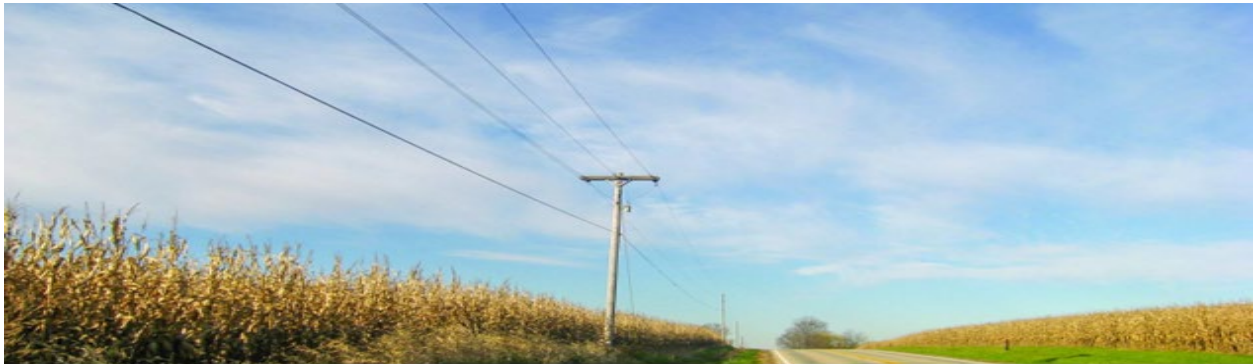


## Cover Page

**Project Title:** Smart Grid Deployment to support Rural-Focused Resiliency at a Small-Scale Electric Co-Op Project (Smart Grid Project)

**Topic Area:** Topic Area 2: Smart Grid Grants



**Technical Point of Contact:**

Lee Bedsaul  
Line Superintendent  
[LeeBedsaul@syemc.com](mailto:LeeBedsaul@syemc.com)  
(336)-356-5274

**Business Point of Contact:**

Travis Bode  
Manager of Economic Development  
[TravisBode@syemc.com](mailto:TravisBode@syemc.com)  
(336)-356-5238

**Team Member Organizations:** Surry-Yadkin Electric Membership Corporation (Applicant), North Carolina Association of Electric Cooperatives (NCAEC), Yadkin Valley Chamber of Commerce, Surry County Economic Development Partnership, Surry Community College, Nash Community College, Forsyth Technical Community College, NC Works/American Job Center, Surry County Schools and The Salvation Army.

Senior / Key Personnel	Organization
Travis Bode, Project Administrator Lee Bedsaul, Project Manager Misty Utt, Financial Manager Anna Jones, Community Benefits Manager	Surry-Yadkin Electric Membership Corporation (Applicant)

**Project Location(s):** Yadkin County, Wilkes County, Forsyth County, Surry County, and Stokes County, North Carolina

**Statements Regarding Confidentiality:** No confidential information is contained in this proposal.

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## Project Overview

Surry-Yadkin Electric Membership Corporation (SYEMC) is requesting funding through the Grid Resilience and Innovation Partnership (GRIP) program, Topic Area 2 for its **Smart Grid Deployment to support Rural-Focused Resiliency at a Small-Scale Electric Co-Op Project (Smart Grid Project or Project)**. The Project will design and implement a series of smart grid infrastructure upgrades including 1) updating antiquated distribution equipment, 2) enabling remote monitoring of substation transformers, and 3) deploying a “self-healing” fault location, isolation, and service restoration (FLISR) system. The Project will also make cybersecurity improvements to ensure technology is safeguarded and members can enjoy Project benefits. These benefits include a more flexible, reliable, and resilient grid which prevent and lessen the impacts of systemwide outages.

## Background

**Organizational Background and History.** SYEMC is a community-focused small electric utility co-op serving approximately 27,860 member-consumers in Surry County, Yadkin County, Wilkes County, Forsyth County, and Stokes County, North Carolina (NC). SYEMC’s service area encompasses rural areas in each of these counties, including agricultural users, rural residences, and dozens of small and unincorporated communities across the region. Infrastructure includes more than 3,629 miles of distribution line, 112 miles of transmission line, 18 substations, eight transmission delivery points serving 28,000+ service points, and 44,304 distribution poles.

There are 32 disadvantaged census tracts across the five counties SYEMC serves.<sup>1</sup> These five counties are comprised of a primarily White population (74%) with a substantial Black population (18%), and Hispanic population (11%).<sup>2</sup> Of all households, 12% do not speak English in the home, the majority of which are Spanish speakers (77%).<sup>3</sup> The per capita income across these counties is \$27,559. In comparison, North Carolina has a per capita income of \$31,993 and the nation as a whole has a per capita income of \$35,384.<sup>4</sup> Therefore, this Project will take place in an area where the per capita income is 14% lower than the state level and 23% lower than the national level.

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<sup>1</sup> [Climate and Economic Justice Screening Tool](#) Surry County Census Tracts (37171930802, 37171931102, 37171930801); Wilkes County Census Tracts (37193960200, 37193960300, 37193960500 37193960700, 37193961100); Yadkin County Census Tracts (37197050501, 37197050400, 37197050300, 37197050200); Forsyth County Census Tracts (37067002901, 37067002806, 37067002903, 37067003105, 37067002702, 37067001400, 37067001602, 37067000500, 37067000600, 37067000700, 37067000801, 37067000802, 37067001901, 37067002001, 37067002002, 37067003701, 37067003500) Stokes County (37169070300, 37169070100, 37169070700)

<sup>2</sup> EJ Screen ACS Summary Report (Forsyth County, Yadkin County, Surry County, Wilkes County, and Stokes County)

<sup>3</sup> Ibid

<sup>4</sup> 2016-2020 American Community Survey 5-year estimates

SYEMC's service area is located approximately 180 miles from the eastern seaboard, in a forested and agriculturally dominated area. Across the five-county radius, there are 4,227 farms on 474,389 acres of land.<sup>5</sup> Of these farms, 98% are considered family farms.<sup>6</sup>

The service area has been increasingly affected by extreme weather events. SYEMC's service area is subject to high winds and storm damage including hurricanes, localized flooding along waterways, periods of excessive heat, and periods of excessive cold. In 2022, a NC Disaster was declared by the Federal Emergency Management Agency (FEMA) in all five counties of SYEMC service territory in response to Hurricane Ian. All five counties received public assistance.<sup>7</sup>

SYEMC's existing grid system relies on grid infrastructure that was deployed more than 75 years ago. System limitations and aging infrastructure have significantly hampered SYEMC's ability to deploy smart grid infrastructure, effectively manage distributed energy resources (DERs), and have led to resiliency and outage issues. In the past five years, SYEMC estimates it has experienced approximately 400 outages as a result of severe weather (about 80 per year). Most recently, (December 24, 2022), frigid temperatures caused rolling blackouts in SYEMC's service territory for the first time in the organization's history.

In addition, acts of domestic terrorism targeting utility substations and other grid infrastructure have crippled other utilities across North Carolina.<sup>8</sup> Cybersecurity measures are needed to safely implement this Project and prevent the disproportionate prevalence of outages and electric system disruptions in SYEMC's service area.

Organizational Successes. SYEMC has successfully brought electricity to numerous remote, rural communities, since 1941. Successes include participation in the [Incipient Failure Identification for Common Grid Asset Classes \(IFID\) program](#), implementation of (b) (4) in U.S. Department of Agriculture (USDA) [Rural Economic Development Loans and Grants \(REDLGs\)](#) since 2017, and administration of more than (b) (4) million in USDA Direct Rural Utilities Service (RUS) Loans across 13 different projects. (Further discussed in the Technical Qualifications).

SYEMC has also successfully integrated clean energy projects into its operations. Since 2018, SYEMC has facilitated 2,884 charging sessions with a total charge time of 7,345 hours (about 10 months), decreased carbon emissions by 34,764 kg, and saved over 6,926 gallons (about 26217.75 L) of gasoline. Member-owned solar includes 150 connected (residential) accounts with 1,035 kw of generation, 371 kWh of battery storage, and (b) (4) in reimbursements. In 2014, SYEMC installed a solar farm at its (b) (4) Breaker Station avoiding 1,598,202 kg of CO2 and generating 229 kw. In addition, 13 substations are equipped with Conservation

Voltage

<sup>5</sup> 2017 Census of Agriculture County Profiles ([Surry County](#), [Yadkin County](#), [Wilkes County](#), [Forsyth County](#), [Stokes County](#))

<sup>6</sup> Ibid

<sup>7</sup> FEMA - <https://www.fema.gov/disaster/3586> (FEMA 3586-EM 10/1/22)

<sup>8</sup> NPR – [North Carolina Attacks Highlight the Vulnerability of Power Grids](#) (December 12, 2022)

Reduction (CVR) technology, resulting in an annual reduction of (b) (4) in the wholesale power bill.

**Current Project Development Status.** All components have undergone preliminary feasibility, financial, and operational analyses as well as engineering review, planning, and conceptual design. All required permits have been secured. Components are at 50 – 70% design. Sites for installation of all Project components are identified.

### Project Goal

The Project will aim to accomplish the following three goals:

- **Goal #1:** Position SYEMC to deliver a more flexible, reliable, and resilient electric power system to its service territory
- **Goal #2:** Enhance the grid resilience of the SYEMC electric system
- **Goal #3:** Prevent and lessen the impact of systemwide outages on rural communities

The overall end goal of the Project is to prevent and lessen the impact of systemwide outages on SYEMC’s rural communities by 45-50%.<sup>9</sup> These goals are intended to maximize long-term benefits for SYEMC members, particularly those residing in the 32 disadvantaged census tracts it serves.

**Baseline Infrastructure Improvements.** SYEMC proposes to deploy a suite of interdependent, coordinated smart grid and smart grid enabling elements across its five-county service territory. These targeted improvements include:

- Upgrading and replacing outdated distribution equipment including:
  - Upgrade of 17.6 miles of copper lines to 17.6 miles of three-phase aluminum lines
  - Installation of 12 new sets of three-phase solid-state sectionalizing devices, the replacement of 3 existing sets of three-phase hydraulic sectionalizing devices and the replacement of 36 single-phase hydraulic sectionalizing devices for critical business loads on 9 substations (includes Tasks 2 and 3)
  - Replacement of 9 sets of three-phase hydraulic reclosers with 9 sets of three-phase solid state sectionalizing devices. Replacing 10 single-phase solid-state sectionalizing devices, and installing 32 new single-phase, solid-state sectionalizing devices for heavily load circuits on 4 substations.
- Installation of (b) (4) substation transformers
- Installation and deployment of the FLISR system throughout the grid – FLISR allows the grid to quickly identify and isolate faults and then “self-heal” to minimize outages
- Administering comprehensive cybersecurity improvements. These are required for SYEMC to implement the Smart Grid Project.

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<sup>9</sup> Estimates based on: U.S. Department of Energy. [Fault Location, Isolation and Service Restoration Technologies Reduce Outage Impact and Duration](#). (December 2014). (p. 16)

**Practices and Regulatory Framework Improvements.** The State of North Carolina has pledged to reduce electric power sector greenhouse gas emissions by 70% below 2005 levels by 2030 and to achieve carbon neutrality by 2050<sup>10</sup> as part of the state's plan to establish a 21<sup>st</sup> century regulatory model supporting clean, affordable, reliable and equitable energy.<sup>11</sup> SYEMC is committed to working collaboratively with the North Carolina Department of Environmental Quality (NCDEQ) / State Energy Office in the pursuit of these goals. The Smart Grid Project will help to improve this framework.

**Technology Improvements.** Technology improvements center on smart grid enabling components, remote substation transformer monitoring, FLISR deployment, and comprehensive cybersecurity measures. A 2014 DOE study of five utilities with FLISR capability found that FLISR helped to reduce the number of customers interrupted by up to 45% and the customer minutes of interruption by up to 51%.<sup>12</sup> (See Technical Description for more.)

**Critical Success Factors.** Critical success factors are the Project's Specific, Measurable, Attainable, Relevant, and Time-bound (SMART) technical milestones / Go/No-Go decision. These are discussed at length in the Workplan.

### DOE Impact

Without DOE funding, the Project would be postponed at least 10 years and perhaps indefinitely, resulting in continued outages and disruptive events. Approximately 93% of SYEMC's total electric energy sales are to rural residential members. The utility's facilities and equipment are spatially distributed, serving primarily low-density populations across its service territory. The costly investments to improve the reliability of the system are a strain on the member-consumers, including to those residing in the 32 disadvantaged census tracts. In addition, material, fuel, and supply costs have increased significantly in the past two years, further exacerbating SYEMC's financial ability to complete this Project. DOE funding will help to alleviate pressure to increase rates, maintain energy equity, and maintain affordability in the service area while providing additional equitable benefits to members.

### Community Benefits Plan: Job Quality and Equity

The Project will create community benefits to disadvantaged communities (DACs) in SYEMC's service territory including its 32 disadvantaged census tracts. Project-driven job creation will foster equity, inclusion and economic development as well. SYEMC will hire three full-time positions (data analyst, apprentice lineman, journey lineman), and six contract positions (b) (4) line crew) to support the Project. An estimated 40+ temporary engineering, design and construction jobs for consulting engineers and contractors will also be hired.

<sup>10</sup> North Carolina Department of Environmental Quality, State Energy Office. *North Carolina Clean Energy Plan: Transitioning to a 21<sup>st</sup> Century Electricity System*. October 2019, p. 52.

<sup>11</sup> *North Carolina Clean Energy Plan*, p. 12.

<sup>12</sup> U.S. Department of Energy. [Fault Location, Isolation and Service Restoration Technologies Reduce Outage Impact and Duration](#). (December 2014). (p. 16)

Anticipated Benefits to Local Communities and Disadvantaged Communities. Anticipated benefits to SYEMC's local and disadvantaged communities include:

- **Decreased Duration, Frequency, or Impact of Power Disruption.** The Project will create improved monitoring, advanced fault detection, and smart grid capabilities that will prevent catastrophic disruptive outage events at the substation level. The Project is anticipated to reduce outage times by 51% and reduce outages caused by severe weather by 10% (from 80 per year to 72 per year).
- **Increased Access to Clean Power.** By supporting DERs such as Electric Vehicles (EVs) and EV charging, the Project will make it possible to incrementally shift grid users away from fossil fuels. Reduced consumption of fossil fuels can reduce air pollution, improve health, and prevent economic losses.<sup>13</sup> The Electrical Safety Foundation (ESFi) reports that smart grid technology provides improved "integration of emerging technologies like solar power systems and electric vehicle charging stations."<sup>14</sup> The Project is anticipated to increase system capacity by approximately 500% to support DERs including 100 additional EV's, 75 residential solar arrays, and 20 EV charging stations.
- **Support of Minority Business Enterprises (MBE).** This Project will support SYEMC's goal to increase the percentage of underserved businesses as contractors/vendors from 6% to 16%. NC Works, Surry-Yadkin Works, and local chambers of commerce and economic development organizations will support direct outreach to MBEs for employment and contracting opportunities associated with the Project. Outreach will take place through planned community engagements, direct outreach to businesses, and social media and will focus on the recruitment of women, veteran and minority-owned businesses. In addition, feedback on relevant SYEMC programs and projects will be solicited at local events and stakeholder meetings as well as through feedback surveys. Furthermore, the largest employer in the SYEMC service area, (b) (4) is a minority-owned business that will significantly benefit from the Project.

Labor Force Plan. SYEMC's labor force plan includes the following:

- **Attracting, Training and Retaining a Skilled Labor Force with Strong Labor Standards** will center on the Project's primary recruitment and training partners: three North Carolina community colleges and the workforce boards serving the five counties.
- **Workers' Free and Fair Chance to Join a Union.** No labor unions operate within SYEMC's service territory. However, SYEMC places no restrictions on employees' ability to join a labor union and respects their choice to ask questions regarding unionization.
- **Partners** to support these objectives include Nash, Forsyth Technical, and Surry Community Colleges; and NC Works/American Job Center. While not formal partners,

<sup>13</sup> NASA. [Reducing Emissions to Mitigate Climate Change Could Yield Dramatic Health Benefits by 2023](#) (2021)

<sup>14</sup> Electrical Safety Foundation International, "Emerging Technologies: Solar Power, Wind Power, Smart Grid and Smart Meters." <https://www.esfi.org/emerging-technologies-solar-power-wind-power-smart-grid-and-smart-meters/#SmartGrid>



the Piedmont Triad and High Country Workforce Regional Development Boards will provide additional support.

Detailed information on the above content can be found in the Community Benefits Plan (CBP).

### [Strategy for Sharing and Maximizing Project Benefits Across Disadvantaged Communities](#)

This Project will improve health outlook and economic opportunity for residents and businesses within SYEMC's service territory. The Project will strive to maximize project benefits, especially to the 32 disadvantaged census tracts across the five-county radius through the following:

[Resident and Community Leadership Engagement](#). SYEMC will engage residents and community members on the Project through several methods including the monthly magazine publication [Carolina Country](#) (available online), direct email, social media, bill inserts, and the SYEMC podcast. In addition, SYEMC will participate in 5 community engagements over the 5-year project period, and survey members to solicit feedback on the Project once a year. SYEMC will also provide 10 educational opportunities/workshops each budget period of the grant. This process will allow SYEMC to adjust as needed to the community benefits approach as the Project period unfolds. Leaders from all five counties in SYEMC's service territory and all SYEMC's community partners will be involved in our communications efforts to engage the community.

Communications will be targeted to areas identified as disadvantaged to ensure efforts are made to reach underserved populations.

[Connectivity and Growth](#). Improving the reliability and resilience of the power grid in SYEMC's service territory will bring a new vitality to rural, underserved, and disadvantaged communities. Frequent outages have a clear and well-documented impact on health outcomes for those living in affected regions.<sup>15</sup> In addition, frequent outages can stymie economic growth and recruitment of businesses. For example, SYEMC's Customer Owned Generation (COG) involving 20-25 generators located at poultry-growing locations in Surry County is a pilot program planned for Q2 of 2023 that could grow exponentially as a direct result of this Project. The COG program will focus on utilizing member-owned generators during generation emergencies. Participating members will be compensated in the form of a monthly bill credit. In the event of a generation emergency, these members would also be compensated for their fuel. The flexibility and increased capacity of smart grid technology will lead to more similar projects positively impacting residents and businesses located in SYEMC's DACs.

### [Long-Term Constraints](#)

The Project will create no long-term constraints to access of natural resources and cultural resources by communities in SYEMC's service territory, as certified by independent environmental engineers. Certifications can be obtained upon request. Installation of the Project will not result in the need for a long-term cleanup strategy, nor will it burden impacted

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<sup>15</sup> Casey, JA, M. Fukurai, D. Hernandez, and MV Kiang, "Power Outages and Community Health: a Narrative Review." *Current Environmental Health Report*, December 2020.



communities with cleanup costs and waste. The proposed Project will help to prevent the accidental release of environmentally harmful substances from substations (transformer leaks, greenhouse gas emissions, etc.).

### Climate Resilience Strategy

The proposed technical upgrades will create a “self-healing” resilient and reliable grid that mitigates climate and severe weather-related impacts.

**Climate Impacts.** Climate-responsive outcomes from the Project include removal of hundreds of gallons of oil from the grid as a direct result of replacing all oil circuit reclosers (OCRs) with vacuum-interrupting reclosers. The Project will also allow the grid to support an additional 100 EV’s, 75 residential solar arrays, and 20 EV charging stations.

**Extreme Weather Patterns.** The Project is anticipated to reduce the risk of wildfires by 50-75% and makes SYEMC’s grid more resilient to rolling blackouts by allowing FLISR system to pinpoint and “heal” the system as soon as service interruptions happen. SYEMC anticipates the Project will reduce outages caused by severe weather by 10%.

## Technical Description, Innovation, and Impact

### Relevance and Outcomes

**Detailed Project Description.** Much of SYEMC’s existing grid relies on antiquated facilities and equipment. SYEMC is seeking funds to deploy a suite of interdependent, coordinated smart grid and smart grid enabling elements to create a resilient “self-healing” grid. Components include:

- Update of an antiquated distribution equipment
  - Upgrade of 17.6 miles of copper lines to 17.6 miles of three-phase aluminum lines
  - Installation of 12 new sets of three-phase solid-state sectionalizing devices, the replacement of 3 existing sets of three-phase hydraulic sectionalizing devices and the replacement of 36 single-phase hydraulic sectionalizing devices for critical business loads on 9 substations (includes Tasks 2 and 3)
  - Replacement of 9 sets of three-phase hydraulic reclosers with 9 sets of three-phase solid state sectionalizing devices. Replacing 10 single-phase solid-state sectionalizing devices, and installing 32 new single-phase, solid-state sectionalizing devices for heavily loaded circuits on 4 substations.
- Enabling (b) (4) transformers)
- Deployment of a FLISR system
  - Upgrade of 193 (sets of multiphase) reclosers to solid-state sectionalizing devices and communications modules at downline locations beginning at the first set of devices outside the substation across all 73 distribution feeders.
  - Deployment of 187 single-phase solid-state sectionalizing devices and communications modules on single-phase branch lines feeding from their corresponding feeder.

- Installation of comprehensive cybersecurity measures

Grid Outcomes. The Project will deploy a series of strategically selected smart grid deployments to create the grid outcomes below:

- Reduce SYEMC maintenance costs by (b) (4) over the next 30 years.
- Increase system capacity for Task 2 Projects by approximately 500% (as related to Task 2 specific locations) to support DERs including future microgrid deployments, local / behind-the-meter resilient power supplies, behind-the-meter batteries, and related systems.
- Decrease duration, frequency, or impact of power disruption by 15%.
- Improve system resilience in the face of cyber-attacks and natural disasters.
- Increase capacity and grid visibility by 100% on downline sectionalizing devices.
- Provide pinpoint outage isolation technology.
- Reduce likelihood of environmental damage due to oil spills by 100% through improved transformer monitoring, preventing the release of harmful transformer fluids into the environment.
- Improve response time caused by downed power lines by 50-75% as a direct result of FLISR implementation to reduce the chance of wildfires.
- Support member-driven clean energy - 500% more DERs, including 100 additional EV's and 75 residential solar arrays.
- Support an additional 20 EV charging stations across the grid.
- Deploy automated fault isolation and service restoration measures.
- Enable comprehensive data collection, real-time monitoring, improved analytics, and improved controls integration.
- Leverage support for future benefits (e.g., fire detection) via bolt-on enhancements.
- Use of cellular infrastructure to facilitate replication in rural areas of North Carolina where broadband communications have been challenging.

Technology Used. Smart grid enabling technology to be installed includes 3-phase aluminum conductors, solid state sectionalizing devices, cellular fault indicators, and automatic switchgear for critical businesses, county governments, municipal water, rural health care, social services, residential areas, income adjusted housing, and electric vehicle charging. Remote Substation Transformer Monitoring Technology will include the buildout of a FLISR system for grid visibility, fault location and detection, and rapid and targeted response to outages and to support remote monitoring of transformer winding temperature, oil level, and oil temperature. Remote Fault Location, Prediction and Isolation Technology is a critical technology designed to isolate and re-route power around identified faults, improve reliability, and reduce outage duration.

Other Principles and Objectives to be Pursued. As part of the Project, SYEMC will also pursue community benefit principles and objectives for its DACs. These are discussed in the CBP.

Relevance of the Proposed Project to GRIP Goals. This project addresses the three strategic goals outlined by DOE in the GRIP Funding Opportunity Announcement as described below.

- **Transform community, regional, interregional, and national resilience, including in consideration of future shifts in generation and load.** This Project intends to utilize smart grid technology to address outages caused by climate change and severe weather events. Replacing copper conductors with advanced aluminum conductors will increase line capacity from 1 to 5 MW. These upgrades will allow SYEMC to distribute electricity more efficiently at higher capacity, reduce line losses, safeguard the grid from climate change, and make it more adaptable to new DERs.
- **Catalyze and leverage private sector and non-federal private capital for impactful technology and infrastructure deployment.** SYEMC is a member-owned cooperative organization. This means members contribute to and equitably control the capital of the co-op. Federal funding will provide financial support that otherwise would burden SYEMC's rural members. The smart grid and its improved capacity, resiliency and redundancy will be attractive to private economic developers and economic development organizations (EDOs) when recruiting new businesses to the area.
- **Advance community benefits.** The Project will foster equity, inclusion and economic development through job creation and support for MBEs. Once operational, the new technology will increase the grid's ability to support 500% more DERs helping to decrease the need for fossil fuels and potentially minimize negative health outcomes.
- **Priority Goals.** The Project will support meaningful community and workforce engagement, invest in the American workforce, advance DEIA priorities, and contribute to the Justice40 Initiative's investment goals. (See CBP for additional details).

Expected Project Outcomes. Expected Project outcomes include:

- Improved service for 1,818 connections, including increased energy efficiency at the utility distribution level.
- Reduced maintenance costs for SYEMC by (b) (4) over 30 years.
- Ability of the SYEMC grid to support an additional 100 additional EV's, 75 residential solar arrays and 20 EV charging stations.
- Create a "self-healing" grid system supporting business, residents, and local governments in rural areas.
- Reduced outages times by 51%.
- Reduced outages caused by severe weather by approximately 80 per year to 72 per year (10% reduction)
- Implementation of the FLISR system.

Additional benefits to disadvantaged communities detailed in the CBP include decreased energy burden, decreased environmental exposure and burdens, increased access to low-cost capital, an increase in high-quality job creation, increased clean energy contracting with minority-owned or disadvantaged business enterprises, and increased energy democracy.

## Feasibility

**Technical Feasibility.** All elements of the Project are technically viable and commercially available as proven through extensive use across multiple scales of utilities nationwide. All components align with SYEMC's core competencies and established record for constructing, operating, and maintaining the infrastructure for safe and efficient power delivery.

**Capability of Achieving Anticipated Performance Targets.** SYEMC has extensive experience implementing and managing projects of similar size and scope, and Project personnel have decades of relevant experience. (See Technical Qualifications for additional information.)

**Previous Work and Prior Results.** SYEMC has extensive experience managing similar projects:

- **Incipient Failure Identification for Common Grid Asset Classes (IFID)** – In 2020, SYEMC was selected from hundreds of cooperatives as a participant for the IFID project through the Department of Energy Grid Modernization Laboratory Consortium (GMLC) program. The 36-month project was terminated at the end of 2022 and is intended to operationalize a multi variate, multi modal approach to diagnose and prescribe remediation pathways for both short term but critical failures locally and incipient growing problems centrally in commonly utilized equipment throughout the country.
- **DC Fast Chargers Project** – In 2020, SYEMC placed the first DC Fast Charger for Circle K Carolinas. The Project was funded by SYEMC in conjunction with North Carolina Electric Membership Corporation (NCEMC), SYEMC's state umbrella organization. The project cost (b) (4) and was successfully completed and closed out.
- **Electric Transportation Refrigeration Unit (eTRU) Project** – SYEMC has completed the first eTRU project for all NC Electric Cooperatives. The Project will allow hybrid refrigerated long-haul trailers to use electricity to cool climate sensitive loads instead of diesel fuel. The Project will create a direct reduction in carbon emission from the trailers, decreased operations and maintenance costs for the freight company, and a small increase in kWh sales for SYEMC. The project is being jointly implemented by SYEMC, NCEMC and Hollar & Greene Produce at a cost of (b) (4).

**Access to Necessary Infrastructure.** SYEMC owns and maintains all equipment and facilities associated with the Project. In total, 17.6 miles of existing easements will be utilized (of 3,629 miles of easements total in SYEMC's distribution system). SYEMC owns all parcels of land where substations are located. The use of cellular technology (as opposed to fiber) will also use existing and accessible infrastructure.

**Use of Existing Infrastructure.** The Project will use existing infrastructure which includes 3,629 miles of distribution line, 112 miles of transmission line, 18 substations, eight transmission delivery points serving 28,000+ service points, and 44,304 distribution poles.

**Skilled Workforce Access.** SYEMC has identified 9 community partners – listed in the chart below - which will have active Project roles assisting SYEMC with recruitment and hiring of full-

time employees and vendors. Community Colleges are not only resources for hiring, but also for worker training. Letters of commitment from all partners are attached.

Community Colleges	Chambers of Commerce (CoC) / Economic Development Org.'s	Community Based Organizations & Industrial Affiliations
-Forsyth Tech. Community College -Nash Community College -Surry Community College	-Yadkin Valley CoC -Surry County ED Partnership	-North Carolina Association of Electric Cooperatives (NCAEC) -Surry County Schools -The Salvation Army -NC Works/American Job Center

## Innovation and Impacts

**Current Standard Practice / State-of-the-art Technology.** Currently, SYEMC utilizes a standard grid, with limited smart grid features. This Project will implement state-of-the-art FLISR technology. FLISR technology installed as a pilot program in the Orlando, Florida area in 2019 exceeded distribution engineers' expectations.<sup>16</sup> The community "saw a 94% reduction in the number of . . . customers affected by outages during the 13-month trial of FLISR."<sup>17</sup> FLISR is intended to "reduce customer inconvenience from unexpected outages and, more importantly, reduce economic losses for the distribution utility due to undelivered energy."<sup>18</sup>

**Innovation of the Proposed Technology.** Innovation includes the following:

- **Advanced technology.** FLISR is the Project's central technical innovation. FLISR has been found to reduce the number of consumers interrupted by up to 45% and the consumers minutes of interruption by up to 51% during an outage.<sup>19</sup> In addition to FLISR, the remote transformer monitoring technology will be capable of remotely monitoring transformer winding temperature, oil level, and oil temperature. In the event of a system disturbance, transformer fault, or other interruption that could cause transformer malfunction—including domestic terrorism—this innovative technology will help prevent catastrophic disruptive outage events at the substation level.
- **Innovative partnerships.** Supplemental to community partners, SYEMC will look for innovative contract partners. Innovative partnerships in SYEMC's recent history include agribusinesses like Hollar and Greene Produce, solar farms and battery storage, and an EV charging network. The Project will build on these successes and extend Justice40-compliant, climate-responsive green energy options when contracting with vendors.
- **Innovative community engagement.** In addition to communicating with members about the Project through existing platforms, direct email, social media, and the Carolina

<sup>16</sup> Orlando Utilities Commission, "Self-Healing Grid System is a Game Changer." OUCconnect.

<https://oucblog.com/self-healing-grid-system-is-a-game-changer/>

<sup>17</sup> Ibid.

<sup>18</sup> Dizdar, Nikola. "The Benefits of FLISR Implementation in ADMS." Power Engineers. November 7, 2022.

<https://www.powereng.com/library/the-benefits-of-flisr-implementation-in-adms-insight>

<sup>19</sup> U.S. Department of Energy. [Fault Location, Isolation and Service Restoration Technologies Reduce Outage Impact and Duration](#). (December 2014). (p. 16)

Country monthly magazine etc., SYEMC will participate in 5 community engagements and hold one survey per year over the 5-year project period to solicit feedback from members on the Project. While this is not a new way to involve the community, SYEMC will actively take community feedback into consideration as the Project is ongoing – not just at the beginning or end of the process. These meetings will give transparency to SYEMC’s members and ensure the most underserved community members have voices heard throughout the process.

**Overall Impact on Advancing the State-of-the-Art/Technical Baseline.** This Project will serve as a replicable template for other rural-serving utilities across the state and, potentially, nationwide. The decision to employ cellular technology (rather than fiber) for communications will make the Project more suitable to serve as a prototype in other rural areas where broadband internet access may be limited.

### **Resilience and Decarbonization Support**

The Project is aligned with state, local, tribal, regional and national resilience and decarbonization, and other energy plans, aimed at resilience in the face of extreme (often climate change impacted) weather events, cyber and physical attacks, and solar storms. The Project aligns with the [North Carolina Clean Energy Plan](#)<sup>20</sup> most notably through the plan’s third goal: 3) “accelerate clean energy innovation, development, and deployment to create economic opportunities for both rural and urban areas of the state.”<sup>21</sup> In addition, the Project supports the Plan’s overall recommendations including 1) decarbonizing the electric power sector, 2) grid modernization and resilience, 3) clean energy deployment and economic opportunity, 4) equitable access, and 5) energy efficiency.<sup>22</sup>

Notably, the Project also aligns with the State of [North Carolina’s 2020 Climate Risk Assessment and Resilience Plan](#)<sup>23</sup> that lays the groundwork for strategic planning for projects like the Smart Grid Project. According to the plan, “energy systems in North Carolina will ultimately benefit from modernization and installation of preventative infrastructure to protect from flooding and sea level rise, as well as a diversified electricity supply system to meet demand. Mitigation of these disruptions can be done by updating existing infrastructure, building additional infrastructure, and enabling alternate, renewable sources of energy, all of which will be reflected in retail costs.”<sup>24</sup>

In addition, the Wilkes County Comprehensive Plan names “aging infrastructure” as a threat to the community.<sup>25</sup> Similarly, the Forsyth County Comprehensive Plan specifies the County needs

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<sup>20</sup> North Carolina Department of Environmental Quality, State Energy Office. [North Carolina Clean Energy Plan: Transitioning to a 21<sup>st</sup> Century Electricity System](#). October 2019.

<sup>21</sup>Ibid (p. 12.)

<sup>22</sup> Ibid (p. 12.)

<sup>23</sup> State of North Carolina, [Climate Risk Assessment and Resilience Plan](#). June 2020.

<sup>24</sup> Ibid (p. 5 L-7).

<sup>25</sup> [Wilkes County Joint Comprehensive Plan 2020-2024](#) (p.16)



to make targeted investments in utility infrastructure.<sup>26</sup> Yadkinville, a rural community within Yadkin County, notes the need for updating utility infrastructure in the community, rather than expanding utilities infrastructure.<sup>27</sup> NC is cited by DOE as one of 32 states “that have developed and adopted renewable portfolio standards,”<sup>28</sup> and SYEMC works closely with NCEMC to align all operational goals, policies and projects with the state energy plan.

### Project Impacts

**Project Potential to Reduce Perceived Risk for Project Deployment.** There are no perceived risks to Project deployment beyond the impact of supply chain issues. SYEMC has accounted for this risk in its project timeline and has built in contingencies to address any unforeseen issues.

**Project Potential to Achieve Further Deployment.** Further deployment will be possible once the Project is successfully implemented. As mentioned above, the cellular infrastructure will make replication much more likely in rural areas of NC where broadband connection is challenging.

**Additional Private Sector Investments.** Increased grid capacity, resiliency and redundancy will not only support the growth of existing businesses but will lay a foundation for new economic development in SYEMC service territory. SYEMC anticipates increased business growth as a result of a modern, smart and dependable electric grid. For many businesses, power interruptions can result in significant financial loss, delayed consumer deliveries, processing breakdown, and potential equipment damage. As companies start to recognize their dependency on a reliable energy supply, smart grid infrastructure will play a significant role in site selection.

### Development of Smart Grid Functions

SYEMC will implement the Project through three major elements: 1) updating antiquated distribution equipment, 2) enabling remote monitoring of substation transformers, and 3) deploying a “self-healing” FLISR system. In addition, the Project will install necessary cybersecurity improvements to ensure technology so the Project can operate safely.

### Enhancement of System Flexibility

The Project is aimed at system flexibility aligned with DOE GRIP objectives. FLISR allows the grid to quickly pinpoint the location of a fault, isolate the fault, and “self-heal.” This isolation technique allows the remainder of the grid to operate without constraints, and with more flexibility to manage load and distribution.

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<sup>26</sup> [Winston-Salem / Forsyth County Legacy 2030 Comprehensive Plan](#) (p. 219)

<sup>27</sup> [Yadkinville, North Carolina Comprehensive Plan 2017](#) (p 2.21)

<sup>28</sup> US Department of Energy, p. 10.



## Workplan

### Project Objectives

SYEMC has included a list of high-level goals and objectives as well as expected outcomes below. Additional details regarding tasks, sub-tasks, milestones, and go/no-go decision points can be found in the Statement of Project Objectives (SOPO) document. Details are also provided in the Work Breakdown Structure and Task Description sections that follow.

### Buy America Requirements for Infrastructure

This Project involves construction, alteration, maintenance and/or repair of public infrastructure in the United States and as such any iron, steel, manufactured products and construction materials will be produced in the United States.

### Technical Scope Summary

The scope of work will be divided into seven distinct tasks to be accomplished across three Project goals. These are detailed in the Work Breakdown Structure below. The Milestone Summary section denotes associated milestones and budget periods. A full summary of the Community Benefits Plan milestones can be found in the Community Benefits Plan.

### Work Breakdown Structure and Task Description Summary

<b>Goal #1: Position SYEMC to deliver a more flexible, reliable, and resilient electric power system to its service territory</b>	
<b>Outcomes 1.1: Improved service for 1,818 connections, including increased energy efficiency at the utility distribution level.</b>	
<b>Outcome 1.2: Reduce maintenance costs for SYEMC by (b) (4) over 30 years.</b>	
<b>Outcome 1.3: Enable the ability of the SYEMC grid to support an additional 20 EV charging stations.</b>	
<b>Objective #1: Implement project management and planning activities at onset of award and over the 5-year project period as needed.</b>	
<b>Tasks</b>	<b>Sub-tasks</b>
1.0 Project Management and Planning	1.1 Project Management Plan
	1.2 NEPA Compliance
	1.3 Cybersecurity Plan
	1.4 Continuation Briefings
<b>Task 1.0 Deliverables: PMP, NEPA Compliance, Cybersecurity plan, Continuation Briefings</b>	
<b>Goal #2: Enhance the resilience of SYEMC's electric system.</b>	
<b>Outcomes 2.1: Create a "self-healing" grid system supporting business, residents, and local governments in rural areas.</b>	
<b>Objective #2: Upgrade existing antiquated SYEMC distribution equipment to support comprehensive smart grid system deployment</b>	
<b>Tasks</b>	<b>Sub-tasks</b>
2.0 Upgrade two-phase copper lines to three-phase aluminum lines	2.1 Upgrade two-phase copper lines to three-phase aluminum lines, install solid-state sectionalizing device.
	2.2 Reconduct 15.1 miles of existing copper line to three-phase aluminum at (b) (4) substation (12) feeders 7 and 8, install 17 single-phase solid-state sectionalizing devices and corresponding communications modules where applicable and (b) (4) substation (7) feeders 1 and 2.
	2.3 Reconduct 2.5 miles of existing copper single-phase conductor with three-phase aluminum conductor at (b) (4)

	substation (14) feeders 6 and 7. Install 4 sets of 3-phase solid-state sectionalizing devices, 6 1-phase solid-state sectionalizing devices and corresponding comms. modules where applicable.
<b>Task #2.0 Deliverables:</b> Installation report	
3.0 Install 11 sets of three-phase solid-state sectionalizing devices and 13 single-phase solid-state sectionalizing device for critical business loads at 6 substations.	3.1 Install 3 sets of 3-phase solid-state sectionalizing devices at (b) (4) substation (5) feeder 1 and (b) (4) substation (4) feeder 5 and corresponding communications modules creating a self-healing system supporting manufacturing/processing of stone/aggregate and asphalt supporting local and regional infrastructure.
	3.2 Install 2 sets of 3-phase solid-state sectionalizing devices, 5 1-phase solid state sectionalizing devices with corresponding communications modules at (b) (4) substation (4) feeders 2 and 5 creating a self-healing system supporting businesses engaged in the processing, cold storage / transportation of fresh produce and residential members.
	3.3 Install 2 sets of 3-phase solid-state sectionalizing devices, 3 1-phase solid-state sectionalizing device with corresponding communications modules at (b) (4) substation (3) feeders 3 and 6 creating a self-healing system supporting a minority-owned business engaged in the manufacturing and processing of steel structures and residential members, comprised primarily of minority residential
	3.4 Install 2 sets of 3-phase solid-state sectionalizing devices and 3 1-phase solid-state sectionalizing devices with corresponding communications modules at (b) (4) and (b) (4) substations (3 and 13), feeders 1 and 7 creating a self-healing system for the, Surry County government center, Surry County health department, a dental clinic, a permitting center, Surry County social services, retail banking, income adjusted housing, residential housing, electric vehicle charging, and minority-owned business.
	3.5 Install 2 sets of 3-phase solid-state sectionalizing devices, 2 1-phase solid-state sectionalizing devices and corresponding communications modules where applicable at (b) (4) substation (18) and (b) (4) substation (16) feeders 5 and 7 creating a self-healing system for the Town of Elkin municipal water, Yadkin Valley Sewer Authority, rural healthcare, income adjusted housing, residential, lodging and 5 EV charging stations.
<b>Task #3.0 Deliverables:</b> Installation Report	
4.0 Replace 9 sets of three-phase hydraulic reclosers with 9 sets of three-phase solid state sectionalizing devices.	4.1: Install 2 sets of 3-phase solid-state sectionalizing devices, 3 1-phase solid-state sectionalizing devices and corresponding communications modules at (b) (4) substation (8) feeder 2.
	4.2: Install 2 sets of 3-phase solid-state sectionalizing devices, (8) 1-phase solid-state sectionalizing devices and corresponding communications modules at (b) (4) substation (11) feeder 7.
	4.3: Install 2 sets of 3-phase solid-state sectionalizing devices, (8) 1-phase solid-state sectionalizing devices and corresponding communications modules at (b) (4) substation (10) feeder 7.
	4.4: Install 3 sets of 3-phase solid-state sectionalizing devices, (23) 1-phase solid-state sectionalizing devices and corresponding communications modules at (b) (4) substation (1) feeder 3.
<b>Task #4.0 Deliverables:</b> Installation Report	

<b>Objective #3:</b> Enable (b) (4) transformers to prevent and reduce (b) (4) outages.	
<b>Tasks</b>	<b>Sub-tasks</b>
5.0: Install (b) (4) substation transformers	5.1: Finalize engineering design, communications plan, and installation scheme for (b) (4) substations. Installation of devices and establish communications.
<b>Task #5 Deliverables:</b> Plans/schemes, Installation Report	
<b>Goal #3: Prevent and lessen the impact of systemwide outages on rural communities</b>	
<b>Outcome 3.1: Reduce outages times by 51%.</b>	
<b>Outcome 3.2: Reduce outages caused by severe weather by approximately 80 per year to 72 per year (10%)</b>	
<b>Outcome 3.3: Implement a FLISR system.</b>	
<b>Objective #4:</b> Enable deployment of a fault location, isolation, and service restoration (FLISR) system throughout the grid to create a “self-healing” grid preventing faults leading to wildfires and other system disturbances as well as systemwide outages.	
<b>Tasks</b>	<b>Sub-tasks</b>
6.0: Upgrades of 193 multi-phase reclosers to solid-state sectionalizing devices and communications modules at downline locations beginning at the first set of devices outside the substation across all 73 distribution feeders.	6.1: Replace 193 multi-phase oil circuit reclosers (OCRs) sets (an oil filled recloser requires regular oil maintenance) with multi-phase solid-state sectionalizing devices.
	6.2: Replacement of 187 OCRs with single-phase solid-state sectionalizing devices.
	6.3: Deployment of 5 remote terminal units (RTUs) and 380 cellular modems, which will enable direct, remote control of linked systems and facilities from SYEMC’s central control facility.
	6.4: Deployment of a coordinated upgrade to SYEMC’s existing control systems, sufficient to integrate the proposed equipment into a centrally controlled FLISR system.
<b>Task #6 Deliverables:</b> Installation Report	
7.0: Administer comprehensive cybersecurity measures	7.1: (b) (4)
	7.2: (b) (4)
	7.3: (b) (4)
<b>Task #7 Deliverables:</b> Installation Report	

### Milestone Summary

Technical milestones (progress measures and SMART) are outlined in the two tables below. Budget periods are for 12 months and are also indicated in the table below. Milestones related to the community benefits including diversity, equity, inclusion and accessibility (DEIA) are included in the CBP.

Tasks	Milestone (Progress Measure)	Year/Quarter	Verification
1.0 (M#1.1 – 1.5)	M#1.1: Executed Intellectual Property Management Plan (IPMP) between SYEMC and all partner organizations M#1.2: Submit docs for NEPA compliance	M#1.1: Y1Q1 M#1.2: Y1Q1 M#1.3: Y1Q1 (ongoing as needed)	M#1.1 – 1.4: Reports submitted to DOE M#1.5: Submit bid issuance to DOE
5.0 (M#1.5)	M#1.3: Submit original cybersecurity plan and update plan as needed	M#1.4: First briefing to take place Y1Q1 (then ongoing)	
6.0 (M#1.5)	M#1.4: Annual briefings completed M#1.5: Issue bid notifications for Task 2, sub-tasks 2.1 and 2.2, Task 5, Task 6	M#1.5: Y1Q1	

2.0 (M#2.1 – 2.2)  M#7.0 (#2.1)	M#2.1: Award contracts to lowest qualified bidder for Task 2, sub-tasks 2.1, 2.2. M#2.2. All three-phase aluminum lines upgraded.	M#2.1: Y1Q1 (Task 7) M#2.2: Y1Q2 (Task 2) M#2.3: Y1Q2 (operations will be ongoing through Y5)	Submit bid process summary and awardee criteria to DOE M#2.2: Installation report completed.
3.0 (M#3.1- 3.3)  6.0 (M#3.3)  7.0 (M#3.2)	M#3.1: Finalize engineering field design for all Task 3 sub-tasks. M#3.2: Order smart grid components for sub-tasks 1 and 2 and Task 7. M#3.3: Order smart grid components for part one of five distribution components for Task 4.	Y1Q3	Submit project installation plan of smart grid installation elements.
4.0	M#4: Program, install and test communications of Remote Terminal Units (RTU) for use with Smart Grid enabling components for Tasks 2, 3, and 4.	Y1Q4	Successful establishment and pilot test of RTU evidenced through communication verification reports.
<b>End Budget Period 1</b>			
2.0 (M#2/1)  7.0 (M#5.2)	M#5.1: Completion of sub-task 2.1.  M#5.2 Installation of all cybersecurity measures completed.	Y2Q1	Field audit of project completeness.
5.0	M#6: Complete installation of substation monitoring devices and ensure communications have been established with SCADA system.	Y2Q2	Submit project photos of pre- and post-installation and submit verification of established communications and diagnostic readings to DOE.
2.0	M#7: Completion of sub-task 2.2.	Y2Q3	Field audit of project completeness.
6.0	M#8: Verification of smart grid component installation for part two of five of Tasks 6, communications have been established and devices are functional.	Y2Q4	Test results demonstrating functionality of smart grid.
<b>End Budget Period 2</b>			
4.0	M#9: Begin construction of Task 3 (all sub-tasks).	Y3Q1	Test results demonstrating functionality of smart grid.
2.0	M#10: Completion of sub-task 2.3.	Y3Q2	Submit field audit of project to DOE for completeness and smart grid component operational test reports.
4.0	M#11: Complete sub-tasks 4.1 and 4.2.	Y3Q3	Field audit of project completeness.
6.0 (M#12.1)	M#12.1: Verification of smart grid component installation for one fifth of distribution system for Tasks 6-7.	Y3Q4	Test results demonstrating functionality of smart grid. Verifications include real-time.

6.0 (M#12.2)  4.0 (M#12.3)	M#12.2: Communications established and operational. M#12.3: Completion of sub-tasks 4.3 and 4.4.		event logging, up/down notification, and archiving.
<b>End Budget Period 3</b>			
2.0	M#13: Order smart grid components for sub-task 2.3.	Y4Q1	Submit receipt of materials to DOE.
6.0	M#14: Order smart grid components for part 4 of 5 of Task 6.	Y4Q2	Submit receipt of materials to DOE.
2.0	M#15: Completion of sub-task 2.3 and test functionality of self-healing system.	Y4Q3	Submit field audit of project to DOE for completeness of construction and system functionality results of self-healing system.
6.0	M#16: Verification of smart grid component installation for part four of five of Tasks 6-7. Communications have been established and devices are functional.	Y4Q4	Submit test results to DOE as verification of functionality of smart grid components.
<b>End Budget Period 4</b>			
6.0	M#17: Order smart grid components for part 5 of 5 of Tasks 6-7 and begin installation.	Y5Q1	Submit receipt of materials to DOE and installation plan (locations and affected areas).
6.0	M#18: Begin installation of smart grid components for part five of five Tasks 6-7 for FLISR system.	Y5Q2	Submit installation locations to DOE.
6.0  7.0	M#19: Verification of smart grid component installation of distribution system for Task 6 and cybersecurity items for Task 7. Communications have been established and devices are functional.	Y5Q3	Submit test results to DOE as verification of functionality of smart grid components.
6.0	M#20: Tasks 6-7 FLISR completed. System controls and procedure permissions are granted to all distribution system operators.	Y5Q4	Submit full close out report to DOE.
<b>End Budget Period 5</b>			

SMART Technical Milestone	Year	Verification
SM#1 Engineering design completed for Task 2.	Y1	Submit 100% engineering and design documents to DOE project manager.
SM#2 (b) (4)	Y2	(b) (4)
SM#3 Final testing of all self-healing system and smart grid components, ensuring functionality and communications.	Y3	Submit system verification at 75% functionality to DOE project manager.

SM#4 Final testing of all FLISR system components and integration with existing SCADA system.	Y4	Submit system verification at 90% functionality to DOE project manager.
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### Go/No-Go Decision Points

The Go/No-Go Decision Points are the same as the SMART technical milestones referenced above. SYEMC will use these milestones to ensure the Project remains on track.

### End of Project Goal

The Statement of Project Objectives includes four primary objectives, each of which is comprised of tasks and sub-tasks to successfully implement the Project. The End of Project Goals are the cumulative results of those tasks over the five-year funding period.

- End of Project SMART Goal: To prevent and lessen the impact of systemwide outages on our rural communities by 45-50%.<sup>29</sup>

### Project Schedule

Tasks	Subtasks	Year 1				Year 2				Year 3				Year 4				Year 5			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	1.1																				
	1.2																				
	1.3																				
	1.4																				
2	2.1																				
	2.2																				
	2.3																				
3	3.1																				
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	3.5																				
4	4.1																				
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	4.3																				
	4.4																				
5	5.1																				
6	6.1																				
	6.2																				
	6.3																				
	6.4																				
7	7.1																				
	7.2																				
	7.3																				
SMART Milestones		SM#1				SM#2				SM#3				SM#4				End Goal			

<sup>29</sup> Estimates based on: U.S. Department of Energy. [Fault Location, Isolation and Service Restoration Technologies Reduce Outage Impact and Duration](#). (December 2014). (p. 16)



While the cybersecurity measures (Task 7) will be installed by Y2Q1, the operations of these items will be ongoing throughout the Project period. The End Goal depicted for budget period five is the same as the End of Project SMART Goal discussed above.

### Project Management

SYEMC leadership will establish the calendar for leadership team monthly and quarterly meetings to review progress toward completion of tasks and deliverables and rate of expenditure of federal and matching funds, along with required reporting and troubleshooting of any barriers encountered. Monthly and quarterly meeting agendas will be driven by the Workplan's Objectives and Outcomes, Work Breakdown Structure and Milestone Summaries and aligned with DOE contract requirements.

**Overall Approach to Organization for Managing the Work.** Prior to the required Kickoff and Pre-Continuation Briefings the Project Leadership Team will establish the calendar of monthly and quarterly meetings, with agendas aligned with the content and timeline established in the Work Breakdown Structure Tasks, Sub-tasks and Milestones as well as the Milestone Summary's DEIA SMART Milestones, Progress Measures and SMART Milestones. Team members will keep an open line of communication regarding all project activities, from procurement to installation and testing as well as required DOE reporting and documentation.

**Project Team Member Roles.** Team member roles are detailed in the Project Team Qualifications and Expertise section below.

**Critical Handoffs/Interdependencies Among Project Team Members.** The first critical element of interdependency for the Project is between the Community Benefits Plan and the technically-focused elements of the Workplan. Project Administrator Travis Bode will have the primary responsibility for monitoring progress toward the interrelated milestones of each. A second critical element is for the Leadership Team to maintain concurrent awareness of federal expenditures (the responsibility of Financial Manager Misty Utt) and project implementation milestones (the responsibilities of Project Manager Lee Bedsaul, Community Benefits Manager Anna Jones, Construction Manager William Hawkins, and IT Manager Susan Duncan).

### Technical and Management Aspects of the Management Plan.

- **Systems and Practices** – In addition to the practices described above, SYEMC uses (b) (4) for the technical aspects of project management and deployment. The Project will follow all SYEMC protocols used when implementing the Project. All approvals will flow through the Project Manager.
- **Financial Practices** – SYEMC will use generally accepted accounting practices and provide the financial reporting and documentation required by DOE. The Financial Manager will help to ensure all drawdown requests are tracked and all financial reports are sent to DOE in a timely manner.



### Project Risk Management.

- **Securing a Qualified Workforce** – SYEMC will work with the above-mentioned Project partners to ensure a qualified workforce is secured for the Project. In addition to partner work, SYEMC will participate in community engagements aimed at promoting awareness of project-related jobs in disadvantaged communities.
- **Mitigating Risks to Project Performance** – The Project Leadership Team will manage and direct the project in accordance with the accepted Project Management Plan to meet all technical, schedule, and budget objectives and requirements, coordinating all efforts to effectively accomplish the work. Any barriers encountered will be discussed at monthly and quarterly meetings, and with the DOE project manager as appropriate. As previously mentioned, SYEMC has built in contingencies into its Project timeline to account for any unforeseen supply chain shortages or delays.

**Project Changes.** Project Changes will be initially presented to William Hawkins, Construction Manager. Any recommended changes following bid approval will result in a change order, prepared by the relevant contractor and detailing any additional work and expense. Once the change order is approved by Mr. Hawkins and Project Manager Lee Bedsaul, approved change orders will route to Project Administrator Travis Bode for submittal to the DOE for approval.

**Quality Assurance/Control.** The Construction Manager, William Hawkins, is responsible for Quality Assurance/Control, which will be maintained in a five-step process: definition and communication of acceptable criteria for work performance (including change order requirements), creation of an inspection plan and schedule, use of checklists and notes to conduct inspections, timely correction of deficiencies, and verification of acceptance of corrections.

**Communications.** The Project Leadership Team will maintain open communication through monthly and quarterly meetings with project partners and contractors as well as through community outreach events. Additional meetings and check-ins will be established as needed throughout the Project's funding period. Project Administrator Travis Bode will be responsible for periodic reviews of the team to verify that all relevant communications channels are functioning well.

## Technical Qualifications and Resources

### Project Team Qualifications and Expertise

The Project will be run by six key SYEMC staff detailed below:

Team Member Role	Qualifications/Expertise	Dedicated Time
<b>Travis Bode, Project Administrator.</b> Mr. Bode will be responsible for overseeing the entirety of the Project including financial drawdowns. He will be the main	Mr. Bode has served as SYEMC's Manager of Economic Development since 2018. He has experience managing large projects and is skilled in contract administration, financial analysis, and	30%



point of contact for DOE and will be responsible for providing DOE with all required reports.	strategic planning. He is a National Rural Electric Cooperative Association (NRECA) Certified Key Accounts Executive and has a Bachelor of Business Administration from Gardner-Webb University.	
<b>Lee Bedsaul, Project Manager</b> – Mr. Bedsaul will be responsible for the day-to-day management of the Project. He will oversee all project activities and be responsible for managing contractors and vendors. He will report directly to Mr. Bode and be required to provide ongoing project progress updates.	Mr. Bedsaul has served as Line Superintendent for SYEMC for the past year. Prior to that he was a General Foreman. With over two decades of experience, Mr. Bedsaul implements scheduling and work agendas for staff and contractors on numerous projects, assists in completion of work orders and vets accuracy of work performed and is essential to the SYEMC for the planning and implementation of transmission repairs, updates, and maintenance.	60%
<b>Misty Utt, Financial Manager</b> – Ms. Utt will work closely with Mr. Bode and Mr. Bedsaul to oversee Project finances. She will oversee drawdown requests and disbursement of funds throughout the Project including financial oversight of contractors and vendors. She will also work with Mr. Bode to ensure all reporting requirements are met.	Ms. Utt is SYEMC's Vice President of Finance and Accounting. She has held this position since 2016. Prior to that she held the position of Director of Accounting and Finance. Ms. Utt has over 20 years of finance and accounting experience and has managed numerous budgets for large-scale projects. Additionally, Ms. Utt oversees the preparation of all financial reporting, operational accounting, purchasing, inventory, and billing.	25%
<b>Anna Jones, Community Benefits Manager</b> - Mrs. Jones will ensure that the CBP is implemented during the Project. She will oversee outreach to community organizations and workforce development boards and tracking efforts. She will also lead SYEMC's implementation of all community benefits activities.	Mrs. Jones is the Human Resources (HR) Manager for SYEMC. She has held this position since 2021 and is responsible for attracting and retaining a highly skilled, diverse workforce to SYEMC. She participates in the shaping of SYEMC strategies and ensures all policies are clearly communicated to SYEMC employees. She also maintains SYEMC's wellness program for employees.	25%
<b>William Hawkins, PE, Construction Manager</b> – Mr. Hawkins will directly assist the Project Manager on day-to-day activities. He will be the primary individual at the field level responsible for direct communications at all substations and provide direct oversight of all construction activities.	Mr. Hawkins has been a System Planning Engineer with SYEMC since 2016. He is responsible for the design, installation, and maintenance of supervisory control and data acquisition (SCADA) and other hardware. In the past, Mr. Hawkins has managed construction and coordination of station projects. He has been a licensed Professional Engineer (PE) in North Carolina since 2017.	30%
<b>Susan Duncan, IT Manager</b> – Mrs. Duncan will oversee all software implementation and communications as well as cybersecurity implementation.	Mrs. Duncan has been SYEMC's Systems Administrator since 2017. She provides programming support to all staff and received a B.S. in Programming from High Point University in 2001. She is responsible for security, integration, and communication of systems and devices across SYEMC networks.	20%

### Existing Equipment and Facilities

SYEMC owns and maintains all equipment and facilities associated with the Project and will maintain all new hardware and software in perpetuity. Costs for this will be incorporated into its annual operations and maintenance budget.

### Previous Work Efforts and Demonstrated Innovations

Previous work efforts and demonstrated innovations include federal grant and loan administration and a variety of SYEMC innovative projects.

Previous Work Efforts. Prior federal grants and loans include:

- **USDA REDLGs** – Since 2017, SYEMC has been awarded (b) (4) in REDLG grant funding for the following ultimate recipients to stimulate economic development in rural communities in its service territory:
  - (b) (4) REDLG Grant – Lewisville Community Fire Department (2021)
  - (b) (4) REDLG Grant – City of Mount Airy (2017)
- **USDA Direct Rural Utilities Service (RUS) Loans** – In the past three years, SYEMC has administered more than (b) (4) million in RUS loan funds across 13 projects ranging from substation upgrades to transmission line upgrades. Eight of the 13 loans have been successfully closed out, and the remaining five loans are on track for completion.

**Demonstrated Innovations.** Demonstrated innovations include SYEMC's five microgrids, the IFID project, customer-owned generation projects, and the Electric Transportation Refrigeration Unit project - all previously described.

### Key Team Member Time Commitments

Key team members' time commitments are detailed in the above chart.

### Technical Services

No technical services will be provided by DOE/NNSA FFRDC.