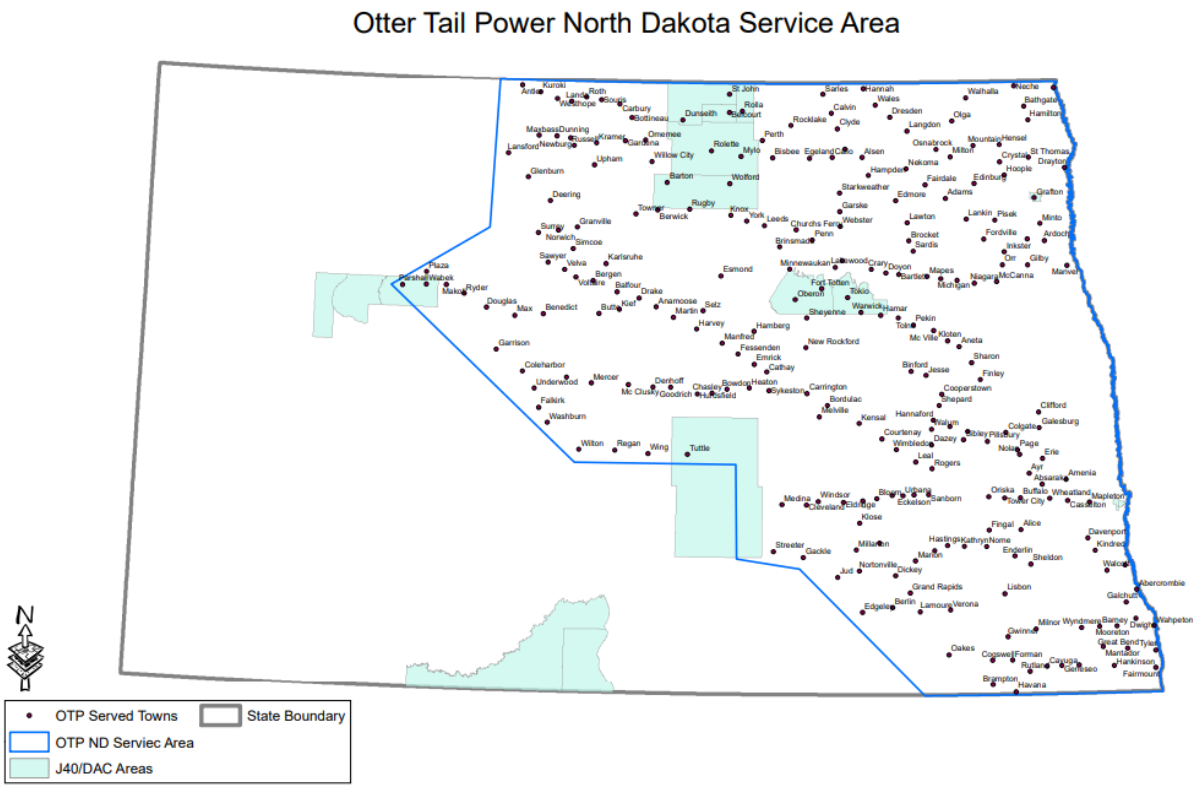


Image 3 – Otter Tail Power Company North Dakota Service Area Justice40 Tracts

It is also important to understand the rural makeup of the communities we serve in North Dakota. As the second smallest investor-owned utility in the United States, we serve 59,153 customers across 257 North Dakota communities, with an average population in those communities of only 382 people. Only 2 towns in our ND service area have a population of more than 8,000 people. Another way to understand the rural nature of our North Dakota service area is by looking at Rural-Urban Commuting Area (RUCA)[35] codes, where 10 denotes the most rural areas and 1 denotes metropolitan area cores. Of the 257 ND communities we serve, 151 are designated as a 10 (59%), 8 are designated as a 2, none have a designation of a 1 and 16 have no designation. This rural composition provides a strong opportunity for the NDTA to reach a historically underserved population of rural Americans.

Another way this grant will benefit rural communities is through in-class educational opportunities. In collaboration with our partners, including ISight, we will demonstrate the next-generation resiliency technologies to middle school students, such as bringing inspection drones into classrooms for students to get firsthand STEM education.

Environmental Impacts – We are not anticipating the program will create environmental impacts. We have an experienced environmental team who will work to mitigate environmental impacts alongside our engineers and line workers. Through this use of drones and satellite

[35] USDA ERS - Documentation

imaging, we will limit environmental impacts during our inspections and therefore the overall program. Throughout the mitigation phase of work the only construction conducted within the program will be pole replacements. Within our application submission is the Department of Energy's Environmental Questionnaire which outlines Next-Generation Grid Resiliency environmental impacts within our North Dakota service area.

Standards of Success

Next-Generation Grid Resiliency meets the three objectives laid out by the North Dakota Transmission Authority.

Objective 1: Reduce the magnitude and duration of grid outages caused by major disruptive storm and non-storm events. Each element of this project provides a direct mitigation to the magnitude and duration of grid outages caused by major disruptive storm and non-storm events.

Maintaining a well-inspected and repaired infrastructure means that we are better prepared for major disruptive events. For example, regular inspections of transmission and distribution poles identify potential issues such as structural weaknesses, rot, corrosion, or damage. Addressing these problems proactively through repairs or replacement helps prevent pole failures during adverse weather conditions, reducing the magnitude and duration of outages. In addition, by keeping trees and vegetation clear of power lines, we can reduce the risk of trees falling onto power lines during storms or high winds, which is a common cause of power outages. In fact, according to Edison Electric Institute 2022 Reliability survey, vegetation is the number one cause of outages, accounting for 20% of all outages.[36]

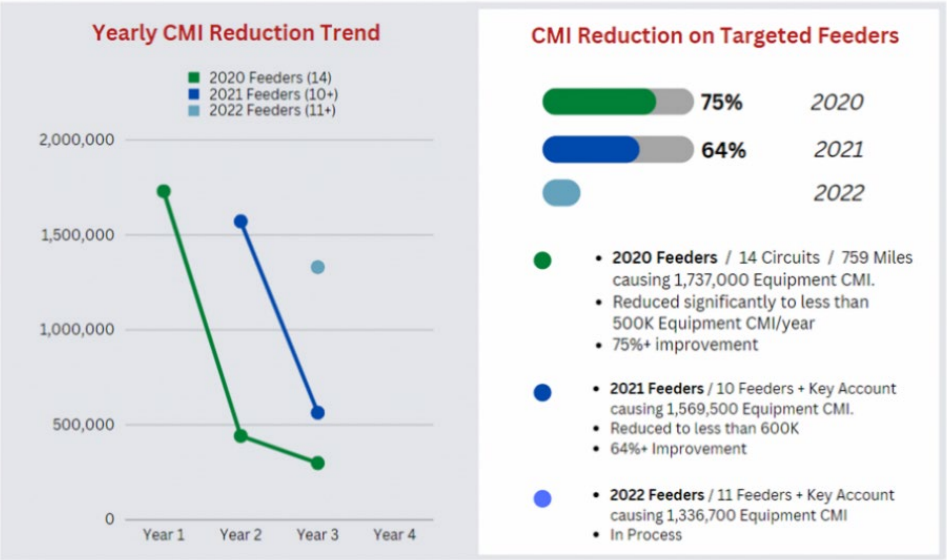
When a major storm or non-storm event occurs, strong winds and heavy precipitation increase the likelihood of trees and branches falling onto power lines, poles, and other grid components. Proactive vegetation management reduces the likelihood of these physical obstructions and acts as a buffer during major storms decreasing the magnitude of grid outages. This increased resilience means that even when storms occur, the grid is better equipped to withstand them without experiencing outages. Fewer obstructions and hazards near power lines also make it safer for workers to assess and repair damage, which can speed up the restoration process. In addition, when outages do occur, they are typically of shorter duration because the grid infrastructure remains relatively undamaged. Utility crews can restore power more quickly when there are fewer obstructions and hazards to address. When storms or other disasters strike, the grid is also less likely to experience extensive damage, and any necessary repairs can be completed more quickly as recently repaired or replaced infrastructure has a higher likelihood of withstanding disruptive events.

Drones also allow our engineers and AI systems to provide accurate assessments of the current state of transmission lines. This method of assessment is of higher quality vs traditional boots-

[36] Edison Electric Institute, 2022 Reliability Survey Report. Published September 2023.

on-the ground methods. This higher quality assessment enables us to make informed decisions, take preventive actions, and respond more effectively to issues before they arise. AI-driven insights can also lead to targeted upgrades and improvements in the grid's overall resilience. For example, drones and AI can identify areas where reinforcement is needed, such as cracked hardware not visible from the ground, making the grid more robust in the face of severe weather as these pre-failing components are likely the first to fail in adverse weather. By mitigating these issues, the system will be able to better withstand future weather events. Drone-based line inspections can also identify faults and failures in the transmission lines more swiftly in comparison to ground patrols, which is critical for reducing outage durations. The image below highlights results from a previous Exacter pilot implementation, showing a positive impact on customer minutes of interruption.

Image 4 – Customer Minutes of Interruption from Exacter Pilot Implementation with US utility.[37]



Substations are the heartbeat of the electrical delivery system and substation assessments can help identify areas of the substation that are nearing failure and may be vulnerable to adverse weather conditions. This information will lead to targeted improvements which increase the substation's resilience to storms and other disruptive events.

The insights gained from The Program assessments enable us plan for and complete needed repairs or replacements in advance, which shortens outage durations and minimizes their impact. According to the DOE, the leading cause of electric outages in North Dakota (2007-2017) was faulty equipment or human error.[38] Furthermore, infrastructure failure has a disproportionate impact on rural communities due to the response time for repair crews, which can be longer due to the distances that crews must travel to conduct repair work. Remote terrains and difficult landscapes [also] pose challenges for repair crews, delaying restoration

[37] Exacter, 14 November 2023
[38] North Dakota Energy Sector Risk Profile

efforts.[39] This means that proactive inspection and replacement in these areas, funded through this grant, will have an outsized impact on members of these disadvantaged rural communities.

Table 5:

Objective 1 Standards of Success	Metrics	Project	Measurement
Objective 1: Reduce the magnitude and duration of grid outages caused by major disruptive storm and non-storm events.	Magnitude of interruptions to the critical customers (for storm and non-storm events, separately).	Overall Program	CAIDI excluding major event days and CAIDI including major events days
	Length of time for restoration/recovery after extended outages.	Overall Program	CAIDI including major events days
	Number of personnel trained to manage the resilience project once it is finished.	Overall Program	Approximately 200 personnel

Objective 2: Reduce the frequency and impacts of grid outages caused by major disruptive storm and non-storm events. Each element of this project provides a direct mitigation to the frequency and impacts of grid outages caused by major disruptive storm and non-storm events.

Regular inspections and repairs of transmission and distribution poles, substations and transmission lines help identify and address potential issues before they lead to outages. Using data-driven approaches for prioritizing maintenance efforts also reduces the frequency of outages as potential issues are identified and addressed in advance. Reinforcing or replacing damaged or aging infrastructure with stronger materials improves the overall structural resilience of the grid. For example, when we identify woodpecker or fire-damaged poles they are replaced with ductile iron, which improves resiliency to wildfires and is resistant to woodpecker damage, both of which are prevalent in rural areas. This means the grid is better equipped to withstand the stresses and forces of major storms, reducing the likelihood of pole failures and outages during such events. When a storm moves through sections of the power grid, the lines and equipment that are in the worst condition are the most impacted – and experience the most outages. Properly maintained grid infrastructure is less susceptible to damage during storms, decreasing the likelihood of outages occurring during an extreme weather event. AI algorithms can also prioritize maintenance efforts by identifying critical areas that are most likely to be affected by adverse weather conditions. This ensures that maintenance resources are directed where they are needed most, reducing the likelihood of outages. Preventive maintenance also reinforces grid infrastructure, reducing the frequency of outages

[39] Power Outage Restoration Challenges and Solutions in Rural Areas (utilitiesone.com)

caused by equipment failures. Quicker restoration of power reduces costs associated with emergency repairs and extended outage periods.

Our service areas are subject to natural disasters such as severe snow and ice storms, derechos, tornadoes, flooding, and fires. Extreme weather events within our service area directly affect our infrastructure, causing disruption in service to customers and result in repair or replacement costs due to downed wires and poles or damage to our operating equipment.[40] Next-Generation Grid Resiliency helps us strategically prepare for these weather patterns. During extreme weather, there is an increased likelihood of vegetation encountering overhead power lines, such as a tree branch falling on a power line during a storm, or a tree blown into lines due to high winds. By improving and expanding VM practices with this grant, we can identify and remove potential hazards across more of our remote service territory before they cause problems, thus reducing this likelihood. A similar AiDash partnership with National Grid saw a 5% improvement in SAIFI.[41] Vegetation can also pose a fire risk if it meets power lines, especially during dry or windy conditions. By removing and/or maintaining vegetation, we can help reduce the risk of wildfires. Applying data analytics and modeling, and adding data sources such as satellites, to VM allows us to transform our VM approach, moving from a static to a dynamic planning model, ultimately improving our climate resiliency.

There are also intangible benefits for restoration crews that stem from this grant investment. As the duration of storm restoration work is shortened because of improved resiliency, employees benefit from more stable hours and fewer nights away from home. This also allows workers to focus more on preventative work rather than emergency restoration work. Storm restoration can be some of the most dangerous work a lineworker performs due to the weather conditions that exist during restoration. As such, having a more reliable and resilient system that is less prone to severe weather reduces the likelihood and frequency that our lineworkers will work in treacherous conditions. As utilities often operate in hazardous environments, such as remote or difficult-to-access locations and high-voltage areas, sending human inspectors into these environments poses significant risks. Drones eliminate the need for personnel to physically reach these areas, mitigating the potential for accidents and injuries. Slips, trips, and falls are the leading cause of workplace fatalities according to OSHA reporting. Drone technology drastically reduces the opportunities for exposure to these risks as drone operators virtually never have to leave the area where the drone is launched from and can cover as much as two miles of right-of-way from a single location. There are still further beneficial aspects of preventative work relative to emergency restoration. We have estimated, based on pole replacement numbers, that storm work would be 25% to 50% more expensive than the same work on a scheduled basis. Shifting some emergency restoration work to preventative work through the Program can have a positive fiscal impact on us and, in turn, our customers.

[40] Otter Tail Power, 2021 Annual Report. Annual Report and Proxy Statement | Otter Tail Corporation
[41] How National Grid Improved Grid Reliability with Data-Driven Insights from Space (aidash.com)

Table 6:

Objective 2 Standards of Success	Metrics	Project	Measurement
Objective 2: Reduce the frequency and impacts of grid outages caused by major disruptive storm and non-storm events.	Frequency of interruptions to critical customers.	Overall Program	SAIFI tracked over the course of the project.
	Qualitative assessment of the physical durability of the grid (how much the grid can withstand: both initial and frequent disruptions of 1 hour or more).	Overall Program	Total number of interruptions of one hour or more in the two years prior to the project mitigation, 2023 and 2024 relative to the second year of the project, 2025.
	Qualitative assessment of the grid operational flexibility (how adaptable the grid is in terms of damage).	Preventative Vegetation Management and IVMS	Miles of vegetation management completed annually.
		Pole Integrity	Number of poles repaired or replaced as a result of pole integrity assessments.
		Drone and AI-Enhanced Transmission Line Inspections/Repairs	Dollars invested in transmission and distribution line mitigation work completed as a result of project.
		Advanced Substation Assessments/Repairs	Dollars invested in substation mitigation work completed as a result of project.
	Restoration/recovery times after frequent outages of 1 hour or more.	Overall Program	CAIDI with outages under 1 hour removed from analysis.

Objective 3: Implement grid modernization projects to develop energy solutions that provide lower-cost energy access to disadvantaged or underserved communities and promote energy sufficiency and energy justice in these communities while providing clean energy in alignment with the Biden Administration's Justice40 Initiative. Renewable energy (RE) and distributed energy resources (DERs) that are installed and managed locally give disadvantaged communities the opportunity to meet the energy needs of their community, take control of their energy resources, and enjoy the long-term environmental and economic advantages of these resources. These initiatives not only offer a source of clean, local, renewable energy but also reduce energy costs, generating savings that can be reinvested into the community.

By proactively conducting grid assessments, we can identify and address potential issues before they lead to power outages. This means residents in rural and disadvantaged communities experience fewer and shorter outages, leading to more consistent access to essential services like heating, cooling, and medical equipment. In addition, a stable power supply supports local businesses, job opportunities, and community services. It can encourage economic growth and reduce vulnerability in disadvantaged communities. Proactive grid assessments can also help identify and address issues related to environmental impacts, such as reducing the risk of power line-induced wildfires, which can have a significant impact on communities.

Next-Generation Grid Resiliency also helps decrease energy burden in disadvantaged and rural communities. For example, by utilizing grant funding to make these reliability investments, we reduce the total project cost to customers by ~40% percent, reducing energy burden. Furthermore, a more resilient grid helps reduce repair costs resulting from weather events. This reduction in repair costs helps us keep rates low, resulting in a decrease in energy burden. A more resilient grid also reduces the need for backup power sources, which can be a significant burden for, or not accessible to, low-income households. During outages homeowners are likely to use portable gas generators to maintain their basic needs. Improving system reliability can help ensure that all members of the community have access to reliable electricity without experiencing frequent power outages, regardless of their ability to pay for backup power sources. We will utilize the Interruption Cost Estimation (ICE) Calculator to measure the economic costs of power interruptions to businesses and residences. According to Berkeley Lab, "the economic costs that power interruptions impose on businesses and residences are a critical consideration when making decisions that affect the future reliability and resilience of the electric power system. Based on more than 20 years of utility-sponsored surveys on the costs of power interruptions to customers, Berkeley Lab developed the tool through close partnerships with industry. To ensure its continued effectiveness, [they continue] to augment it with research on the latest methods for collecting and developing information on the economic consequences of power interruptions on businesses, residences, and society at large."[42]

Without this investment, customers in our service area could be at risk of reduced resilience due to the increasing number and intensity of weather events. While resiliency programs are standard for any utility, they are transformational for our small rural communities whose economies and wellbeing depend on reliability. Any mitigation or prevention of disruptive events has direct social and economic benefits to our customers. The Program will improve and enhance our current programs and improve the resiliency and reliability of service to the rural customers we serve. The Program will also provide key learnings and effective use cases that will benefit other small and rural utilities and communities in North Dakota. This grant will allow us to focus on enhancing the reliable service our customers depend on so they, in turn, can focus on growing the economies of rural America. With a more reliable and resilient grid we anticipate greater economic development for our service area. In fact, "energy is tightly linked to economic development. Higher levels of GDP are correlated with greater electricity use, access, reliability

[42] Economic Value of Reliability & Resilience | Electricity Markets and Policy Group (lbl.gov)

and affordability."[43] Our state, tribal, and local governments are often working towards increasing private sector investment and we will continue to be a partner in economic development for our communities.

Finally, we will promote engineering internships at schools that support disadvantaged, underserved and rural communities, including University of North Dakota and North Dakota State University.

Table 7:

Objective 3 Standards of Success	Metrics	Project	Measurement
Objective 3: Implement grid modernization projects to develop energy solutions that provide lower-cost energy access to disadvantaged or underserved communities and promote energy sufficiency and energy justice in these communities while providing clean energy in alignment with the Biden Administration's Justice40 Initiative.	The number and type of RE/DER installations under grid modernization initiatives.	Overall Program	Total number of circuits with resilience increases that support RE/DER installations.
	The financial impact to households as a result of avoided outages.	Overall Program	The ICE Calculator will be used to calculate customer costs avoided from fewer outages.
	The number of workforce development programs developed for the disadvantaged/underserved communities.	Overall Program	Two workforce development programs; Engineering internship focused on resiliency and student educational programs.
	The number of energy businesses/jobs created for the disadvantaged/underserved communities.	Overall Program	Nine jobs will be created, and we will track the number of these jobs that are in DACs.

The final standard of success is compliance. We intend to comply with each requirement outlined in the NDTA grant. This includes Research, Technology, and Economic Security (RTES), National Environmental Policy Act (NEPA) and Davis–Bacon Act (DBA). We will also ensure that RTES and DBA requirements flow down to all subcontractors. This program will involve the construction, alteration, maintenance, and/or repair of public infrastructure in the United States and we intend to honor the Buy America Requirements for Infrastructure Projects. For example, ISight has made a strong push to Build America, Buy America with the acquisition of American made drones including the Hybrid Project SuperVolo (Blountville, TN), the Freestyle Astro

[43] Jack, Kelsey. 31 March 2022. "How much do we know about the development impacts of energy infrastructure?" Mar 31, 2022. EMLab, University of California, Santa Barbara. Accessed 13 November 2023.

(Woodenville, WA) and the Watts Innovation Prism (Hunt Valley, MD). These aircraft are all NDAA (National Defense Authorization Act) compliant and provide reliable, industry tested aircraft that meet the rigors of industrial/commercial use for critical energy infrastructure.

Project Timeline

Next-Generation Grid Resiliency will be delivered in two phases. Phase 1 will consist of physical and analytical assessments and Phase 2 will focus on mitigation actions recommended from Phase 1. Our contractors listed above will complete all drone and AI work and analytical assessments within Q2-Q4 of 2024. Once we receive the assessments, we will start designing mitigation work and initiate the mitigation activities using internal resources. We will complete all project-funded mitigation work by the end of the second year of project funding.

Table 8:

Program Timeline	2024				2025				2026			
Program Components	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Annual Reporting	★	★	★	★	★	★	★	★				
Quarterly Reporting			★				★				★	
AiDash IVMS												
EXO Pole Inspections												
ISight Drone T&D Inspections												
Exacter Substation Assessments												
Vegetation Management												
T&D Pole Mitigation												
Substation Mitigation												
Internship												
ISight Educational Demos												
Community Engagement												

Project Budget

Next-Generation Grid Resiliency is estimated to be completed with a total budget of $11,177,647. Our cost share will cover the mitigation costs (excluding vegetation management), 50% of the wood pole inspections, and the other costs (program reporting and administration, marketing, and auditing). Our cost share totals $6,745,559, 60% of the total program budget. NDTA's cost share, $4,432,088, 40% of the total program budget, will cover the remaining budget, including: contractor, vegetation management, personnel, and community benefits. Personnel costs are based on historic rates for these roles. These loaded rates include our payroll loading rate (63%) and capitalized administrative and general rate (25%) for a combined rate of 87% applied to the raw hourly rates. The payroll loading rate includes qualified pension expense; 401k match; 401k enhanced contributions; post-retirement medical; active medical less premiums paid by employees; active dental less premiums paid by employees; health savings account company

contributions; life and long-term disability (LTD) insurance premiums; post-employment LTD expense; workers compensation; taxable meals; vacation and vacation accrual; FICA and unemployment taxes; holidays and floating holidays; sick leave; and other miscellaneous lost time activity. The capitalized administrative & general (Cap A&G) rate includes all or a portion of the total calendar year account balances that indirectly support the initiation and completion of a self-constructed asset, specifically back-office personnel, in the following FERC accounts to determine the Cap A&G overhead rate: Administrative and General Salaries, Office Supplies & Expense, Administrative Expenses Transferred Credit, Outside Services Employed, Injuries and Damages (excluding Workers' Compensation), Regulatory Commission Expense, Duplicate Charges Credit, General Advertising Expenses, Miscellaneous General Expenses, Rents, Maintenance of Structures, and Maintenance of General Plant. Table 9 outlines the complete budget breakdown for the Program. An inflation rate of 3% was applied to all personnel costs for each year. It is important to note that we are not expecting any additional grant funding beyond the NDTA to support these critical resiliency efforts for North Dakotans.[44]

Table 9: Next-Generation Grid Resiliency Budget

Budget Category	Cost	Quantity	2024	2025	Total	Basis of Cost
Contractors						
Exacter						
Substation Assessments			$200,000		$200,000	Cost based on Exacter quote.
Transmission Line Assessments			$250,000		$250,000	Cost based on Exacter quote.
ISight						
Drone Assessments	$518	750	$388,380		$388,380	Cost based on ISight quote.
PLP						
Drone Assessments			$309,685		$309,685	Cost based on PLP quote.
EXO						
Steel				$200,000	$200,000	Cost based on EXO quote.
Distribution (OTP Cost)	$20	5000		$105,060	$105,060	Cost based on EXO quote.

[44] Environmental review costs are not included within Table 9. If during award negotiations the NDTA or DOE determine OTP needs to complete an environmental review, OTP will comply and adjust the budget accordingly.

Distribution (NDTA Cost)	$20	5000		$105,060	$105,060	Cost based on EXO quote.
Transmission (OTP Cost)	$20	4000		$84,295	$84,295	Cost based on EXO quote.
Transmission (NDTA Cost)	$20	4000		$84,295	$84,295	Cost based on EXO quote.
AiDash						
IVMS - Distribution			$288,471		$288,471	Cost based on AiDash quote for 2,822 miles of distribution lines.
Mitigation						
Vegetation Management			$1,000,000	$1,000,000	$2,000,000	Cost based on historic costs.
Exacter Devices	$4,000	10	$40,000		$40,000	Cost based on Exacter quote.
Distribution Pole Mitigation	$3,500	927	$1,622,250	$1,622,250	$3,244,500	Cost based on historic costs.
Transmission Pole Mitigation (over 41.6 kV)	$8,000	35	$139,664	$139,664	$279,329	Cost based on historic costs.
Transmission Pole Mitigation (41.6 kV)	$5,500	71	$195,800	$195,800	$391,600	Cost based on historic costs.
Transmission Line Mitigation	$2,000	750		$1,500,000	$1,500,000	Estimate per mile based on historic costs.
Substation Mitigation	$1,500	265		$409,425	$409,425	Estimate per substation based on historic costs.
Community Benefits						
Internships	$7,000	2	$14,000	$14,420	$28,420	Two Resiliency Internships for the duration of two years.
Personnel						
Grant Coordinator (1)	$64	1000	$63,730	$65,642	$129,372	General Project Position with loaded rates.
Marketing Manager (1)	$122	60	$7,336	$7,556	$14,891	General Project Position with loaded rates.
Reliability Engineer (1)	$103	2080	$213,554	$219,960	$433,514	General Project Position with loaded rates.

Other Costs						
Program Oversight & Reporting			$300,000	$300,000	$600,000	Cost for quarterly and annual reporting and program administration.
Annual Independent Audit			$25,000	$25,750	$50,750	CPA costs for Third Party Annual Audit
Marketing			$20,000	$20,600	$40,600	Historic costs for project printing/mailing
				Total Budget	$11,177,647	
				OTP Cost Share	$6,745,559	
				NDTA Cost Share	$4,432,088	

Conclusion: Otter Tail Power customers depend on our ability to provide reliable and resilient electric service. According to the National Association of State Energy Officials and the USDA, our rural communities face higher rates of poverty[45] and high energy burden.[46] These inequities are exacerbated during electrical outages. Next-Generation Grid Resiliency will provide improved and equitable resiliency in our disadvantaged rural communities. Through preventative vegetation management and IVMS, Pole Integrity, Drone and AI-Enhanced Transmission Line Inspections/Repairs, and Advanced Substation Assessments/Repairs our electric grid will gain the resiliency needed to help mitigate the consequences of extreme weather events. This grant funding will enable us to accelerate these transformational investments for our customers and for North Dakota.

[45] USDA ERS - Chart Detail

[46] Rural Data Resources for State Energy Planning and Programs. National Association of State Energy Officials. Published May 2020. www.naseo.org