Advanced Solutions to Mitigate Wildfire Risk [Concept Paper TA2-036-E]

GRIP FOA-0002740 Topic Area 2 Smart Grid Grants (40107)

The *Advanced Solutions to Mitigate Wildfire Risk* project is aimed at reducing the risk of wildfire ignition from utility infrastructure, providing early detection and response capabilities, and reducing the devastating effects of wildfires across high-risk communities in the west by leveraging and scaling the deployment of advanced technology solutions. Supporting the project is a unique coalition of electric utilities, technology providers, national laboratories, education, and community partners.

Project Partners	***Role***	***Business POC***	***Technical POC***
UMS Group	Grant Manager, Contractor	Jack Shearman	Joseph Lake[1]
Slalom	Grant Administrator, Contractor	Tim Stafford	Andrew Houston
Avista	Subrecipient, For-Profit Utility	David James	David James
Burbank Water and Power	Subrecipient, Public Utility	Riad Sleiman	Calvin Clark
Eugene Water & Electric Board	Subrecipient, Public Utility	Jeannine Parisi	Tyler Nice
Inland Power & Light	Subrecipient, Cooperative Utility	Timothy O'Brien	Dustin Bruffett
Pacific Gas & Electric	Subrecipient, For-Profit Utility	Brian House	Brian House
Public Utility District No. 1 of Klickitat County	Subrecipient, Public Utility	Mark Garner	Mark Garner
Fire Adapted Communities Learning Network (FAC Net)	Community Engagement Lead, Contractor	Michelle Medley-Daniel	Michelle Medley-Daniel
Community Energy Project	Community Partner, Contractor	Charity Fain	Charity Fain
Unite Oregon	Community Partner, Contractor	Marion Powell	Marion Powell
Grid Forward	Regional Coordinator, Contractor	Bryce Yonker	Rebecca Goold
Utility Safety Associates	Utility Wildfire SME, Contractor	David Geier	David Geier
AiDash	Technology/Service Contractor	Bradley Smith	Kyle Carson
ALERTWildfire	Technology/Service Contractor	Nick Maggio	Nick Maggio
Aveva	Technology/Service Contractor	Ann Moore	Ann Moore
Gridware	Technology/Service Contractor	Kelly Strand	Tim Barat
IrisCX	Technology/Service Contractor	Luke Krueger	Luke Krueger
Overstory	Technology/Service Contractor	Karim Al-Khafaji	Karim Al-Khafaji
Pano AI	Technology/Service Contractor	Stephen Murdock	Sonia Kastner
Sharper Shape	Technology/Service Contractor	Kristy McDermott	Mike Granger
Technosylva	Technology/Service Contractor	David Buckley	David Buckley
Bonneville Power Administration	Federal Power Partner	James Hillegas-Elting	Julie Barton-Smith
Oregon State University	Education Partner	Eduardo Cotilla-Sanchez	Yue Cao
Pacific Northwest National Lab	Research Partner	Carl Imhoff	Andre Coleman

Table 1: Project Partners and Points of Contact (POC)

Project Locations[2]: The project will be conducted within the service territories of the utilities listed in the table above, in California, Idaho, Oregon, and Washington.

Confidentiality statement: The combination of organizations in this coalition or 'project partners' is a confidential arrangement not to be shared. The listed interest of participating utilities in various areas of work is also confidential information. No other trade secrets or sensitive intellectual property is shared in this submission.

---

[1] Primary Contact: jlake@umsgroup.com | 518.925.7334

[2] The Project has letters of support from Idaho Offices of Energy and Mineral Resources; Oregon Department of Energy; and Washington State Department of Commerce.

1.0 Project Overview

1.1 Background

The annual number of acres burned by wildfires in the western US is now more than double what it was in the 1990s[3]. In response, leading utilities have invested in technologies to 1) increase situational awareness about fire threat conditions; 2) better model and understand wildfire risks in and around their service territories; 3) address ignition risks caused by exposure of assets to vegetation along right of ways; 4) reduce the number of customers exposed to planned and unplanned outages; and 5) effectively monitor and manage the grid during fire events.

Grid Outcome	***Enabling Technologies/Mechanisms.***
Reduce probability of ignition due to utility equipment operations or failure	Data collection/analysis of equipment condition + event notifications.
	Realtime monitoring of equipment, event notifications.
	Improved asset maintenance processes from digital inspection.
	Improved wildfire risk modeling & identification of high-risk assets.
Reduce probability of ignition from contact between utility equipment & vegetation	Optimized vegetation management based on risk.
	Improved asset + VM maintenance processes from digital inspection.
	Improved wildfire risk modeling & identification of high-risk assets.
Reduce consequence of ignition from utility equipment	Optimized fuels management based on risk.
	Improved situational awareness – automated ignition detection.
	Improved wildfire spread modeling informing prepositioning of crews.
Reduce consequence of ignition from non-utility sources	Optimized vegetation & fuels management based on risk.
	Improved situational awareness – automated ignition detection.
	Improved wildfire spread modeling informing prepositioning of crews.
Reduce frequency of electricity network outages (including PSPS)	Data collection/analysis of equipment condition, event notifications.
	Realtime monitoring of equipment, event notifications.
	Improved asset + VM maintenance processes from digital inspection.
	Improved wildfire risk modeling & identification of high-risk assets.
Reduce duration of electricity network outages (including PSPS)	Grid-independent monitoring, improved isolation, event notifications.
	Improved situational awareness during de-energizations.
	Improved wildfire risk modeling & identification of high-risk assets.

Table 2: Technology Mechanism Alignment to Grid Outcomes

Beyond system hardening, effective wildfire risk mitigation programs for utilities include preventative elements that reduce the probability of ignition events from occurring and mitigate the impact of fires on utility infrastructure and customers. Certain activities, such as wildfire risk modeling or situational awareness, support both ignition prevention and impact reduction efforts.

Prevent Ignitions	***Reduce Impacts***
Utility Situational Awareness	Utility Situational Awareness
Wildfire Risk Modeling	Wildfire Risk Modeling
Vegetation Management	Ignition Detection & Monitoring
Asset Inspections & Maintenance	Outage Management
Asset Monitoring	Community Preparation & Responsiveness

Table 3: Wildfire Risk Mitigation Activities

[3] Source: Congressional Research Service. https://sgp.fas.org/crs/misc/IF10244.pdf

1.2 Project Goal

This project seeks to deploy a suite of advanced wildfire risk mitigation technologies within utilities facing wildfire risk challenges, and to serve as a catalyst for widespread adoption of similar technologies across the western United States. This includes the following goals:

- Accelerate the deployment of advanced wildfire risk mitigation technologies - particularly among smaller, publicly owned utilities in the western united states - by demonstrating success and reducing technology risk perceptions.
- Reduce the probability and consequence of ignitions from utility equipment failures, or from contact between utility equipment and vegetation or other materials.
- Improve utility situational awareness, particularly in high fire threat areas.
- Reduce outage frequencies and durations.
- Improve community awareness of the actions being taken within this project, and where they fit within the context of the full suite of fire mitigations deployed by utilities.
- Increase wildfire awareness within communities through direct engagement and provide support for specific actions that can be taken to increase wildfire resilience.

1.3 DOE Impact

The DOE matched funds for this project will accelerate the deployment of advanced wildfire risk mitigation technologies among utilities facing significant wildfire challenges in the western US.

Utilities mitigate technology risks by conducting small scale pilots and deploying proven solutions that have been vetted for many years across the industry. While the technologies included in this project have been proven successful with leading utilities around the world, most have not been deployed in the field for more than 5 or 10 years. By directly offsetting a portion of the financial burden, this project will reduce technology risk for coalition utilities, particularly smaller utilities with less tolerance for financial risks. This project will also fund assessments of each utility's wildfire mitigation strategy and the deployment of fundamental enhancements that will support broader investment in advanced technologies in the future.

The project will support the broader-scale deployment of the technologies across the west, particularly by small and medium-sized utilities that can observe the successes of coalition utilities and factor that into their own decision-making. The experiences and lessons learned from this project will be documented and shared with other utilities through forums like the IWRMC and a proposed annual symposium with other federally-funded projects addressing wildfires.

1.4 Community Benefits Plan: Job Quality and Equity

Each partner utility is actively engaged in attracting, training, and retaining a skilled and well-qualified workforce. Partner utilities have collective bargaining agreements, labor-management partnerships, or other such agreements which further describe the wages, benefits, and other worker supports provided by the partner utility's commitments to supporting workforce education or training, and the partner utility's efforts to engage employees in the design and execution of a workplace safety and health plan.

Partner utilities' current employee base will primarily be utilized for implementation. In the event that opportunities for additional outside labor is required, UMS Group and FAC Net will work

closely with partner utilities to try and leverage place-based groups' workforce capacity. Connections and partnerships with place-based workers will already be facilitated as part of the community engagement work FAC Net will be performing with the utilities. For example, in utility service areas where there are place-based fuels reduction crews, the community engagement process will create relationships between the utility and local organizations seeking work for their crews. This pipeline can serve to ensure that job quality and workforce continuity are maintained.

1.5 Disadvantaged Communities

The Community Benefits Plan is intentionally based on a strategy of creating connectivity and conditions for authentic relationship growth, especially in areas where they may not currently exist, including rural, underserved, and disadvantaged communities. Fire Adapted Communities Learning Network (FAC Net) has been selected to lead the community engagement workstream. They have specific expertise in wildfire resilience community engagement and unique experience working with state resource agencies to develop strategic partnerships and plans. The framework includes a particular focus on addressing each utility's fluency in engaging underserved and disadvantaged communities and increasing community engagement maturity throughout the duration of the project. Please see the Community Benefits Plan for further details.

1.6 Constraints/Negative Impacts on Communities

Negative environmental impacts are not anticipated for any communities, disadvantaged or otherwise. Most of the technology that will be implemented through this program will be software. These technologies will provide advanced situational awareness, improving the visibility of the environment and utility infrastructure. This data can inform communities and utilities in their discussions and actions.

1.7 Climate Resiliency

In addition to addressing wildfire-related challenges, some of the technologies deployed within this project that relate to improving utility vegetation management and situational awareness will also reduce impacts from high wind events and improve grid restoration times following outages due to flooding, ice storms, heavy snow, and other climate-driven events.

2.0 Technical Description, Innovation, and Impact

In support of the overall objective for BIL-GRIP Topic Area 2 to "deploy and catalyze technology solutions that increase the flexibility, efficiency, reliability, and resilience of the electric power system,"[4] this project will fund the deployment of a suite of critical and complementary wildfire risk mitigation technologies designed to rapidly improve the maturity and effectiveness of utility operations in geographic areas facing significant wildfire threats in the western United States. As such, this project is specifically targeting the objective related to projects that "prevent faults that may lead to wildfires or other system disturbances."

In addition to financial support for technology deployment, the project includes an annual assessment of each utility's overall wildfire mitigation strategy. Recommendations and direct

[4] DE-FOA-0002740 Page 24 of 140

support will be provided to improve each utility's wildfire risk mitigation program and support the effective integration of new technologies and data streams into existing operating processes.

In parallel with the annual utility assessments and the deployment of advanced technologies, this project will also include the development and implementation of a customized Community Engagement & Preparedness Plan for each coalition utility's service territory. The Community Engagement Workstream[5] will entail the creation of a tailored annual strategy that reflects specific priorities around project information sharing, community feedback, integration with regional priorities, and the identification of opportunities for additional coordination among and between utilities and community stakeholders.

2.1 Relevance and Outcomes

This project leverages a "wildfire risk mitigation in a box" approach that provides a robust set of key mitigation strategies and technologies that have been proven successful in the United States and around the world. The selection of technology solutions will be tailored to specific utility partners and deployed in the field. Coalition utilities will be guided towards technologies and solutions that maximize overall wildfire risk reductions for the community for a given amount of money invested. These include, but are not limited to the following:

AiDash provides a robust vegetation management software solution that utilizes artificial intelligence algorithms and satellite images. The solution optimizes utility vegetation/fuels management activities based on wildfire risk. The software allows utilities to estimate wildfire ignition and spread risk relative to critical utility assets and provides insights that enable both field and strategy teams to rapidly identify and address deficiencies.
AVEVA provides a real-time and historical data management platform – the PI System. This powerful and scalable solution includes hundreds of industry standard interfaces/collectors to compile data from various sources, field devices, and equipment. PI has been widely adopted by electric utilities globally to support generation, transmission, distribution, substation, smart grid, and many other core utility functions.
Gridware delivers a distributed network of small, solar-powered hardware devices, permanently deployed to distribution grid poles. The devices can house and power a variety of sensors, and along with the organization's outage management and asset management software tools and APIs for grid operators drive real time identification and localization of faults that cause wildfires. This includes both faults caused by equipment failures and contact from the surrounding environment. Gridware operates independently of the grid to ensure the system is always on and available, including during PSPS and outage events.
Overstory provides a satellite-based vegetation management software solution that works in real time and at scale. Overstory helps utilities optimize vegetation management work based on wildfire risks and potential reliability impacts. The software utilizes machine learning to interpret satellite imagery around transmission and distribution corridors, allowing utilities to more precisely direct pruning efforts.
Pano AI provides early wildfire detection, intelligence, and notification via an end-to-end technology solution. The solution leverages ultra-high-definition cameras that rotate 360-degrees and capture a full panorama every minute. By synchronizing camera data with satellite and other data feeds, Pano AI's artificial intelligence produces a real-time picture of potential threats and delivers immediate, actionable intelligence through an intuitive web platform.
Sharper Shape provides infrastructure data collection, processing, and analytics solutions that enable electric utilities to create and leverage a "digital twin" of their networks. This powerful software interface enables utilities to conflate real world spatial information with critical asset management data to perform digital inspections and improve operational reliability of the network. Sharper Shape provides utilities with an asset registry with absolute accuracy, enabling better and faster asset management and vegetation management activities.

[5] See Community Benefits Plan (CBenefits.pdf) for additional details.

Technosylva provides a robust wildfire risk analysis solution that integrates with advanced weather prediction data to identify infrastructure assets that are the most concern as ignition sources for destructive fires. Through integration with sensors deployed in the field, they can immediately identify which assets should be prioritized for operational action, such as possible de-energization or corrective field work, based on an estimated consequence from a possible asset-caused ignition. In addition, the real-time fire environment of the platform can identify which infrastructure assets may be at the highest risk from active wildfires, helping organizations with proactive notification and resource allocation and deployment.

Table 2: Project Technology Providers

Other technology solutions that align with overall project objectives may be considered for deployment. This includes EDF's **GeneSys** embedded software for digital control system management; **IrisCX** direct customer engagement application; and University of Oregon, University of Nevada, Reno, and University of California, San Diego's **ALERTWildfire** camera system for wildfire detection and monitoring.

Overall, the project technology partners all offer solutions that:

- improve understanding of infrastructure condition,
- help prioritize maintenance activities by risk, and/or
- enable better operational intelligence to reduce the frequency and duration of outages.

While assessing each partner utility and identifying specific areas of need is a key part of the project workplan in year 1, most have already established some preliminary focus areas and priorities. The following section describes the partner utilities and their preliminary priorities.

Avista provides electricity to 406,000 customers and natural gas to about 372,000 customers across 30,000 square miles and four northwestern states. (b) (4) [redacted]

Burbank Water and Power (BWP) is a vertically integrated, publicly owned municipal utility serving the City of Burbank's electrical needs for more than 100 years. BWP's electric system provides power to approximately 53,133 customers. About 28% of BWP's service territory is located within a Tier 2 high fire-threat district, and (b) (4) [redacted]

Eugene Water & Electric Board (EWEB) was founded in 1911 and is the largest publicly owned electric and water utility in Oregon. EWEB's electric system services over 96,000 residential, commercial, and industrial customers within the City of Eugene as well as rural areas in the nearby McKenzie Valley. (b) (4) [redacted]

Inland Power & Light (IP&L) was founded in 1937 and is the largest electric cooperative in Washington, serving approximately 44,500 members. IP&L serves a large and diverse service area transmitting and distributing electricity within a service area covering over 8,000 square miles in 13 counties in Eastern Washington and North Idaho, much of which is in high-risk

wildfire areas. (b) (4) [redacted]

Pacific Gas & Electric (PG&E) was incorporated in California in 1905 and is one of the largest combined natural gas and electric energy companies in the United States. The company provides natural gas and electric service to approximately 16 million people throughout a 70,000-square-mile service area in northern and central California. PG&E maintains 106,681 circuit miles of electric distribution lines and 18,466 circuit miles of interconnected transmission lines. (b) (4) [redacted]

Public Utility District No. 1 of Klickitat County is located in South Central Washington. Klickitat PUD serves approximately 14,000 customers within a 2,200-square-mile service territory that includes 200 miles of transmission and 1,700 miles of distribution lines. The service area covers the entirety of Klickitat County and portions of Skamania, Yakima, and Benton Counties in Washington state. (b) (4) [redacted]

While primarily focused on mitigating disruptions due to wildfires, the technologies included in this project will also help utilities manage risks associated with flooding, wind events, ice storms, heavy snow, and other climate-driven events. This supports the key BIL-GRIP objective around "improving the electric grid's ability to avoid, mitigate and recover from major disruptions and plan for future disruptions across all hazards."

In terms of Grid Modernization goals, both Gridware and Pano AI offer advanced hardware platforms that significantly improve utility situational awareness and better localization of faults or other events, which can lead to improved restoration times.

The funds allocated for this project will address each of the areas listed above and support a number of Topic Area 2 investment focus areas, including[6]:

- Improving the visibility of the electrical system to grid operators, to help quickly rebalance the electrical system with autonomous control, through data analytics, software, and sensors.
- Anticipate and mitigate the impacts of extreme weather or natural disaster on grid resiliency, including investments to increase the ability to redirect or shut off power to minimize blackouts, prevent wildfires, and avoid further damage.

In addition to the direct Grid Modernization and Aging Infrastructure outcomes provided by the technology and service provider members of the coalition, the overall project approach helps to support a variety BIL and GRIP goals and priorities:

[6] DE-FOA-0002740 Pages 25 and 26 of 140

BIL / GRIP Objective	***Enabling Project Approach***
Prioritize driving innovative approaches to achieving grid infrastructure deployment at-scale where significant economic benefits to mitigate threats and impacts of disruptive events to communities can be attained.	***Utility Partner Selection.*** Wildfires do not recognize jurisdictional borders, so the coalition has been designed to fund investments within a broad array of utility types and sizes, all of whom face significant wildfire threats throughout the west.
	Industry and Cross-Industry Sharing of Best Practices and Lessons Learned. The project has been designed to facilitate sharing of lessons learned in near real-time among utility participants and organizations like the IWRMC, BPA, PNNL, and OSU to ensure leading practices are captured and industry learning can be accelerated.
Leverage private sector and non-federal public capital to advance deployment goals. Leverage Federal infrastructure funding to maximize grid infrastructure deployment at-scale. Demonstrate how federal investments under the GRIP program can lead to additional future investments by industry, communities, venture capital, and other private debt and equity capital.	***Utility Funding Match.*** Utility partners will fund 50% of overall project costs.
	Annual Wildfire Mitigation Strategy Assessments. A portion of the project funding is reserved for annual assessments of each utility's wildfire risk mitigation program to ensure alignment with leading practices from around the world, and to ensure maximum impact and success of each technology deployment.
	Funding Allocations for Community Engagement. A portion of the project funding is reserved for the development and implementation of an annual Community Engagement & Preparedness Plan for each utility service territory.
	Partnership with FAC Net. The project Community Engagement Workstream entails coordination with utilities, local CBOs, and communities to share information about the project and its relation to broader utility wildfire mitigation efforts. The goal is to support and inform other wildfire risk mitigation efforts made by communities and local/regional businesses.

Table 5: Project Approach to Enabling BIL/ GRIP Objectives

2.2 Feasibility

UMS Group and the coalition of utilities, technology/service providers, community engagement leaders, federal energy administrations, academic institutions, and national labs assembled for this project are uniquely qualified to execute the workplan to deliver all stated outcomes.

In 2019, UMS Group created the International Wildfire Risk Mitigation Consortium (IWRMC) – a collaborative of twenty electric utilities facing significant wildfire risk in the United States, Canada, Australia, and South America. The IWRMC routinely engages with non-utility stakeholders from academia, government, first responder organizations, and experts from other industries to support an overall mission to "accelerate learning around wildfire risk mitigation." UMS Group facilitates the consortium, providing subject matter expertise, organization, planning, research, benchmarking services, and analytical support for the community.

The project will include several pathways for utility and non-utility partners to continuously share insights and leverage learnings from each other. Members of the project coalition will share their experiences with the other project members through routine reporting, and direct discussions will provide opportunities to pose questions and solicit feedback around any challenges that are experienced. The project will include the creation and maintenance of a "Lessons Learned" database, a centralized repository of use cases, technology solution sets, and key learnings to help member utilities quickly gather, interpret, and act on leading wildfire risk mitigation practices. Education and Research partners such as Bonneville Power Administration (BPA), Oregon State University (OSU), and Pacific Northwest National Laboratory (PNNL) are supportive of the project and will advise and coordinate as needed throughout the project lifecycle.

The holistic approach offered by this project ensures that underlying issues can be addressed within the project window, increasing the likelihood of success for each utility, and offering a more efficient path towards achieving overall wildfire mitigation goals.

All coalition utility partners maintain a skilled workforce and strong relationships with labor unions which will be utilized where applicable, alongside technology/service provider staff, to deploy and maintain the advanced technologies included in this project.

2.3 Innovation and Impacts

Each technology deployed within this project represents either a major leap beyond the status quo for utility operations and wildfire risk mitigation, or the filling of a substantial void.

Provider	***Technology***	***Utility Industry "Status Quo"***
AI Dash / Overstory	Satellite-Based Veg. Management	Laborious, manual field assessments with annual follow-ups (at most), time-based vs. risk-based.
AVEVA	Data Management & Analytics Platform	Disparate data sources with little or no organization and manual links between them.
Gridware	Realtime, Grid-Independent Monitoring	Fault- or ignition-triggered event awareness. Laborious, manual field inspections. High percentage of "unknown" outages causes.
Pano AI / ALERTWildfire	Automated, Rapid Wildfire Detection	Customer, fire service, or other 3rd party detection and reporting – often long after ignition.
Sharper Shape	LiDAR/Digital Twins & Spatial Analytics	2-Dimensional, often inaccurate and imprecise GIS with little or no integration with asset mgmt. system.
Technosylva	Wildfire Risk & Spread Modeling	Industry void - little or no wildfire risk or spread modeling at this level of sophistication.

Table 6: Beyond The Status Quo

The nature of this coalition – which includes utilities, technology providers, service providers, community engagement leaders, industry experts, federal energy administrations, academic institutions, and national labs – is itself a key innovation delivered by this project. While sharing and collaboration between utilities, between academic institutions, or between technology partners is commonplace, sharing between each of those individual groups is substantially less common. At the same time, each of these groups has a role to play in advancing the state of the industry, building resilience into the grid, and making our communities safer. Furthermore, the coalition will continue to seek out new technologies that support the project goals.

2.4 Support of Regional Strategies and Plans

Below, Table lists various state, local, tribal, regional, and national resilience and other goals, strategies and plans which this project aligns and supports.

Jurisdiction	***Goal, Strategy, or Plan***	***Description of Alignment with or Support of Goal, Strategy, or Plan***
National	National Cohesive Wildland Fire Management Strategy[7]	This project addresses several challenges outlined in the NCWFMS, including "managing vegetation and fuels" and "effectively and efficiently responding to wildfire".
California	California Public Utility Commission Wildfire Safety	This project strongly aligns with the objectives of the CPUC's WSD overall strategy and roadmap for eliminating utility-related wildfires, such as "reduce losses to structures and critical infrastructure from

[7] https://www.forestsandrangelands.gov/strategy/thestrategy.shtml

	Division Strategy and Roadmap	utility-related wildfires"; "Limit planned and unplanned outages due to utility-related wildfires and mitigation activities"; "Ensure utilities prioritize and make prudent wildfire mitigation investments".
	CAL FIRE Utility Wildfire Mitigation Program[8]	PRC 4292 and 4293 specify vegetation clearances that utilities must maintain around poles and powerlines to prevent ignitions.
	California Wildfire & Forest Resilience Action Plan[9]	The plan "recognizes the need for strong partnerships among federal, state, local and tribal entities and private organizations."
Oregon	Oregon Guidebook for Local Energy Resilience[10]	This project strongly aligns with the Guidebook's suggested actions for utilities to increase resilience, e.g.: vulnerability/risk assessments, installation of sensors for event detection, digitization of maintenance and engineering records, and refinement of shutdown procedures.
Washington	WA Dept. of Natural Resources - Electric Utilities Wildland Fire Prevention Task Force – Final Report[11]	This project supports the overall goals of task force related to electric utility wildland fire preventing, particularly those related to vegetation management priorities and collaborative work around communication of wildfire prevention messages.
Idaho	Idaho Firewise[12]	This project supports the mission of Idaho Firewise (and Firewise USA) to coordinate, support, and promote wildland fire education.

Table 7: Support of Regional Strategies and Plans

2.5 Deployment Risks and Challenges

2.5.1 Technology/Service Ineffectiveness

Technology risks relate to the ability to solve the problem the technology was designed for. In some cases, this type of failure can lead to substantial disruption of normal business operations. The technologies deployed within this project are specifically focused on adding new capabilities to mitigate wildfire risks. Thus, a failure to deliver the intended capabilities are extremely unlikely to substantially impact the fundamental operations of coalition utility businesses. Coalition technology partners have all been vetted, with UMS Group/Slalom having confirmed that all have been deployed successfully with utilities in the US to date.

In the event that a technology or service being deployed as part of this project fails to meet the needs of a coalition utility in any way, those lessons and experiences will be documented and shared with the other members of the coalition to avoid further negative impact. This will also create additional opportunity for the coalition to analyze the failure and determine if an alternative course of action can be taken to correct the underlying issue.

2.5.2 Prime or Sub-Recipient Business Dissolution/Bankruptcy/Contraction

A failure of the prime applicant business would likely necessitate withdrawal from the coalition and a lack of project administration and implementation support. UMS Group has been in business since 1989, and maintains relationships with hundreds of utilities, subject matter experts, and technology and service providers around the world. Slalom employs more than 13,000 people in 43 markets and 11 Build Centers across North America, Europe, and Asia Pacific, with annual revenue exceeding two billion dollars.

[8] https://osfm.fire.ca.gov/divisions/community-wildfire-preparedness-and-mitigation/utility-wildfire-mitigation/
[9] https://wildfiretaskforce.org/wp-content/uploads/2022/04/californiawildfireandforestresilienceactionplan.pdf
[10] https://www.oregon.gov/energy/safety-resiliency/Documents/Oregon-Resilience-Guidebook-COUs.pdf
[11] https://www.dnr.wa.gov/publications/rp_fire_electric_utility_taskforce_report.pdf
[12] https://idahofirewise.org/

UMS Group and Slalom are highly diversified businesses, in terms of both regional coverage and product/service offerings, which provides a measure of insulation from economic upheaval and overall volatility. In the unlikely event that both the UMS Group and Slalom businesses fail, other preferred partners can be selected to administer the project activities.

2.5.3 Technology Provider Business Dissolution/Bankruptcy

Failure of a coalition technology provider business would likely necessitate their withdrawal from the coalition and the unavailability of the technology/service.

Grid Forward, UMS Group, and Slalom have assessed the quality of the technology and service offerings from all Coalition technology partners, including direct discussions with utilities which have deployed these offerings in recent years. The level of risk posed by a potential failure of a technology partner business has been deemed to be acceptable, as alternative solutions/providers may be substituted to achieve similar project goals.

2.5.4 Wildfires & Severe Weather Event Operational Challenges

Utilities can face severe weather and/or catastrophic wildfires on their networks, and these "Major Events" necessitate a substantial shift in operating posture as the utilities shift their focus to grid restoration. As such, any new technology deployments associated with this project could be delayed until the utility can complete higher priority restoration work.

Despite the increasing prevalence of extreme weather events and of wildfires driven by climate chance, these 'major events' are relatively rare. UMS Group and Slalom recognize the importance of the triage processes that utilities have in place to prioritize things like emergency response and grid restoration. As the coalition partners operate in a variety of geographies across the western and northwestern US, it is unlikely that progress would be halted on the project across all jurisdictions due to any single major event.

2.5.5 Human Resource Constraints

UMS Group and Slalom engage in hundreds of different consulting projects each year, and as leaders in the market for utility management consulting work the substantial demand for their services could potentially impact delivery of project objectives.

The nature of the UMS Group/Slalom partnership ensures that all necessary resources are provided over the course of the project. Both companies maintain the ability to shift internal resources as needed to ensure consistent delivery of all project deliverables. Furthermore, UMS Group maintains partnerships with several preferred subject matter experts which can be leveraged to augment staff commitments and ensure project success.

2.5.6 Supply Chain Constraints

Global supply chain issues have emerged following the global COVID-19 pandemic, creating longer lead times for many products and particularly those with advanced microchips.

Four of the coalition's technology partners provide software-based solutions that are not impacted by global supply chain issues. Gridware's devices are produced with interchangeable components that are easily sourced and require limited or no redesign to accommodate into the product. The electronics bill of materials is sourced from US distributors and leverage a scalable agreement with California-based contract partners to meet manufacturing needs.

2.6 Additional Impacts

The DOE matched funds for this project will accelerate the deployment of advanced wildfire risk mitigation technologies among utilities facing significant wildfire challenges in the west and northwest U.S. The coalition includes a diverse mix of investor- and publicly-owned utilities, and each faces a different level of wildfire risk exposure and overall organizational risk tolerance.

Generally speaking, utilities mitigate technology risks by deploying proven solutions that have been vetted for many years across the industry. They look to each other when conducting the cost/benefit analyses feeding decisions about new technology deployments.

While the technologies included in this project have been proven successful with leading utilities around the world, most have not been deployed in the field for more than 5 or 10 years. Furthermore, they represent a considerable investment for many smaller utilities to bear. By directly offsetting a portion of the financial burden, this project will reduce technology risk for coalition utilities and open the door to direct evaluation and demonstration of benefits. This supports broader-scale deployment of the technologies across the west, particularly by small and medium-sized utilities who can observe the successes of coalition utilities and factor that into their own decision-making processes.

This project will fund assessments of each utility's wildfire mitigation strategy and the deployment of fundamental enhancements that will support broader investment in advanced technologies in the future. Participants will document experiences and lessons learned, which will be shared with the broader industry through forums like the IWRMC. This collective knowledge will improve industry response and the effectiveness of future technology deployments by informing utilities of any pitfalls identified through this project.

2.7 Encouraging and Facilitating Smart Grid Functions and System Flexibility

The funds allocated for this project will support Topic Area 2 investment focus areas, including[13]:

Topic Area 2 Priority Investments	***Project Alignment with Priorities***
Improving the visibility of the electrical system to grid operators, to help quickly rebalance the electrical system with autonomous control, through data analytics, software, and sensors.	Deploy sensors[14] to increase visibility of grid and environmental conditions. Deploy software[15] to improve accuracy and precision of spatial information related to grid assets and the local environment. Deploy software[16] to connect data sources, supporting analytical capabilities and autonomous control.
Anticipate and mitigate the impacts of extreme weather or natural disaster on grid resiliency, including investments to increase the ability to redirect or shut off power to minimize blackouts, prevent wildfires, and avoid further damage.	Deploy software to improve assessment of wildfire risks related to vegetation/fuel loads[17] and fire spread conditions[18]. Deploy hardware/software[14] to detect faults/ignitions, improve situational awareness during emergencies, and accelerate restoration times following outages and PSPS events.

Table 8: Encouraging and Facilitating Smart Grid Functions and System Flexibility

[13] DE-FOA-0002740 Pages 25 and 26 of 140
[14] E.g., Gridware, Pano AI, ALERTWildfire
[15] E.g., Sharper Shape
[16] E.g., AVEVA / EDF GeneSys
[17] E.g., AiDash, Overstory
[18] E.g., Technosylva

3.0 Workplan

3.1 Project Objectives

This project seeks to deploy a suite of advanced wildfire risk mitigation technologies within utilities facing wildfire risk challenges, and to serve as a catalyst for widespread adoption of similar technologies across the western United States. Specific goals include:

- Accelerate the deployment of advanced wildfire risk mitigation technologies - particularly among smaller, publicly owned utilities in the western united states - by demonstrating success and reducing technology risk perceptions.
- Reduce the probability and consequence of ignitions from utility equipment failures, or from contact between utility equipment and vegetation or other materials.
- Improve utility situational awareness, particularly in high fire threat areas.
- Reduce outage frequencies and durations.
- Improve community awareness of the actions being taken within this project, and where they fit within the context of the full suite of fire mitigations deployed by utilities.
- Increase awareness and provide support to communities around specific actions that can be taken to increase wildfire resilience.

3.2 Technical Scope Summary

The project has been divided into two parallel workstreams: (1) Utility Technology Deployments; and (2) Community Engagement & Preparedness. The Prime Recipient will support all tasks associated with the first workstream, while a Community Engagement Workstream Lead will be the primary coordinator and executor of tasks associated with the second workstream. The Utility Technology Deployments workstream includes additional support provided by the Recipient to each Subrecipient utility to identify and implement opportunities to align the utility's wildfire risk mitigation strategy with leading practices from around the world. This additional support is provided at the utility's request and based on individual needs.

The project will proceed as an annual cycle that includes Initial Planning (Tasks 2 and 3), Execution (Task 5), Continuous Sharing of Lessons Learned (Tasks 4 and 6), and finally Annual Reviews (Tasks 7 and 8) to assess performance and provide guidance for the following year's activities. The Annual Reviews conducted in one year inform the Initial Planning conduced in the following year. Tasks related to Sharing of Lessons Learned are designed to support the overall project objectives by increasing the likelihood of success for each coalition utility.

Specific work locations associated with this project will be determined based on the baseline assessments performed in the Initial Planning tasks. Utility headquarter locations have been provided with this application and may be associated with software technology deployments. As hardware deployment locations are identified, an updated Locations of Work spreadsheet will be provided, along with required Environmental Questionnaires for each work location and utility.

3.3 Buy America Requirements for Infrastructure Projects

This project involves the deployment of sensors which are affixed to electrical infrastructure, as well as software for analyzing and managing wildfire risks. All hardware and software deployed as part of this project meet the Buy America Requirements for Infrastructure Projects as defined

in the FOA. Furthermore, all project partners have committed that all data generated, stored, and utilized within this project will remain within the United States.

All subrecipient utilities maintain strict cybersecurity requirements for all work performed and technologies deployed. A detailed cybersecurity plan will be provided prior to award. The project workplan includes an annual planning process for each partner utility, along with quarterly touchpoints and an end-of-year assessment, providing intentional opportunities to review and update the cyber security plan throughout the year.

3.4 WBS and Task Description Summary

The graphic below shows the Annual Work Breakdown Structure (WBS) for the project. Note that after Year 1 of the project, some Subtasks are no longer required as they will already be completed.

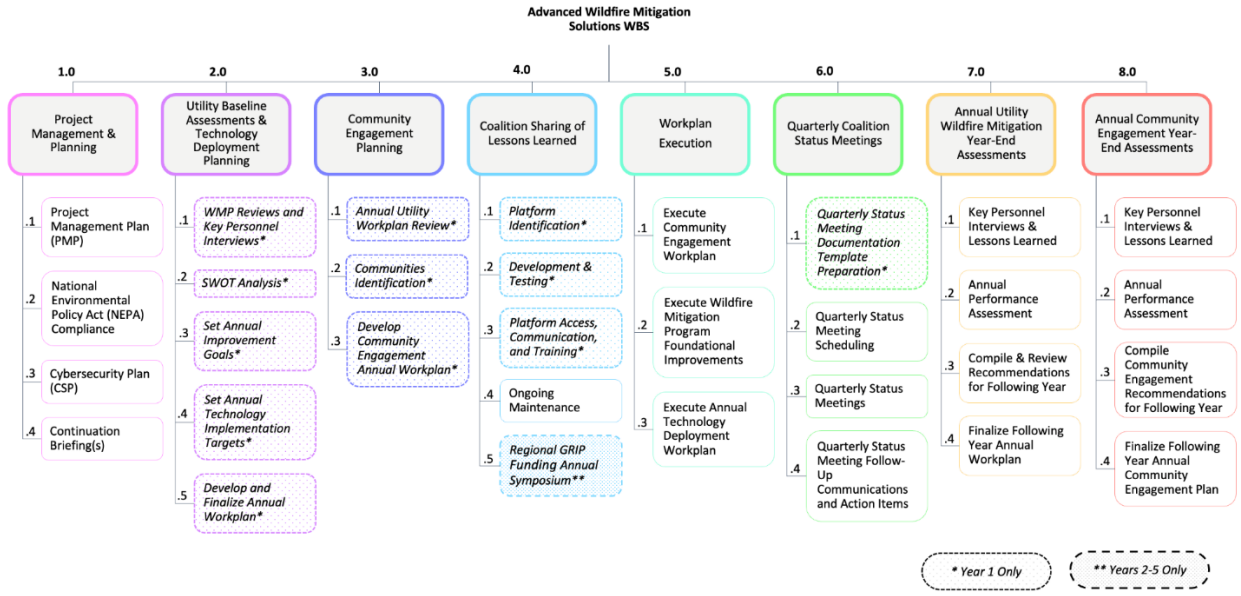

Figure A - Annual Work Breakdown Structure (WBS)

<u>Task 1.0 – Project Management and Planning</u> – The activities included in this task are designed to satisfy DOE requirements around the creation and management of a Project Management Plan (PMP); documentation necessary for compliance with NEPA; creation and ongoing management of a Cybersecurity Plan (CSP); and the execution of annual Continuation Briefings with DOE staff.

Subtask 1.1 – Project Management Plan (PMP)

Subtask 1.2 – National Environmental Policy Act (NEPA) Compliance

Subtask 1.3 – Cybersecurity Plan (CSP)

Subtask 1.4 – Continuation Briefing(s)

<u>Task 2.0 – Utility Baseline Assessments & Technology Deployment Planning</u> – This task includes activities required to support an initial assessment of each coalition utility's current wildfire risk mitigation strategies. This assessment provides the foundation for constructing a tailored workplan for the year, which is the ultimate deliverable from Task 2. In addition to identifying the suite of advanced technologies that address specific key risk areas for each utility, this body

of work will also include recommendations to improve the utility's overall risk mitigation approach and ensure effective outcomes. A similar body of work will be undertaken as part of Task 7, supporting the development of a workplan for the following year.

Subtask 2.1 – **WMP Reviews & Key Personnel Interviews:** Supports general information gathering and the basic assessment.

Subtask 2.2 – SWOT Analysis: Supports additional assessment detail and transposes general feedback into an easily understood framework that can be leveraged easily.

Subtask 2.3 – Set Annual Improvement Goals: These are overall goals for the utility to further develop its wildfire risk mitigation maturity throughout the year.

Subtask 2.4 – Set Annual Technology Implementation Targets: A specific list of technologies to be deployed, geographic locations to focus on (where applicable), and quantification of the deployments (i.e., number of hardware devices installed, or scope/scale of software deployed/utilized within the organization).

Subtask 2.5 – Develop and Finalize Annual Workplan, Including Success Metrics: The ultimate deliverable from Task 2, this is the utility's committed plan for the year ahead and the basis for measuring success at the end of the year.

Task 3.0 – Community Engagement Planning – This task includes activities required to support the development of an annual Community Engagement & Preparedness Workplan that is tailored to the needs of specific communities while complementing any initiatives already planned by coalition utilities. A similar body of work will be undertaken as part of Task 8, supporting the development of a Community Engagement & Preparedness Workplan for the following year.

Subtask 3.1 – Annual Utility Workplan Review: Required to assess specific technology deployment locations and identify potential impacts and/or benefits to local communities.

Subtask 3.2 – Disadvantaged Communities (DAC) Identification: This information becomes a key guiding element of the annual Community Engagement & Preparedness Workplan.

Subtask 3.3 – Develop Community Engagement Annual Workplan, Including Success Metrics: The ultimate deliverable from Task 3, this is the guiding document to be utilized throughout the year and the basis for measuring success at the end of the year.

Task 4.0 – Coalition Sharing of Lessons Learned – This task includes the development and deployment of a software tool to capture lessons learned by each coalition member throughout the project and share them with the other participants in real time. It also includes an annual symposium to be held in years 2-5 to share lessons learned with a broader group of stakeholders from other regional GRIP Projects. Subtasks 4.1, 4.2, and 4.3 will completed in year 1 of the project, with ongoing maintenance (Subtask 4.4) the only required activity in years 2-5.

Subtask 4.1 – Platform Identification *(Year 1 Only)*

Subtask 4.2 – Development & Testing *(Year 1 Only)*

Subtask 4.3 – Platform Access, Communication, and Training *(Year 1 Only)*

Subtask 4.4 – Ongoing Maintenance

Subtask 4.5 – Regional GRIP Funding Annual Symposium *(Optional, Years 2-5 Only)*

Task 5.0 – Utility Annual Workplan Execution – This task represents the bulk of the project

execution work, in terms of deploying advanced technologies, making foundational improvements within utility wildfire mitigation programs, and engaging with the community. Subtask 5.1 represents the execution of the Workplan developed in Subtask 3.3, while Subtask 5.3 represents the execution of the Workplan developed in Subtask 2.5.

Subtask 5.1 – Execute Community Engagement Workplan

Subtask 5.2 – Execute Wildfire Mitigation Program Foundational Improvements

Subtask 5.3 – Execute Annual Technology Deployment Workplan

Task 6.0 – Quarterly Coalition Status Meetings – This task includes activities related to the scheduling, facilitation, and follow-up from meetings with the full coalition each quarter. These meetings are designed to capture feedback from each utility, including lessons learned, challenges faced, successes achieved, and overall progress towards the objectives of the project. These meetings represent key check-in milestones and are critical for leveraging the experiences of the group to improve the odds of success for everyone.

Subtask 6.1 – Quarterly Status Meeting Documentation Template Preparation *(Year 1 Only)*

Subtask 6.2 – Quarterly Status Meeting Scheduling

Subtask 6.3 – Quarterly Status Meetings

Subtask 6.4 – Quarterly Status Meeting Follow-Up Communications and Action Items

Task 7.0 – Utility Wildfire Mitigation Year-End Assessments – This task includes a formal look back on the previous year and evaluate performance relative to the specific targets included in the Community Engagement Workplan. It also includes the incorporation of lessons learned and performance achievements from the previous year into a new plan for the following year.

Subtask 7.1 – Key Personnel Interviews & Lessons Learned: Direct interviews with key personnel at each utility provides critical information gathering to help qualify the results of the Performance Assessment in Subtask 7.2.

Subtask 7.2 – Annual Performance Assessment: Designed to evaluate the overall success of the utility for the year as measured by the metrics defined in the Workplan in Subtask 2.5.

Subtask 7.3 – Compile & Review Recommendations for Following Year: Using information gleaned from direct interviews and the Annual Performance Assessment, recommendations will be compiled for use in developing the following year's workplan, addressing any required gaps, or supporting more ambitious targets in future years.

Subtask 7.4 - Finalize Following Year Annual Workplan: Produce the annual workplan for work to be completed in the following year, as described in Subtask 2.5.

Task 8.0 – Community Engagement Year-End Assessments – This task includes a formal look back on the year to ensure that the coalition has capture all key lessons learned related to Community Engagement from each utility. It also includes the incorporation of lessons learned and performance achievements from the previous year into a new plan for the following year.

Subtask 8.1 – Key Personnel Interviews & Lessons Learned

Subtask 8.2 – Annual Performance Assessment

Subtask 8.3 – Compile Community Engagement Recommendations for Following Year

Subtask 8.4 - Finalize Following Year Annual Community Engagement Plan

3.5 Milestone Summary

The following Milestones are included in the project workplan:

Annual Go/No-Go Decision Point: this milestone occurs following the completion of both the Annual Technology Implementation and Wildfire Mitigation Workplan (Subtask 2.5) and the Annual Community Engagement Workplan (Subtask 3.3) for each coalition utility.

In addition to meeting the BIL GRIP requirement of at least one project-wide Go/No-Go decision point for each budget period, the workplan deliverables associated with this milestone clearly define the work to be completed throughout the year (budget period). Without these annual plans, project success cannot be quantifiably evaluated.

Technology Deployment Milestones – Quarterly Coalition Status Meetings (3): Each utility's Annual Technology Implementation and Wildfire Mitigation Workplan will include additional milestones that are specifically tailored to them for the year. For example, each utility will set an annual target number of deployments (hardware) and/or target scope/scale of deployment within the organization (software). Within each plan the utility will be required to estimate the percentage deployment completion expected by the date of each Quarterly Status Meeting, and will be required to report against that milestone during the meeting. Should a utility not reach the milestone expected by that date, the other members of the coalition have an opportunity to provide recommendations for improving overall progress. Examples of Milestones that may fall into this category include:

- 25%, 50%, 75%, 100%, or "XX"% of total annual technology deployments completed
- Technologies deployed in "XX"% of service territory
- Technologies deployed in 100% of high fire threat areas of service territory
- % of Staff trained to utilize software deployed to support wildfire risk mitigation

Community Engagement Milestones – Quarterly Coalition Status Meetings (3): Each utility's Annual Community Engagement Workplan will include additional milestones that are specifically tailored to them for the year. For example, each utility may set an annual target number of workshops/information sharing sessions to be conducted within specific communities, or to reach a certain percentage of communities by a specific date. Within each plan the utility will be required to estimate the percentage completion expected by the date of each Quarterly Status Meeting and will be required to report against that milestone during the meeting. Should a utility not reach the milestone expected by that date, the other members of the coalition have an opportunity to provide recommendations for improving overall progress. Additional SMART Goals and Milestones that may be found in the Community Benefits Plan.

3.6 End of Project Goals

Wildfires are inherently unpredictable, and the weather patterns that drive them can vary greatly from year to year. As such, it is difficult to quantify risk reductions on shorter time horizons. However, the following measures and End of Project Goals will help to quantify overall project success with respect to its core objectives.

Overall Project Objective	***Measure***	***End of Project Goal***
Accelerate the deployment of advanced wildfire risk mitigation technologies in the western united states by demonstrating success and reducing technology risk perceptions.	Number of new, non-coalition utilities in CA, ID, OR, and WA piloting or deploying advanced wildfire risk mitigation technologies by project end.	>5
Reduce the probability and consequence of ignitions from utility equipment failures, or from contact between utility equipment and vegetation or other materials.	Number of ignitions from utility equipment failures or contact between utility equipment and vegetation/other materials (Normalized by # Red Flag Warning (RFW) days experienced)	Overall Net Reduction or 5-Yr Avg. Downward Trend
Improve utility situational awareness, particularly in high-fire threat areas.	Number of ignitions or vegetation/other material contact with utility equipment detected automatically.	>3 per applicable utility[19]
Reduce outage frequencies and durations.	SAIDI - Excluding Major Event Days (MEDs), SAIFI - Excluding Major Event Days (MEDs)	Overall Net Reduction/ 5-Yr Avg. Downward Trend
Perform ongoing in person or virtual Community Engagement with clear next-steps and follow-ups	Percentage of the community outreach facilitated through this project with DACs as identified in Table 5 of the Community Benefits Plan.	75%

Table 9: End of Project Goal

Please note: additional SMART Goals have been identified for the Community Benefits workstream, and are detailed in the Community Benefits Plan.

3.7 Project Schedule

Figure B and Figure C (next page) represent a high-level schedule for the entire project, including task and subtask durations, milestones, and Go/No-Go decision points. Additional subtasks related to the Community Engagement & Preparedness workstream are described in the Community Benefits Plan. Additional detail regarding the overall project plan, including more granular views of these schedules, are available upon request.

Please refer to section

3.4 WBS and Task Description Summary for detailed descriptions of the tasks and subtasks referenced within these schedules.

[19] This measure only applies to utilities that have deployed sensor hardware that provides enhanced situational awareness, such as that provided by Gridware or Pano AI.

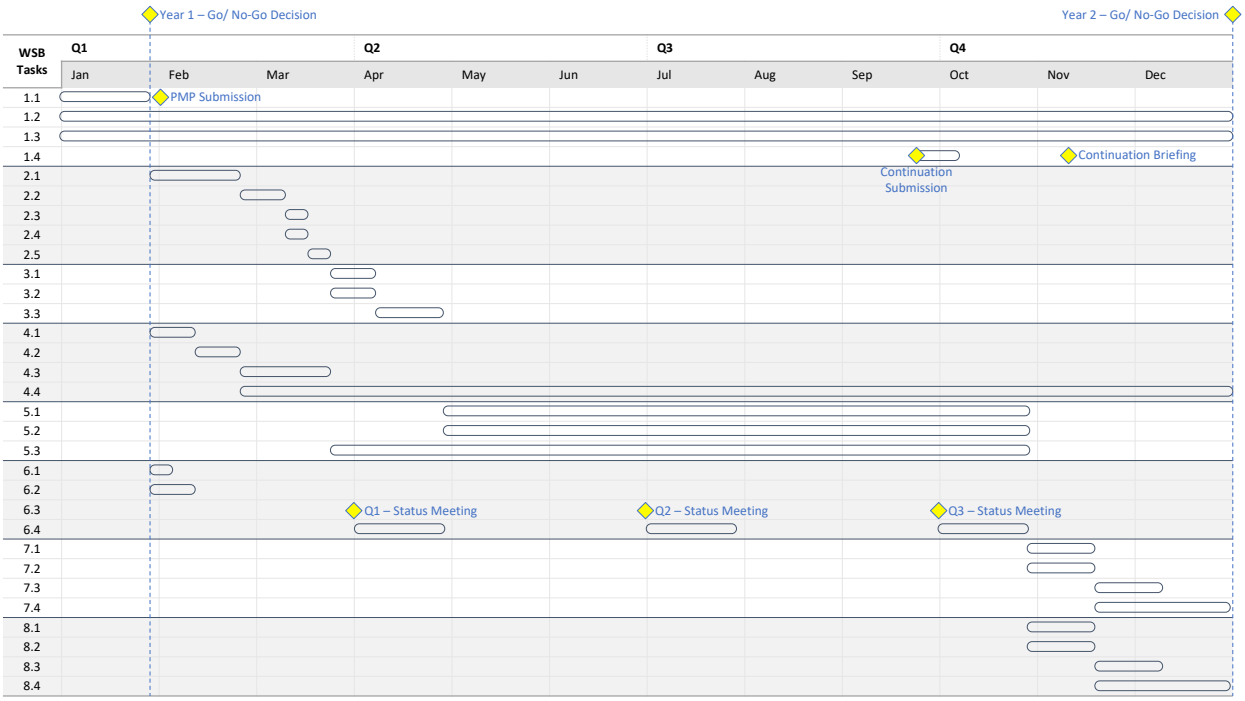

Figure B: Project Schedule - Year 1

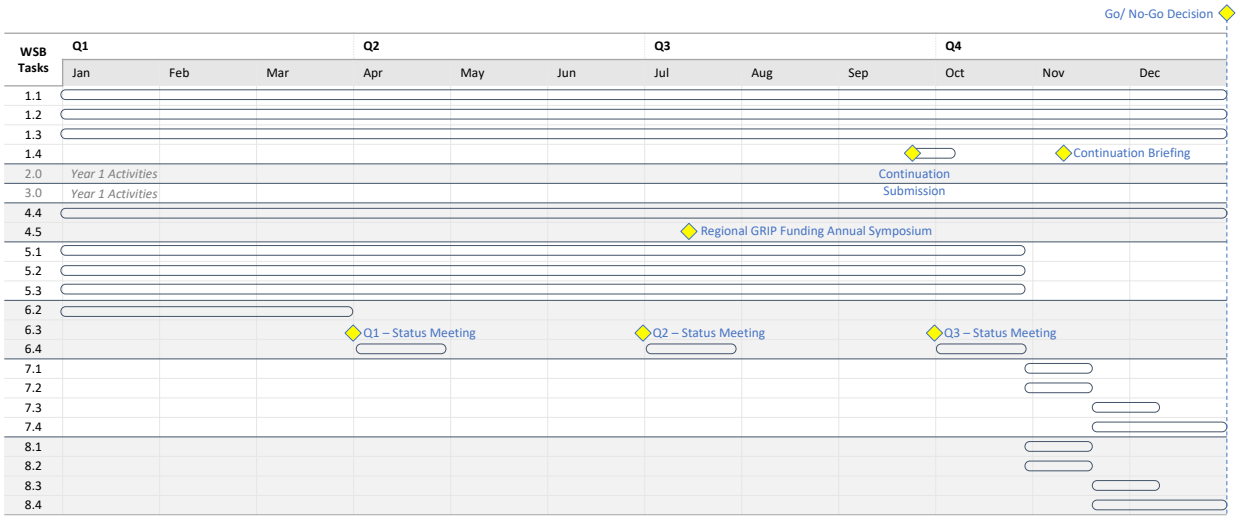

Figure C: Project Schedule - Years 2-5

3.8 Project Management

UMS Group and Slalom will share primary responsibilities for Project Management activities, with additional key contributions from Grid Forward and FAC Net where applicable.

The Project Management approach for the project includes five stages that are described below. Stages II through V will be repeated during each budget cycle (annually).

Stage I – Initiation

- This application captures the key deliverables from the Initiation stage of the project and should be generally considered the Project Initiation Document (PID). Nonetheless, project activities will not proceed to Stage II or beyond until the coalition receives notice of acceptance

from the DOE and completes the Project Negotiation process as described in the FOA.

- Overall feasibility of the project as it relates to the project objectives has been studied, reviewed with all members of the coalition, and finalized in accordance with the required components of this application.

Stage II – Planning

- In Year 1, a detailed Project Management Plan will be created and submitted to DOE within 30 days of funding award. This plan will be continually updated throughout the budget cycle and will be fully reviewed and enhanced at the beginning of each project year based on the lessons learned in prior years. The Project Management Plan will provide additional elaboration beyond the summary information provided in this application.
- While many aspects of the Project Plan have already been created to support this application, the Project Plan, Project Scope, and Work Breakdown Schedule will be finalized and documented in the official Project Management Plan document each year.

Stage III – Execution

- Throughout the Execution stage, UMS Group will remain the primary coordinator of activities related to the Utility Technology and Wildfire Risk Mitigation workstream, while FAC Net will be the primary coordinator for the Community Engagement workstream.
- Project deliverables within Stage III include a SWOT Analysis for each coalition utility (Subtask 2.2), an Annual Technology Implementation and Wildfire Mitigation Workplan (Subtask 2.5), and an Annual Community Engagement Workplan (Subtask 3.3). The workplans are particularly critical to the overall management of the project as they affirm the commitments of each coalition utility and provide both progress and overall success metrics. Much of the work completed in Stage IV will revolve around reporting activities related to these metrics.

Stage IV – Monitoring and Control

- Quarterly Coalition Status Meetings (Task 6) will be conducted with all members of the coalition. Utilities will be required to report out on progress towards project milestones associated with the workplans developed in Tasks 2 and 3.
- Additional project status meetings will be conducted between the Project Administrators (UMS Group, Slalom, Grid Forward, and FAC Net) at least every 3 weeks, or more frequently during particularly critical periods of the schedule.

Stage V – Closure

- Tasks 7 and 8 will produce several important deliverables, including Performance Assessment and Recommendation Reports for each coalition utility. These reports will capture specific accomplishments and/or missed opportunities from the previous year, along with driving factors of performance and recommendations for the following year.
- The Planning stage for the following budget cycle/project year will overlap with the Closure activities from the previous year. This approach will ensure the maximum amount of time remains available for project execution, and that the previous year's recommendations are firmly captured in the workplans for the following year.

3.8.1 Project Risk Management

The overall Risk Management approach for this project primarily revolves around leveraging the diverse skillsets and areas of expertise of its project administration team. Each coalition member has extensive experience in specific areas which inform their ability to identify potential negative outcomes before they occur. The following table highlights the specific areas of expertise for each Project Team member that is relevant to the successful management of this project.

Project Team Member	*Areas of Expertise*
UMS Group	Utility operations and maintenance; Utility wildfire risk mitigation; Utility best practice identification and sharing; Facilitation of interactions between diverse groups of stakeholders; Performance management; Project management.
Slalom	Project management; Data management and governance; IT systems and support.
Grid Forward	Industry modernization and transformation; Facilitation of interactions between diverse groups of stakeholders; Community engagement and facilitation.
FAC Net	Community wildfire resilience; Stakeholder engagement and communications; Bespoke regional action plans.

Table 10: Project Risk Management

In addition to leveraging project team member expertise, this project will also establish real-time communication channels, routine check-in meetings for information sharing at least every three weeks, and formal coalition-wide status calls at least once every quarter.

The table below lists the primary risks identified for this project, along with key ways each risk will be monitored and managed.

Risk	*Management Approach*
Technology/Service Ineffectiveness	All technology providers identified as part of this coalition offer technologies that are known to be effective for mitigating wildfire risks, as they have proven effective with other utilities around the world. However, opportunities may exist to increase effectiveness or the likelihood of deployment success. This project has been constructed to capture these "Lessons Learned" throughout the execution phase of the project through direct discussions and reporting mechanisms, and to ensure that all members of the coalition are aware of them. If a technology or service appears ineffective, this coalition is well positioned to flag the issue, analyze the underlying drivers, and to offer guidance or corrective actions for future deployments.
Prime or Sub-Recipient Business Dissolution, Bankruptcy, or Contraction	UMS Group and Slalom both maintain the ability to manage the project independently of one another in the unlikely event that either business faces extreme hardship. FAC Net maintains a unique posture as a national coordinating organization for a smaller network of regional organizations. Should FAC Net face extreme business hardship, smaller regional CBO's may be directly engaged to meet the project objectives.
Technology Provider Business Dissolution, Bankruptcy, or Contraction	All technology providers have been vetted prior to the submission this application. In the unlikely event that a technology provider faces extreme business hardship and cannot deliver their technology in accordance with the project plan, alternative providers have been identified for each of the potential solution areas included in the project. UMS Group maintains a database of advanced technology vendors/suppliers that have proven successful within the industry and can be leveraged as needed to fill any emerging gaps.
Wildfires & Severe Weather Event Operational Challenges	The duration of the project (5 years) mitigates the potential effects of wildfires or other severe weather events on achieving the project goals. These events are by their nature unpredictable, but the project plan and schedule has been constructed with the assumption that each utility may experience this type of event at least once each year.

Human Resource Constraints	Due to the nature of their businesses, UMS Group and Slalom maintain a resource pool that can grow or shrink as project needs dictate. In many cases, UMS Group and Slalom may be able to substitute resources for each other to meet project needs and balance constraints across the businesses. UMS Group also maintains relationships with dozens of industry experts that can be hired on contract to support the project if needed.
Supply Chain Constraints	Four of the coalition's technology partners provide software-based solutions that are not impacted by global supply chain issues. Providers of hardware solutions have mitigated the risk of supply chain issues by utilizing interchangeable components that are easily sourced and require limited or no redesign to accommodate into the product. Also, the electronics bills of materials are sourced from US distributors and leverage scalable agreements with US-based contract partners to meet manufacturing needs.

Table 11: Primary Risks Identified

3.9 Lobbying

All Recipients and subrecipients associated with this project will not use any federal funds to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters related to the project. Non-federal funds have not been paid and will not be paid to any person for influencing or attempting to influence an officer or employee of any federal agency; a Member of Congress; an officer or employee of Congress; or an employee of a Member of Congress in connection with this application.

4.0 Technical Qualifications and Resources

4.1 Qualifications and Expertise

UMS Group Inc. (Prime Recipient) was founded in 1989 to provide strategic consulting services to an increasingly dynamic and changing utility industry. Their organizational improvement services span a broad range of management needs, including corporate and functional level business planning, benchmarking and best practice assessments, performance improvement tools and approaches, performance measurement and incentive programs, operational excellence, process reengineering and installation, and change management. They have supported hundreds of assessments, introduced new technologies, and implemented significant operational enhancements on six continents with more than 300 utility companies, including those with the most significant wildfire challenges around the world.

Supporting UMS Group on this initiative is **Utility Safety Associates**, led by Chief Executive Officer David Geier. Mr. Geier had a distinguished career at San Diego Gas & Electric, where he retired as the Interim Chief Operating Officer and was known for delivering exceptional results for wildfire and employee safety, reliability, customer service and bottom-line financial performance. He is recognized globally for his wildfire mitigation expertise and has more than four decades of utility experience, including being involved with almost all aspects of utility operations. He was one of the primary architects of the utility wildfire prevention program in San Diego County which is world renowned for its effectiveness. Utility Safety Associates brings more than 120 years of combined utility operating experience focused on grid operations and public safety.

Slalom is a purpose-led, global business and technology consulting company. Since their consulting business started in 2001, Slalom has grown to over 13,000 team members in six countries and 43 markets. They have close partnerships with over 400 leading technology

providers, including AWS, Google, Microsoft, Salesforce, Snowflake, and Tableau. Slalom deeply understands their customers, and their customer's customers, to deliver practical, end-to-end solutions that drive meaningful impact.

Founded in 2010, **Grid Forward** is an industry trade organization with a mission to accelerate modernization and promote innovation of the regional energy grid. As a non-profit organization with about 150 members, Grid Forward brings together utilities, solution providers, government agencies, regulators, NGOs and others to work together on advancing the capabilities of the grid. For this project, Grid Forward will focus on leveraging its convening and educational capabilities. They will share key updates and lessons of the regional project with the wider community, wrapping in presentations with their flagship gatherings and help to support unique meetings and events specific to lessons from this effort. The region has expressed keen interest in mitigating wildfire risk and the Grid Forward network is deep with advanced technology companies that can play a supporting role in this. During and after the project they can help communicate pathways where the lessons learned can impact further commercial activity. A key example of the contributions Grid Forward can provide, is that it sparked the idea for this submission and recruited the gathered parties who have assembled for it.

Fire Adapted Communities Learning Network (FAC Net)[20] is a national network of place-based organizations working to build sustainable wildfire resilience capacity in fire-prone communities. They provide community-based leaders with resources, tools, and connections to reduce their wildfire risk and increase community resilience. Additionally, FAC Net provides strategy development, facilitation, and network design, and hosts a special learning community for people working on fire adaptation at the state scale.

4.2 Equipment and Facilities

All UMS Group, Slalom, Utility Safety Associates, Grid Forward, and FAC Net employees, and project partners and subcontractors, are provided with personal computers and mobile phones to support their daily work. All project contributors have extensive experience working in virtual environments, and travel for in-person work can be arranged as required to support all necessary project activities. Travel for key community engagement milestones and project deployments will be required but most meetings will be conducted remotely.

4.3 Previous Work and Demonstrated Innovations

Together with five major utilities facing extensive wildfire risk in the western United States and Australia, **UMS Group** founded the International Wildfire Risk Mitigation Consortium (IWRMC) in 2020. The current IWRMC member base consists of twenty electric utilities facing significant wildfire risk in the United States, Canada, Australia, and South America. UMS Group is the primary facilitator of the consortium, providing subject matter expertise, organization & planning, benchmarking services, research, and analytical support for the community.

IWRMC members tackle wildfire issues through participation in tactical working groups, quarterly best practice sharing webinars, and direct discussions with their peers. Periodically, the

[20] FAC Net is supported by a cooperative agreement between The Nature Conservancy, USDA Forest Service and agencies of the Department of the Interior through a subaward to the Watershed Research and Training Center.

consortium launches opt-in collaborative projects, allowing members to conduct deep-dive studies on best practices and potential technological solutions. A recent example is the Hazard/Strike Tree Benchmarking & Best Practice Study[21] led by Southern California Edison.

IWRMC participants share best practices in wildfire risk mitigation within six domains:

Figure D: UMS Group - Best Practices Sharing Domains

The UMS Group team has developed a web-based platform to support the mission of the IWRMC. The IWRMC web portal contains a vast, curated repository of industry research and analyses, including wildfire risk mitigation plans, academic research, case studies, news articles, conference presentations, regulatory frameworks, and more. The portal also serves as a secure place for participants to share data and documents, including presentation materials, meeting minutes, webinar recordings, and working group calendars.

IWRMC member companies are able to share insights regarding their use of specific technologies and service providers for wildfire risk mitigation via a Vendor and Technology Leaderboard (VTL). The VTL is a database of technologies and service providers, organized by use case, and easily searched or filtered by region, utility types served, and/or applicable working group. This time-saving repository has proven invaluable to utilities exploring new ways to mitigate wildfire risks. It also serves as a platform for utilities to document their experiences for the benefit of others.

The IWRMC Wildfire Risk Mitigation Maturity Model offers a framework for utilities of any size, and with any amount of wildfire risk exposure, to assess the effectiveness of their wildfire risk mitigation efforts. The model consists of 50 key capabilities that utilities with highly mature wildfire risk mitigation programs should possess. Detailed definitions and examples are included in the model, along with assessment and analytical tools to aid in identifying and closing gaps.

Slalom's energy practice focuses on helping the world's largest and most influential energy customers with the needs today as well as the future. They work with more than half of the Fortune 500 energy companies through their 350+ industry-specialized consultants. Their work ranges from grid modernization strategy to the implementation of technology solutions for both internal and customer-facing capabilities. Over the last 5 years, Slalom has played a key role in helping utilities in the west with their wildfire mitigation needs. Their expertise in bringing together data to drive insights and developing secure solutions, combined with this deep industry experience, will help ensure the deployment of the right wildfire solutions within this project.

[21] https://energized.edison.com/stories/sce-spearheads-global-effort-to-reduce-wildfire-risk

Grid Forward's core work focuses on information, community and expertise. The organization provides updates on key industry developments and thought leadership content; hosts gatherings to bring diverse stakeholders together to share best practices and pathways to deploy better solutions (such as the recent GridFWD gathering that focused on 'Ensuring a Resilient 21st Century Electric Grid'[22]); and maintains a network of experts who are driving ahead with the implementation of advanced grid efforts.

FAC Net's experience includes working with state resource agencies to develop strategic partnerships and plans, supporting the design and operations of state networks, and providing facilitation for statewide education programs. Our framework leverages FAC Net's specific expertise and unique experience to grow and expand the community engagement efficacy of our partner utility providers.

4.4 Key Member Time Commitments

UMS Group, Slalom, Grid Forward, and FAC Net will support all project tasks through either a 'Lead' or 'Contributor' role, as described in the table below.

Task		***Project Team Member Contributions***			
		UMS Group	**Slalom**	**Grid Forward**	**FAC Net**
1.0 – Project Management and Planning		Contributor	Lead	Contributor	Contributor
2.0 - Utility Baseline Assessments & Technology Deployment Planning		Lead	Contributor	-	-
3.0 - Community Engagement Planning		Contributor	-	Contributor	Lead
4.0 – Coalition Sharing of Lessons Learned		Lead	Contributor	Contributor	Contributor
5.0 - Workplan Execution	5.1 - Execute Community Engagement Workplan	Contributor	-	Contributor	Lead
	5.2 - Execute Wildfire Mitigation Program Foundational Improvements	Lead	Contributor	-	-
	5.3 - Execute Annual Technology Deployment Workplan	Lead	Contributor	-	-
6.0 - Quarterly Coalition Status Meetings		Lead	Contributor	Contributor	Contributor
7.0 - Annual Community Engagement Year-End Assessments		Contributor	-	Contributor	Lead
8.0 - Annual Utility Wildfire Mitigation Year-End Assessments		Lead	Contributor	-	-
Annual Time Commitment (Workdays / FTEs)[23]		(b) (4) [redacted]			

Table 12: Key Member Contributions and Time Commitments

4.5 DOE/NNSA FFRDC Technical Services

PNNL will contribute to the project by offering general subject matter expertise and guidance but are not anticipated to provide additional technical services to the coalition within the project.

[22] https://gridforward.org/conference/gridfwd-2022/

[23] Approximate. 1 Full-Time Equivalent (FTE) = 1 person working 8 hours per day/40 hours per week. Calculations based on 260 workdays per year. Time commitments may vary from year to year based on the specific needs of coalition utilities. See 3.7 Project Schedule for specific task durations.