Project Title: **Building the Smart Grid of the future through the COOPERATIVE ENERGY ECOSYSTEM**

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Topic Area 2 – Smart Grid Grants (BIL section 40107)

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Team Member Organization(s): Tri-State Generation and Transmission Association ("**Tri-State"**), 42 electric distribution member cooperatives, & Aerinet Solutions Corp

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Project Location: Nebraska, Wyoming, Colorado, New Mexico, Kansas, Montana, Texas, and Utah; Headquarters: CO-007 Westminster, Colorado

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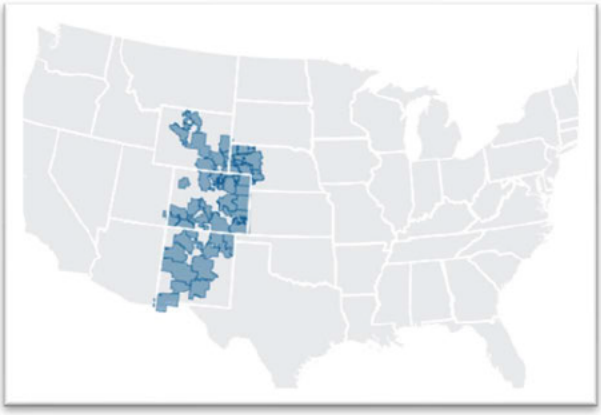
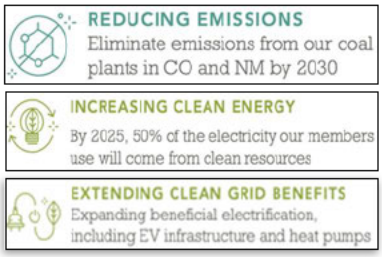
1. PROJECT OVERVIEW

Background: Founded in 1952, Tri-State Generation and Transmission Association **(Tri-State)** is a not-for-profit cooperative and **wholesale power supplier** that **serves 42 electric distribution** members[1] in **Colorado, Nebraska, New Mexico, and Wyoming.** As a member-owned electric cooperative, Tri-State provides electricity to **more than one million rural customers** across its combined service territory of nearly **200,000 square miles.** Since Tri-State was built by and for its members, **affordability is a central part of the mission**, and the company returns patronage capital to members from any profit accumulated. Electric cooperatives were founded to provide power to rural areas where no electric provider would otherwise likely operate; as a result, Tri-State and its electric distribution member systems **serve:**

- Federally recognized **230+ disadvantaged communities, 18 sovereign tribal nations** (including 29 chapters of Navajo Nation), **and persistent poverty counties**.
- Approximately **385,000 people**, or **25%** of Tri-State's service territory is classified as **"disadvantaged."**
- **41%** of households are in a census tract **living below the Federal Poverty Line**.
- **12%** of consumers are in the **90th percentile nationally** for **energy burden**.
- **51%** of consumers are **above 50% for energy burden**.



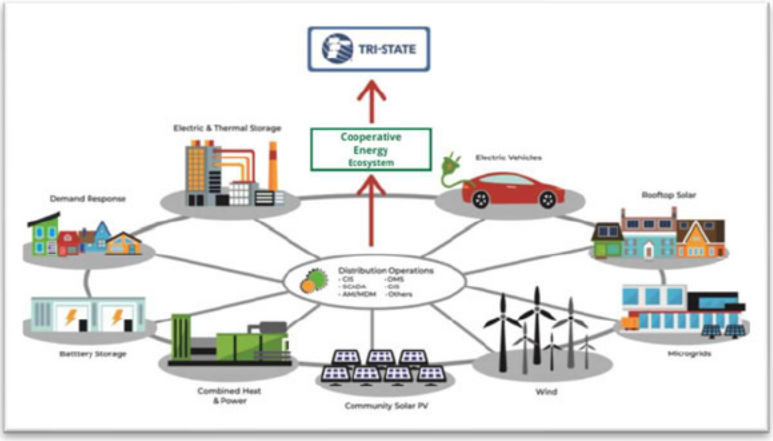


Tri-State's mission is to provide these areas and their rural ratepayers a **reliable, affordable, and responsible** supply of electricity. While "reliable" and "affordable" are relatively easy to define, **"responsible" energy** is produced by operating in compliance with all relevant federal, state, and local laws and regulations, prioritizing employee safety, leveraging **modern technologies such as Smart Grid, maximizing efficiencies**, and increasing the supply of emissions-free renewable energy from hydropower, wind, solar, and other resources. Tri-State implemented the **Responsible Energy Plan[2] (REP)** where **50%** of the electricity used by members will come from **clean energy by 2025**. Additionally, all emissions from Tri-State's **coal plants** in **Colorado and New Mexico will be eliminated by 2030** while providing transition support for employees affected by coal facility retirements and working with impacted communities to find meaningful economic development opportunities. Tri-State works with several local, state, and Federal entities to provide tangible and measurable results including

[1] https://www.tristate.coop/member-list
[2] https://tristate.coop/sites/default/files/PDF/Responsible-Energy-Plan/Tri-State%20Responsible%20Energy%20Plan%202022%20Highlights.pdf

local workforce opportunities and issues during the energy transition. Tri-State has already **made significant strides** in implementing REP in the areas of: **Coal Reduction** - retired its coal facilities in New Mexico; **Member Renewables** - instituted new member-driven policies to enable member flexibility and the development of local renewables, and supported the development of a microgrid to promote resilience through local generation; **Support of Electrification** - committed over $2 million in funding to extend the public EV charging network, member installation of 1,000 EV chargers, and electrification of home comfort systems for over 1,500 heat pumps since 2021; and **Regional Renewables** - pursuing a western regional transmission organization (RTO) to integrate more efficient and cost-effective renewables in the grid.

To rapidly accelerate the deployment of **Tri-State REP** and to achieve the **DOE GRIP FOA objectives**, Tri-State proposes a holistic project to implement the strategic plan and principles of the **Cooperative Energy Ecosystem (CEE) Program**. **CEE** is Tri-State's highest layer/visual of a smart grid, essentially the hub and spoke model as shown on the **figure below**. The concept is about ensuring cooperative members (consumers) and their values are enabled by the collaboration of 42 local distribution cooperatives, 4 states, and Tri-state G&T, to share their values within the **Ecosystem "family".** The core of CEE is the **software component** (OMS, SCADA etc.) located inside the Distribution Operation hub and act as ***process-enablers*** that engages and manages the integral components (Demand Response, Solar, Microgrid, etc.) and communicates back to Tri-State. Through **CEE, Tri-State will decrease consumer energy burden, increase green jobs, increase consumption of renewable energy, and improve the overall grid efficiency in conjunction with the participating rural electric distribution members of Tri-State**. Optimizing the CEE through scale and collaboration is how value is created, and how providers can set the equilibrium between supply and demand to deliver the greatest value. The CEE enables the energy ecosystem to become flexible and transactional to address the needs of rural Americans in a new renewable-energy based future. The CEE 1.) is replicable and scalable to all Tri-State's 42 distribution cooperative members serving four States, 2.) reduces risk for deployment of innovative technologies and renewable energy, 3.) supports state, local, tribal, regional resilience, and decarbonization, and 4.) catalyzes additional private sector investments. Thus, building on Tri-State's proactive ongoing efforts, **Tri-state proposes** to **deploy and implement** CEE's ***core process enablers in this project***:

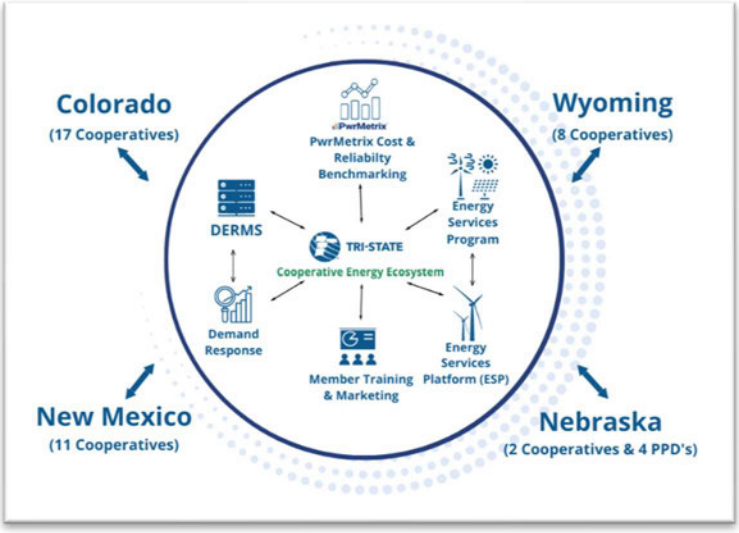


1. Energy Services Platform (ESP)
2. Distributed Energy Resource Management System (DERMS)

3. Energy Services Program
4. Demand Response Programs
5. Member Training & Marketing Program
6. Cost Outage Reliability Benchmarking, Visualization, and data analytics (PwrMetrix)

Technical details are discussed under *"Section 2: Technical Description, Innovation and Impact"* of this proposal. See **visual layout** of Tri-States CEE below.

PROJECT GOALS: This project has the following key goals and targeted improvements.



- **Establish a scalable Cooperative Energy Ecosystem** (CEE) for electric cooperatives to participate and remain economically and operationally healthy for the foreseeable future.
- **Increase the efficiency, capacity, flexibility, reliability, and resilience** of Tri-State's bulk power grid comprising **5,700 miles** of transmission lines **serving 4 states** (Colorado, Nebraska, New Mexico, and Wyoming) and **42** distribution members.
- **Increase regional support for resilience by integrating clean renewable energy resources** on both large and small scale in underserved and unserved communities.
- **Increase deployment of grid-edge connected devices** to support **decarbonization** through electrification of loads.
- **Lower energy burdens** to rural and **disadvantaged communities.**

Critical success factors in achieving Tri-state goals and contributing to the overall success of the CEE project are the four **cooperative principles.** [3] **Since 1952,** Tri-state and its 42 members have successfully practiced these principles and will be the **foundation of Tri-State's future success**, including this proposed project.

1.) ***Concern for community*** - Tri-State and 42 members work for the sustainable development of communities through policies supported by the membership.
2.) ***Cooperation among cooperatives*** - Tri-State, its 42 distribution members, and their industry partners located in 4 states with diverse geography, infrastructure, and skilled workforce must closely collaborate and work as a team.
3.) ***Autonomy and independence*** - 42 distribution members are autonomous, self-help organizations controlled by their members. They are free to enter into agreements with

[3] https://www.electric.coop/seven-cooperative-principles%E2%80%8B

other organizations allowing freedom to voluntarily join and select programs.

4.) ***Education, training and information*** - equally provided to elected representatives and employees to help effectively contribute to the development of the cooperatives and help enhance cooperative understanding.

DOE IMPACT: **Tri-State is limited in the financial tools** that are available to manage the energy transition without putting undue upward rate pressure on the **electric bills** of rural communities. **The service area of Tri-State has significant population of low- and moderate-income consumers**. While Tri-State will proceed even without funding, **DOE funds allow for a rapid expansion of programs, reduction of implementation costs, acceleration of deployment, larger scale implementation, and enabling achievement of the Presidential goals of clean energy transition**. Once programs are established, Tri-State can create enough return on investment to cover future funding needs in the program. Scale is necessary for these programs to be effective because of Tri-State's large and diverse footprint. Below is the list of DOE Funding Impact with **SMART goals**:

1. **Accelerate** and broaden deployment across all **four (4) states** increasing potential demand response and capacity management to **over 200 MW**. **Shortening the deployment from ten (10) years to five (5) years reduces project capital costs by 15-30%**, thus, reducing carbon intensity of the generation portfolio. These impacts lower energy burden to the end-use consumer.
2. **Reduce** the cost of deploying the program by **$32.5 M (includes grant portion and expected cost increases over time).** It is difficult to gain approval for additional rate impacts on members who are already burdened by energy costs. DOE support eliminates concerns of rate subsidies between states which increases support for deployment.
3. **Minimize** the need for fossil fuel-based generation to meet the peak capacity and defer or eliminate transmission upgrades and capital expenditures (CAPEX) **by $5.7 M per year (assuming $100M of deferred or eliminated CAPEX).** The Cooperative Energy Ecosystem enables strategically focused demand response to **create "non-wires solutions"** to optimize grid operations.
4. **Accelerate** integration and management of distributed energy resources and storage technologies by **100% in the project's first 5 years. Expand** demand response programs immediately to residential accounts, including thermostat control, rooftop solar, storage integration, and electric vehicle (EV) management **by 100% in the project's first 5 years.** Residential programs immediately impact disadvantaged communities positively by lowering poverty and energy burden.
5. **Generate immediate job impact** through rapid deployment for commercial and irrigation demand response beyond current levels. DOE support broadens and accelerates the building of an entire ecosystem **by 5 years**. **Accelerate from 10 to 5 years**, the sharing of best practices on program designs, and other strategies **with the 900+ US** cooperatives. Scale the adoption of flexible grid-edge technology and their associated use cases across the nation.

Community Benefit Plan - Job Quality & Equity: Below is the summary from Tri-State's comprehensive Community Benefit Plan **for the Cooperative Energy Ecosystem (CEE**) with

SMART goals. Read the separate community benefits document, ***"Cbenefits.PDF",*** submitted as part of the proposal package for complete information. The following details **meet the tech-review CRITERION 4 –** *Community Benefits Plan.*

1. Tri-State's project is expected to **bring numerous benefits to both the local community and DACs**. These benefits include reducing the duration, frequency, and impact of power disruptions, increasing access to clean power, supporting minority business enterprises, and **saving 114 GWH of energy per year** from 2025 through 2040. Additionally, the project is expected to **add $24.3M annually in benefits to local economies** through increases in home weatherization, energy audits, mechanical system upgrades, commercial and industrial efficiency improvements, increased community solar, and installed EV charging. The impact to the Beneficial Electrification and Efficiency (BE&E) program is also expected to increase by **$5 million per year** over the next 5 years. Tri-state's 200MW new solar project at the Escalante Station site is estimated to deliver **$200M in economic benefits**, including **adding 350 trades** and **20-30 supervisor construction jobs**, as well as 4-6 permanent operations and maintenance jobs. Finally, the project aims to decrease generation emissions per MWh from **70 tons to 32 tons/MWh by 2040**.
2. Tri-State's plan to attract, train, and retain a skilled labor force with strong labor standards, ensure workers' free and fair chance to **join a union that** includes the following: active labor agreement negotiated with **IBEW Local 111**. Tri-State and its Union participate with equal representation on a **Labor Management Committee**; Colorado Office of Just Transition (OJT) **works with** Tri-State **to develop transition initiatives** and equity options for affected area employees. These include training, tuition reimbursement, job placement, and compensation opportunities to deal with gaps in employment. Tri-State and New Mexico Legislature created an **economic development district** to support transition initiatives in regions most impacted by coal power plant's retirement, and **Tri-State contributed $5 million** to the new district to produce more job opportunities for the region. Tri-State hired a facilitator to guide discussions to explore **community assistance opportunities** for the City of Craig and Moffatt County in northwest Colorado in preparation for the retirement of Craig Station's three coal-fired units between 2025 and 2029; Tri-State developed a **DEI training badge,** which challenges employees to take multiple DEI courses to earn a badge and have integrated DEI training into our leadership development programs. Tri-State posts job openings on Minority Job Boards, veterans' organizations, local community, and trade institutions. Moreover, Tri-State is the **main employer in disadvantaged communities** in service areas with **10,000 inhabitants or less**. At Tri-State, employees receive tuition reimbursement for trades training, certifications, and college credits. Tri-State offers a wide variety of educational materials **and training for electric distribution members' staff as well**.
3. The potential partners that will support these objectives are the following: Colorado Workforce Development Council's (CWDC) board; Colorado Office of Just Transition (OJT); New Mexico Legislature; and Colorado State Energy office. Colorado Public Utilities Commission (CoPUC) and Tri-State agree on goals related to increasing energy efficiency program results incrementally up to 1% of total Colorado kWh sales by 2030. Colorado Clean Energy Fund (CCEF); Colorado's statewide, nonprofit "Green Bank"; 42 distribution electric utilities; Intermountain West Energy Sustainability & Transitions (I-WEST); Governor of

Colorado; IBEW Local 111; and more than 15 local, state, and community leaders across 4 states to collaborate on energy transition issues and opportunities.

4. Tri-State's strategy for sharing and maximizing the project's benefits across disadvantaged communities and how resident and community leadership will be engaged throughout the project's duration include the following: Cooperative Energy Ecosystem (CEE) provides a streamlined program that centralizes the energy opportunities to easily provide consumption of consumer and **member energy programs locally**; CEE programs will help consumers **save money and energy** while cutting emissions through energy efficiency (EE), beneficial electrification (BE), and **low-income funding initiatives**; Tri-State envisions being the aggregator of the CEE for demand response, energy efficiency, beneficial electrification, low-cost funding, and integration of cost-effective distributed energy resources; Tri-State will **offer a partial rebate to residential members interested in in-home storage** to increase the **"energy democracy" and community ownership in disadvantaged communities;** and Tri-State forecasts an additional deployment of **3,000-4,000 residential storage systems of 15-20kWh capacity, 20,000 Smart thermostats, and 20MW of water heater load control.** Additionally, Tri-States' **Rural Energy Savings Program (RESP)** provides relending programs to implement energy efficiency, electrification, and demand response measures to qualified consumers within four-states. This will also provide high-quality customizable marketing and educational materials to 42 distribution members to increase consumer awareness about new energy programs. Tri-State's energy innovation team will **work with 24 state and local stakeholders to establish incremental annual energy efficiency savings** targets for our Colorado member load of at least **0.35% in 2023, 0.5% by 2024, 0.75% by 2025, and 1% by 2030**.
5. Tri-State's CEE project **has no** potential long-term constraints on the community's access to natural resources and tribal cultural resources.
6. The Tri-State climate resilience strategy that accounts for climate impacts and extreme weather patterns includes the following: provide **affordable clean energy** to deal with climate events by working with members to manage distributed energy, leverage **grid-edge** connected devices to further support decarbonization through electrification by the 4 different state energy offices and increase their grid efficiency goals. CCE system will be used for addressing **system-wide transmission congestion and peak demand** while empowering local distribution system operators to manage distributed energy resources in their communities. CEE will also efficiently lead and manage all member demand response and electrification programs. It will **provide a portal** where consumers can manage their resources and offer disaggregation of Advanced Metering Infrastructure (AMI) data to identify program effectiveness. Tri-State plans to overlay PwrMetrix AI analytical predictive maps and **identify "at risk" areas** that may be greatly affected by climate disasters. These programs can be "pushed" to consumers to address **energy reliability concerns and energy burden issues.** Tri-State plans to decrease the **socio-economic losses from unpredictable or increasingly harsh weather events** by **adding 1,000 MW of utility-scale wind and solar** projects and allocating over **200MW of capacity for distribution-level renewables** across multiple distribution members in 4 states.

2. TECHNICAL DESCRIPTION, INNOVATION & IMPACT

Relevance and Outcome: Tri-State project is relevant to the following overall **DOE GRIP FOA strategic goals**. These meet **tech-review CRITERION 1** - supporting Topic 2 "objectives and desired outcomes."

1. **Transform**: As the major generation and transmission utility for the Southwest Power Pool ISO, Tri-State plans to **regionally transform the active management of distributed energy with** the 42 distribution members, serving 4 states. By deploying CEE, Tri-State aims to increase regional support for resilience with clean energy on a large scale and small-scale in communities and increase grid-edge connected devices to further support decarbonization through electrification.
2. **Catalyze**: Over the past 10 years, Tri-State and its 42 distribution members have been independently pursuing programs to **manage peak demand and renewable energy**. Tri-State CEE program objective is to provide a multi-tenanted Energy Services Platform (ESP) where each of these utilities can efficiently build and expand collaborative programs to help meet their system congestion and clean energy objectives. The proposed DERMS platform catalyzes further expansion for many years by 42 utilities across the 4-state region. PwrMetrix AI Outage Cost Reliability Benchmarking, Visualization, and Data Analytics will monitor and benchmark the **reliability impact** of DERMS and DR as a measurement and as a program benefits prediction tool of the CEE.
3. **Advance**: As a collection of 42 distribution members and each serving small **communities** across the Rocky Mountain West, the flexibility of the CEE platform allows each entity to **serve the unique needs of the community in each area**. CEE allows the member co-ops to serve the **unique needs of the 230+ disadvantaged communities with almost 300,000 people**.

In addition, the Tri-state project is relevant to the specific objectives of **Topic Area 2: Smart Grid Grants *(40107)*** shown below. These meet **tech-review CRITERION 1** - supporting Topic 2 *"objectives and desire outcomes and address priority investments."*

- **Increase Transmission Capacity**: key objective of the CEE DERMS is to manage the capacity of roughly 5,700 miles of transmission that Tri-State owns or operates. By leveraging distribution connected generation and grid-edge load, Tri-State plans to increase transmission capacity using non-wires alternatives such as demand response in times of high demand on the system, extending the effectiveness of these renewable resources. Over the 5 years, Tri-State anticipates **integrating over 200MW of controllable load with the DERMS** platform and associated programs.
- **Integrate Variable Renewable Energy**: Tri-State is currently bringing online **1,000 MW of utility scale wind and solar projects** and has allocated over **200MW of capacity for distribution level** renewables across multiple cooperative members. DERMS and ESP platforms are integral in managing these diverse resources **over Tri-State's 200,000 square mile** territory.
- **Aggregate and integrate Grid-Edge devices or electrified loads**: The foundational benefit of the DERMS and ESP is to facilitate aggregation and integration of grid-edge devices, including a broad mix of behind-the-meter storage, solar, wind, electric vehicles, heat pumps,

thermostats and traditional load management of water heaters, air conditioners, and other devices.

Tri-State plans to **achieve these goals and objectives by deploying and implementing** the following solutions: These meet **tech-review CRITERION 1 –** *"deploys technology solutions that increase the flexibility, efficiency, reliability and resilience of the electric power."*

1. Energy Services Platform (ESP)
2. Distributed Energy Resource Management System (DERMS)
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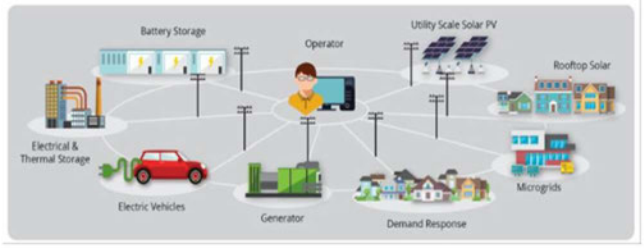
5. Member Training & Marketing Program
6. Outage Cost Reliability Benchmarking, Visualization, and Data Analytics (PwrMetrix AI)

The following details meet **tech-review CRITERION 1** – *"project deploys technology solutions that increase the flexibility, efficiency, reliability and resilience of the electric power system."*

1. **Energy Solutions Platform (ESP)** – CEE has two key software components, the Energy Services Platform (ESP) and the Distributed Energy Resources Management System software (DERMS). These serve two different functions but interact with each other to provide a **holistic integrated solution that results in the rapid adoption of energy efficiency and electrification technologies**. These technologies are the **crucial grid-edge components** that will drive the pathway to a smarter and more flexible grid. ESP will be the **centralized consumer engagement portal**. One **barrier** to consumer participation in utility programs is **lack of awareness**. By implementing a portal that creates an experience along the lines of Google and Netflix, the consumer expectation of *how* they are engaged is met, all within their cooperative ecosystem. ESP will be the **consumer-facing interface** for efficiency or electrification incentive applications, demand response program enrollment, on-bill repayment participation, and trusted local contractors participating in the utility's trade-ally program. These programs are designed to reduce or eliminate the **remaining barriers to participation for consumers**. This aspect is crucial to the success of the demand response components of the smart grid. Consumers are ready and willing to utilize their investments, such as electric vehicles, battery energy storage systems, and solar to benefit the overall grid. But, doing so requires the correct set of economic signals and program design from their utility. Another function of the ESP is to **streamline operational processes involved on the utility side of the programs**. ESP will **enable workflow management** of all incentive applications, on-bill repayment programs, and enrollment and project assignment of contractors participating in the trade-ally management program. It will also act as the **interface between the programs and the required reimbursement cycles** that are required for incentives and demand response

payments. Multi-tenancy allows Tri-State to **manage processes on behalf of all 42 distribution cooperative members in 4 states**, while ensuring cyber-security and data protection by limiting consumer and distribution access to what is specific to their distribution system. Additionally, it increases the flexibility of Tri-State's program by allowing adaptations to be made, meeting distribution level needs instead of implementing a "one-size fits all" program. This is a **critical requirement** for Tri-State and their members. It maintains the **trusted energy advisor relationship** between the distribution member and their consumer, while allowing Tri-State to lower overall costs with **centralized program management**.

2. **Distributed Energy Resource Management System (DERMS)** – this is the 2nd critical interface of the CEE. DERMS platform will aggregate and control DERS in 4 States and 42 member systems, coordinate power supply operation information necessary for grid control, automate and enable algorithms that will optimize the grid according to specified metrics, enhance system resiliency and reliability, shift loads away from high price periods, and supply ancillary another grid services to bulk power.[4] The multi-tenanted approach to DERMS will allow Tri-State to visualize the impact of DERs across the overall system, while ensuring the distribution members have granular insight into their registered assets. The initial need for DERMs at Tri-State is to manage demand response assets and the measurement and validation aspects that enhance the economic value of associated programs. Moreover, the enhanced flexible nature of DERMS encourages the future growth of other smart grid components, such as microgrids, renewable integration, and energy storage. DERMS includes the following capabilities and technology:



Source: OATI, Inc.

Standards Based Integration Flexibility:	The system specifications identify the necessity of supporting standards-based interfaces such as OpenADR, SEP 2.0, MultiSpeak, DNP, and others to streamline integration initially and in the future for a wide variety of systems, including AMI, In-home energy control systems, battery storage, electric vehicle, agricultural control systems, and load control.
Cybersecurity:	To address threats and vulnerabilities, Tri-State has established a comprehensive cybersecurity program that integrates people, process, and technology. The cybersecurity program includes:
a.	**Dedicated cybersecurity personnel** - Tri-State has a cybersecurity department of dedicated professionals who are responsible for monitoring and responding to potential cybersecurity threats. This team has the expertise to implement robust security measures to safeguard our critical assets and systems.
b.	**Well-defined policies and procedures** - Tri-State has established a set of well-defined cybersecurity policies and procedures that cover all aspects of our operations, including access controls, incident response, patch management, training, and awareness. Policies and procedures are designed to ensure that Tri-State is following industry best practices and complying with applicable regulations and standards.

[4] https://www.oati.com/Solution/Smart-Energy/distributed-energy-resource-management

c.	**Advanced cybersecurity technologies** - Tri-State invested in advanced cybersecurity technologies, including but not limited to Next-generation Firewalls, Intrusion Detection and Prevention Systems (IDPS), Endpoint Protection Platform (EPP) / Endpoint Detection and Response (EDR), Vulnerability Scanning Tools, Security Information and Event Management (SIEM), and Security Automation Orchestration Response (SOAR) systems. Tri-State technologies are designed to detect and prevent potential cybersecurity threats in real-time and enable responding to incidents in a timely and effective manner.
d.	**Compliance with cybersecurity frameworks** - Tri-State is committed to complying with applicable regulations, standards, and best practices for cybersecurity. This includes adhering to the North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) standards and implementing the Center for Internet Security (CIS) controls.
Measurement and Verification:	Specified to **provide real-time performance verification** to allow **operators** feedback on **system impact within 5 minutes** and to manage energy for real-time transmission needs as well as critical loads such as C&I (Commercial & Industrial) customers.
Expandable and Flexible Multi-Tenant Approach:	Multi-tenant system allows Tri- State and its 42 members the flexibility to collaborate on control. Tri-State will **utilize its staff to focus on regional resource planning and transmission congestion.** Tri-State will perform **forecasting** that includes hour-ahead, day-ahead, week-ahead, and annual resource planning. Tri-State's **24x7** transmission operators and resource planners will be able to call for the management of various renewable resources as well as the control of loads. Each of the Tri-State **member cooperatives will have portals into the DERMS**, allowing visibility and control of their service area as well as the broad system.
Consumer Connection:	By giving the distribution system cooperatives insight into and control of the system in their area, the distribution systems are able to manage the relationship with their consumers and how those resources are leveraged.
Distribution System Operation:	This multi-tenant approach empowers the distribution system operator to adjust for local issues and provide the most reliable collection of resources made available to the grid.
System Wide Transmission Capacity Management:	Finally, with an overall perspective on regional grid stability, the multi-tenant approach allows Tri-State to combine resources from across its 42 members to meet the broader objectives of the transmission grid.

3. **Energy Services Programs** - Alongside existing efficiency and electrification measures, Tri-State will develop, integrate, and implement on-bill repayment, trade-ally, and additional efficiency and electrification incentive programs including rebates, subscription, and rate signal type programs. Tri-State expects to achieve **efficiency results of 1% of energy sales (kwh) by 2030**. Without DOE funding, many of these implementations will fail to meet cost-effectiveness goals[5], resulting in a lower achievable potential for savings.

4. **Demand Response Programs** - Develop an effective suite of programs tailored to meet the needs of the Tri-State CEE system and the individual needs of the 42 distribution members. Design and implementation of base-level programs including irrigation, residential and commercial offerings, and emerging technology such as residential battery energy storage and electric vehicles. This includes communications devices (where necessary), load control switches, moisture sensors, and other necessary equipment._Tri-State expects to **achieve demand**

[5] *Cost effectiveness is defined as the Total Resource Cost Test >1*

response enrollment levels at 4% of peak load within 5 years with DOE funding. Without DOE funding, it is likely that program availability will be limited to distribution members that have already begun implementation of necessary equipment and systems upgrades.

5. **PILOT program for Distribution Member Systems: ESP & DERMS software and Energy Services** - Tri-State has a regulatory requirement to have **4% of Colorado peak load**, or approximately **85MW**, under **demand response control by 2025**. Tri-State has identified multiple assets that can help achieve this objective including **irrigation management** – potentially control over **5,000 irrigation pivots** for a load of **200MW** with moisture content meters and enhanced load control switches; **20,000 smart thermostats**; and **20 MW of water heater load.**

6. **Member Training & Marketing Program -** Develop training and marketing material for software and programs proposed in this project made available through Tri-State for all 42 distribution members in 4 states.

7. **Outage Cost Reliability Benchmarking, Visualization, and Data Analytics (PwrMetrix AI):** PwrMetrix AI will be used for monitoring and benchmarking the **reliability impact** of DERMS and DR as a measurement and as a program benefits prediction tool of the CEE. The plan is to deploy PwrMetrix to forecast the impact of proposed programs (pre-project implementation) on community benefits, such as outage **reliability and resiliency improvements, to Tri-State's 42 members** and use it as post-project implementation on **actual impact/benefits assessment.** PwrMetrix will transcend all the previous components and form a **standard, referenceable, credible, and repeatable analysis platform to quantify benefits of the proposed project components**. Tri-State plans to overlay analytical predictive maps, outage cost reliability benchmarking, and Justice40 metrics yearly tracking with PwrMetrix AI software and **identify "at risk**" areas that may be affected **by climate disasters**. Reports can be "pushed" to 42 distribution members to address energy reliability concerns, energy burden issues, and decrease socio-economic losses from **weather events**. Tri-State can visualize and assess the holistic reliability, cost, and challenges/needs of the 42 distribution members from 4 states as a whole, while allowing each member to visualize their own feeders and substation's reliability and Justice40 metrics. **A yearly report to DOE** on the reliability, cost, and weather events overlayed on top of Justice40 maps will be provided as **part of the SMART metrics yearly deliverables**. This meets the requirement of TOPIC 2 in improving the visibility of the electrical system to grid operators through data analytics, **SMART metrics,** and software.

Feasibility (following details **meet tech review CRITERION 1** – "*sufficient technical detail to demonstrate that the proposed project is technically feasible and would likely result in the described smart grid benefits.")***:** Given the investment that Tri-State and its member cooperatives have made in piloting individual load management programs, the project team has **competent skills needed for a highly successful** and efficient project. Tri-State has begun the initial scoping of the Energy Services Platform, the DERMs platform, and program design for demand response. Program development will be happening simultaneous to DERMS procurement, with enrollment in programs starting upon implementation. This allows for the time to enroll the targeted capacity amount, **estimated to be 85 MWs by 2025.** Given Tri-State's 42 members' established programs and desire to coordinate with Tri-State to optimize system operational costs, the project is **foundationally viable, feasible and in a position of prime readiness** to meet the aggressive implementation timing. Tri-State has the IT resources to host the DERMS, PwrMetrix

AI Analytics, and Energy Services Platform. Additionally, Tri-State has the communication network with member systems to support communications of the DERMS with member AMI systems. Tri-State also **has facilities** in place to manage the purchase and deployment of load management equipment**.** As an energy and transmission provider, Tri-State has the **facilities in place to meet all regulatory requirements for resiliency, security, cybersecurity, and infrastructure protection**. Tri-State's 42 distribution members hold strong retail relationships with consumers to enable effective participation and communication of value of proposed programs. Tri-State has **1,100 employees** dedicated to the efficient delivery of power **with 70 years of experience** in providing generation, transmission, and energy market participation.

Innovation & Impacts (following details **meet tech review CRITERION 1** – *"potential impact of the project to catalyze additional private sector investments and/or non-federal public or regulated capital."*): This project has **impact broadly beyond its immediate objectives**. It is key to Tri-State to effectively **transition from coal generation for a major portion of the Southwest Power Pool ISO**. While Tri-State's goal is to effectively make this transition for members, Tri-State is in a unique position to **create a premier model** for **3000+ electric** utilities **across the country** on how to successfully implement clean energy transition. The unique innovative approach in this project is capturing the **CEE value of the consumer and cooperative relationships**, which remain one of the strongest in the country. Tri-State holds the role of being a **regional** aggregator for their distribution members. With much of the territory serving **disadvantaged communities**, this project creates a **scalable model for managing DER that serves and positively impact the unique needs of the 230+ disadvantaged communities**. Beyond the development of effective DERMS programs, Tri-State is **prototyping advancements and innovations to load management** that will significantly improve the effectiveness of these projects. For example, while a large controllable load, irrigation is heavily dependent on load forecasting parameters beyond traditional day, time, temperature, and wind. By integrating moisture content metering, Tri-State will be able to greatly improve the ability to forecast whether irrigation is needed. This will greatly improve the ability of many utilities to control potentially large interruptible irrigation load. **Another impactful innovation** is Tri-State's plan to implement **PwrMetrix AI** to monitor and benchmark the **reliability impact** of DERMS and DR as a measurement and as a program benefits prediction tool of the CEE on all 42 member systems. Current standard practice isolates the distribution outage reliability of distribution co-ops from the G&T. With Tri-State's innovative approach, PwrMetrix AI allows Tri-State and member co-ops to quantify and track the SMART metrics individually as a distribution co-op, as a co-op group by specific state, and as a group of 42 systems under Tri-State. This project has the potential for rapid scalability to **100+ G&Ts** (Generation & Transmission) and **900+** distribution cooperatives across the country.

The following details **meet the tech-review CRITERION 1** – *"How the project supports **State, local, Tribal, regional and national** resilience, decarbonization, or other energy goals, strategies and plans?"* Tri-State's goal is to be preemptive in deploying a system across its 4-state region to manage transmission capacity proactively. Tri-State looks to manage its transmission system capacity efficiently, not just for regional stability, but also for the **benefit of all communities**. Rural communities in Tri-State's service territory tend to be **primarily low-income and especially susceptible to societal challenges like poverty, substance abuse, and unemployment**. With

small tax bases, many of these communities struggle to provide basic services and are hampered in their economic development efforts by their distance from major commerce centers and transportation corridors, lack of sufficient workforce and housing, limited broadband capacity, and other challenges. Many Tri-State communities are **also physically isolated** by mountain ranges, rivers, deserts, canyons, and the other natural wonders that make the west special and spectacular but at the same time difficult to traverse and to serve electric power. Cooperatives exist because the economics of providing electricity to these areas **do not suit for-profit utilities**, and while the not-for-profit co-op model has generally served rural America **well for over 80 years**, there is still an **inherent struggle to keep the costs of rural electric service manageable** for those at the end of the line who can least afford increases in the prices of their daily commodities. Tri-State REP and CEE energy transition goal is to have equitable energy accessible by all consumers in **4 States and 42 member co-ops territories**, regardless of economic background, ensuring benefit for all.

The CEE DERMS platform, PwrMetrix AI analytics, and the associated demand response and distributed energy resources will improve the overall cost-effectiveness of energy generation and transmission systems, developing microgrids, and increasing energy efficiency. Tri-State is committed to increasing energy efficiency and demand response to rural and remote areas. This strategy is focused on **electrification, carbon reduction, and lowering energy burdens** of the disadvantaged community residents. **These energy efficiency goals align well with the goals of DOE GRIP FOA and the 4 states served**. For example, Tri-State has worked with the **Colorado Public Utilities Commission (CoPUC)** to agree on goals related to **DSM**. Specifically, Tri-State has committed to increasing energy efficiency programs that results incrementally **up to 1% of total Colorado kWh sales by 2030**, and a demand response program that is able to control **4% of Tri-State's peak demand in Colorado**. These goals will be pursued in the other states as well as part of an overarching strategy. Microgrids and distributed generation provide an opportunity to **drive local economic development while adding resiliency** to local distribution grids. Local generation promotes community solar, **low-to-moderate income participation**, and economic development. Renewable energy coupled with storage options reduces bulk electric system investments in transmission and generation, **lowering energy costs to those most in need**.

The following details **meet the tech-review CRITERION 1** – *"Potential impact of the project to **reduce perceived risk** for project deployment; achieve further deployment **at-scale** to; and lead to additional **private sector investments."***

POTENTIAL RISKS AND CHALLENGES OF SOLUTION – CEE DERMS project presents limited risks, due to the proven **cooperative model** that has driven a desire for our distribution members to coordinate energy optimization efforts with their wholesale power provider, Tri-State. The primary challenge will be **ensuring effective levels of enrollment** in demand response offerings, particularly in areas where demand response will reduce operational costs through peak reduction, reduced energy market purchases or sale of capacity into the market, or alleviation of transmission congestion. Sending a strong economic signal for participation to both distribution members and consumers poses a minor challenge. A risk also resides in **ensuring that vendors providing both the hardware and the software** are able to meet the challenges of working with

a diverse G&T, with a service area of over **200,000 square miles**. Finally, **labor-work force** remains a challenge, especially surrounding **emerging electrification technology**, such as cold-climate heat pumps. **Establishing well-trained and certified contractors** in rural areas with limited consumer-markets has been historically challenging. These technologies are the end-use consumer enabler to participating in the CEE.

MITIGATION STRATEGIES, SCALABILITY & ADDITIONAL PRIVATE SECTOR INVESTMENTS - To address the risk of effective enrollment levels, the development and pricing will be intentionally designed to capture multiple value streams within the CEE. Tri-State will use an external consultant with **experience in assessing and structuring these programs** for other G&T's and cooperatives across the country**.** To mitigate the risk of ineffective participation, a detailed look will be taken at the economics underlying each program offering. Factors such as equipment market-size and avoided demand potential are combined with accepted modeling practices for avoided capacity costs, historical market penetration rates, and industry standard expense costs to understand the long-term impacts of the program. Each program **must surpass the standardized total resource cost test hurdle**, which results in a **positive return** on the investments. Through this test, a **strong program pricing level can be developed** to **encourage participation.** To address the work force issue surrounding contractors and the end-use installation of emerging grid-edge technologies, Tri-State will be working with utilities across the region to structure engagement programs that are **unified and easy to understand for contractors.** Tri-State will also partner with local education, such as community colleges or trade-schools, to create a pipeline of well-trained technicians. Accordingly, the **DOE GRIP funds can significantly** reduce the upfront investment costs necessary, creating the ability for Tri-State to **rapidly deploy programs** such as demand response or the integration of microgrids. This will allow Tri-State to share these practices, program designs, and other strategies with other cooperatives outside of the Tri-State system, **increasing adoption of flexible grid-edge technology** across the nation. To address the ability of vendors to meet the diverse needs surrounding software and hardware, Tri-State will **develop detailed RFPs** that outline the requirements necessary to meet the distribution member's needs. Tri-State will **work closely with 42 distribution members** to prioritize members needs and ensure success. By using DOE funds to implement and deploy the CEE components, solutions for entities similarly structured to Tri-State, such as **the 100+ G&Ts** in the country, will be mature and accessible. This will create a **scalable and repeatable solution** for others to make similar investments. Tri-State will leverage the cooperative principle of "Cooperation amongst cooperatives" and share the best practices and strategies learned on this project with 100+ G&T's and **900+ distribution cooperatives in the nation by disseminating the use cases through online articles, presenting in DOE sponsored events, statewide newsletters, and NRECA RE magazine.** As more and more of the 900+ co-ops adapt the CCE project strategy, **additional private sector investments will occur.**

How the project will have a **significant effect** in encouraging and facilitating the development of **smart grid functions** identified as priority focus areas in 1.B.Topic Area 2? At the core of the project resides the concepts of how to engage consumers and encourage participation. These concepts are engagement, technology education, capital investment enablement, and empowerment of the value of the grid-edge technology. The Energy Services Platform ESP and

associated consumer programs are the key to accomplishing this. ESP is the portal to consumer engagement. By assessing metering data from under-utilized smart metering technology, utilities can create targeted marketing to first engage a consumer. For example, artificial intelligence (AI) algorithms can extract if someone is likely using a gas or propane water heater. Targeted marketing items can be sent to that consumer, inviting them to visit the ESP which is embedded in their online utility interface, to learn more about the technology and programs surrounding efficient electric water heating. Once there, a consumer can make the purchase decision, identify a certified installer in their area through the trade-ally program, and even lower capital investment costs through incentives and low-interest on-bill repayment programs. Once the equipment is installed, a consumer can reduce payback times by receiving incentives through on-going demand response programs. These programs are an essential asset for smart grid functions. Even more broadly, the centralized DERMs platform allows for better resource management for DERs such as microgrids, solar or battery installations, and demand response. By coordinating assets across the broader service territory for Tri-State, investment in and development of smart grid functions can be accelerated.

How would the project **enhance the system flexibility** to meet TOPIC 2 program objectives?
DERMS and demand response program components of this project are crucial to the deployment of a smart grid. DERMs is specifically designed to aggregate and control distributed energy resources and act as a utility level interface into these aggregations. It allows utilities to simplify the processes by streamlining data, automate dispatching in accordance with various forecasting metrics, and coordinate assets to ensure effective utilization of the assets. Essentially, DERMS and DR programs allows for a flexible decarbonized virtual resource, dispatchable at times of need.

4. **WORKPLAN** - the following shows how the project meets the **tech-review CRITERION 2** *"Project Plan and Project Feasibility."*

Project Objectives – The key goals and objectives of this project are shown below.

- Establish a scalable Cooperative Energy Ecosystem (CEE) for electric cooperatives to participate and remain economically and operationally healthy for the foreseeable future.
- Increase the efficiency, capacity, flexibility, reliability, and resilience of Tri-State's bulk power grid comprising 5,700 miles of transmission lines serving 4 states and 42 distribution member systems.
- Increase regional support for resilience by integrating clean renewable energy resources on both large and small scale in underserved and unserved communities.
- Increase deployment of grid-edge connected devices to support decarbonization through electrification of loads.
- Lower energy burdens to rural and disadvantaged communities.

Expected outcome of the project is the successful deployment and implementation of the holistic and scalable **Cooperative Energy Ecosystem CEE** platform consisting of the following **components**: Energy Services Platform (ESP), Distributed Energy Resource Management System (DERMS), Energy Services Program, Demand Response Programs, Member Training & Marketing

Program, and Outage Cost Reliability Benchmarking, Visualization, and Data Analytics (PwrMetrix AI).

- **Technical Scope Summary** – Below is Tri-State's overall work scope and approach to achieve the project objectives divided by yearly performance period and separated by annual go/no-go point decision, specific results/deliverables and **milestones detailed in the Community Benefits Plan**

M=Milestones, D=Deliverables, G=Go/No-Gos	**YEAR 1 - Description**	**DUE**
M1.1	RFP developed and issued to the vendor(s) to provide equipment for identified base-level demand response programs (**Q1**). Community outreach, cybersecurity, permission from members, reached out to State organizations for guidance/feedback (**Q2**). Initial program forecasting, implementation recommendations, and program designs completed. RFP for Energy Services Platform (ESP) completed, and vendor selected (**Q3**).	Q1-Q3
M1.2	Scheduled deployment of PwrMetrix multi-tenant benchmarking platform to recipient & distribution members to track required-DOE-SMART reliability and Justice 40 Metrics as part of grant reporting. Completed Community Benefits Plan list of Milestones (see community benefits plan)	Q1-Q4
M1.3	Project Management and Implementation Plan approved (Q1). Distributed Energy Resource Management (DERMS) Platform RFP completed, vendor selected, and software implementation initiated. On-Bill financing program 100% established and 2-4 pilot cooperatives enrolled (Q2-Q4).	Q1-Q4
D1.1	Initial program forecasting, implementation recommendations, and program designs completed. DERMS, ESP and PwrMetrix reports.	Q3
D1.2	Q1, Q2, Q3 and Q4 Summary Progress Report	Q1-Q4
D1.3	PwrMetrix Benchmarking Reports, Data Analytics and Justice 40 Overlay Visualization Map.	Q4
G1.1	Energy Services Platform - Vendor selected and fully contracted, implementation scheduled.	
G1.2	DERMS software - Vendor selected and fully contracted. Recipient level implementation 80-100% completed.	
G1.3	PwrMetrix installed/trained at recipient and 10 of 42 distribution members	
	YEAR 1 TOTAL BUDGET	**$2,373,822**
Milestones	**YEAR 2 - Description**	**DUE**
M2.1	DERMS software - pilot cooperatives selected and 80-100% implemented. Recipient implementation 100% completed. Demand response equipment provider RFP - vendor(s) selected and initial device needs procured (on order). Contractor relationship established for device install (irrigation, smart thermostat/AC, and water heater DR).	Q1
M2.2	ESP implementation 100% completed, member distribution system software training developed (**Q2**). Member program offering training and turnkey marketing materials fully developed to enable local support of programs and devices (**Q3**).	Q2-Q3
M2.3	Scheduled deployment of PwrMetrix multi-tenant benchmarking platform to distribution members. Completed Community Benefits Plan List of Milestones (see community benefits plan).	Q1-Q4

M2.4	Pilot DR programs including irrigation, smart thermostat, and water heater demand response programs established and consumer-member enrollment initiated. 50-75% of targeted base levels of enrollment equivalent to 4% of recipient's peak Colorado load (demand) enrolled. DERMS implementation completed for all participating cooperatives. Incentive and trade-ally programs 80-100% designed and implemented. Energy efficiency incentive programs achieving minimum energy reduction within the state of Colorado equivalent to 0.5% of Colorado energy sales. Trade-ally program training and enrolling at least 1 contractor at 50-75% of distribution members.	Q4
D2.1	Report: Status update of installed DR programs. PwrMetrix Benchmarking Reports, Data Analytics, and Visualization Map.	Q4
D2.2	Member Training Program and Marketing	Q4
D2.3	Q1, Q2, Q3 and Q4 Summary Progress Report	Q1-Q4
G2.1	Measurable progress identified in milestones have been sufficiently accomplished. PwrMetrix installed/trained to 25 of 42 distribution members	
G2.2	Software (DERMS and ESP) implementation 100% completed for all participating distribution members	
G2.2	Evaluation of necessary AMI upgrades, cellular communications, load switches and other necessary devices completed. All necessary equipment procured.	
	YEAR 2 TOTAL BUDGET	**$ 9,354,902**
Milestones	**YEAR 3- Description**	**DUE**
M3.1	Year 2 efficiency and electrification performance evaluated for cost-effectiveness (Total Resource Cost Test >1); adjustments made as necessary (**Q1**). Year 2 demand response program performance evaluated for cost-effectiveness (Total Resource Cost Test >1); adjustments made as necessary (**Q2**). Programs around emerging technology evaluated, developed, and implemented if economically feasible (**Q3**). Incentive and trade-ally programs fully implemented. Efficiency related incentive programs achieving minimum energy reduction within the state of Colorado equivalent to 0.75% of Colorado energy sales (**Q4**).	Q1-Q4
M3.2	Scheduled deployment PwrMetrix multi-tenant benchmarking platform in distribution members. Completed Community Benefits Plan List of Milestones (see community benefits plan).	Q1-Q4
D3.1	Year 2 program performance evaluation report	Q4
D3.2	Q1, Q2, Q3 and Q4 Summary Progress Report	Q1-Q4
D3.3	Report: Status update of installed DR. PwrMetrix Benchmarking Reports, Data Analytics and Visualization Map.	Q4
G3.1	Measurable progress identified in milestones have been sufficiently accomplished. PwrMetrix installed/trained to 35 of 42 distribution members.	
	Energy efficiency programs achieving minimum energy reduction within the state of Colorado equivalent to 0.75%.	
G3.2	Minimum 4% of peak load (demand) w/in Colorado enrolled in cumulative DR programs.	
	YEAR 3 TOTAL BUDGET	**$ 15,759,261**
Milestones	**YEAR 4- Description**	**DUE**

M4.1	Year 3 efficiency and electrification performance evaluated for cost-effectiveness (Total Resource Cost Test >1); adjustments made as necessary (**Q1**). Year 3 demand response program performance evaluated for cost-effectiveness (Total Resource Cost Test >1); adjustments made as necessary (**Q2**). Demand response program offerings continuing participation and enrollment growth of at least 1% (**Q3**). Energy efficiency programs achieving minimum energy reduction within the state of Colorado equivalent to 0.75% to 1% of Colorado energy sales. (**Q4**)	Q1-Q4
M4.2	Scheduled deployment PwrMetrix multi-tenant benchmarking platform in distribution members. Completed Community Benefits Plan List of Milestones (see community benefits plan).	Q1-Q4
D4.1	Year 3 program performance evaluation report	Q1
D4.2	Report: Status update of installed DR. PwrMetrix Benchmarking Reports, Data Analytics, and Visualization Map.	Q3
D4.3	Q1, Q2, Q3 and Q4 Summary Progress Report	Q1-Q4
G4.1	Measurable progress identified in milestones have been sufficiently accomplished. PwrMetrix installed/trained to 42 of 42 distribution members.	
G4.3	Energy efficiency programs achieving minimum energy reduction within the state of Colorado equivalent to 0.75% to 1% of Colorado energy sales.	
	YEAR 4 TOTAL BUDGET	**$ 10,418,097**
Milestones	**YEAR 5- Description**	**DUE**
M5.1	Year 4 efficiency and electrification performance evaluated for cost-effectiveness (Total Resource Cost Test >1); adjustments made as necessary (**Q1**). Year 4 demand response program performance evaluated for cost-effectiveness (Total Resource Cost Test >1); adjustments made as necessary (**Q2**). All programs moved from Pilot to fully available (**Q3**). Energy efficiency programs achieving minimum energy reduction within the state of Colorado equivalent to .75% to 1% of Colorado energy sales (**Q4**).	Q1-Q4
M5.2	Scheduled deployment PwrMetrix multi-tenant benchmarking platform in distribution members. Completed Community Benefits Plan List of Milestones (see community benefits plan).	Q1-Q4
D5.1	Q1, Q2, Q3 and Q4 Summary Progress Report	Q1-Q4
D5.2	Finalized suite of products (DERMS, ESP, PwrMetrix, Demand Response, & Energy Program). PwrMetrix installed, deployed, and trained on 100% of 42 distribution members. PwrMetrix Benchmarking Reports, Data Analytics and Visualization Map.	Q4
D5.3	Energy efficiency programs achieving minimum energy reduction within the state of Colorado equivalent to 0.75% to 1% of Colorado energy sales.	Q4
D5.4	Final project report to DOE	
	YEAR 5 TOTAL BUDGET	**$ 15,690,606**
	TOTAL for all 5 YEARS	**$ 53,596,688**

Work Breakdown Schedule and Task Description Summary -Tri-State will complete **8 major tasks** over the five (5) year project as shown below.

Task	*Task Description*
1	**Project Management and Planning:** managed by Demand Response and Electrification Managers throughout all phases of the project and reporting to main PM (Project Manager). Managers will be responsible for project objectives, budgets, and reporting**.**
2	**RFP, Purchase, and Implementation of Energy Solutions Platform Software:** Develop RFP for an Energy Solutions Platform (ESP) as consumer-facing interfaces for electrification incentive applications, demand response program (DR) enrollment, on-bill repayment participation, and identify contractors participating in the trade-ally program. ESP will manage the associated workflows for all programs, including payments, incentive application reviews and approvals, and trade-ally management (enrollment into program and on-going project assignments, performance, etc). Post-RFP response, review responses, and select vendor for provision and implementation of software platform for Tri-State and up to 42 distribution members.
3	**RFP, Purchase, and Implementation of DERMS Software:** Develop RFP for multi-tenanted Distributed Energy Resource Management software (DERMS) that will allow for enrollment, dispatching, and measurement/validation for all developed demand response programs. DERMS works in conjunction with the ESP to provide the "back-office" resources necessary for Tri-State to see what demand response resources are available. DERMS software will also be incorporated into existing Energy Markets tools, such as forecasting, to ensure that the demand response programs are utilized in an effective manner. Post-RFP response, review responses, and select vendor for provision and implementation of software platform. Manage implementation for Tri-State and up to 42 distribution members.
4	**Energy Services Programs:** Develop and implement on-bill financing, trade-ally, and additional efficiency and electrification incentive programs including rebates, subscription, or rate signal type programs.
5	**Demand Response Programs:** Develop effective suite of programs tailored to meet the needs of the Tri-States and the individual distribution members. All required hardware components should be evaluated, and an RFP for vendor(s) developed with detailed descriptions of the hardware needs. Vendor(s) will be selected for provision of this hardware, including AMI upgrades, cellular communications devices, load control switches, and moisture sensors.
6	**PILOT Program for Distribution Co-ops: ESP & DERMS Software and Energy Services / Demand Response Programs:** Identify and select up to 4 distribution members to pilot ESP and DERMS software and programs. Once feedback has been provided and program feedback is sufficient, make programs available to all 42 members.
7	**Member Training & Marketing Program:** Develop training and marketing material for software and programs made available through Tri-State members
8	**Cost Outage Reliability Benchmarking, Visualization, and Data Analytics (PwrMetrix AI) -** Deploy multi-tenant benchmarking platform in Tri-state and 42 distribution members to track required-DOE-SMART reliability and Justice40 Metrics as part of grant reporting.

End of Project Goal –

1. Distributed Energy Resource Management DERMS and Energy Services Platform ESP **100% implemented and completed** for all participating distribution members.
2. Community Benefits Plan SMART goals **100% achieved**. See separate ***Cbenefits.PDF*** for details**.**
3. Pilot **Demand Response DR** programs including irrigation, smart thermostat, and water heater programs **100% established** and consumer-member enrollment completed.
4. Contractor relationship established for **3 devices installed** (irrigation, smart thermostat/AC, and water heater DR).

5. Member program training and turnkey marketing materials **100% fully developed** enabling local support of programs and devices.
6. Incentive and trade-ally programs **100% fully implemented**. Efficiency related incentive programs achieved minimum energy reduction within the state of Colorado equivalent **to 0.75% -1% of Colorado energy sales**.
7. Minimum **4% of peak load (demand) within Colorado enrolled** in cumulative DR programs.
8. PwrMetrix AI installed, deployed, and trained on 100% of 42 distribution members. PwrMetrix Benchmarking Reports, Data Analytics, Justice40 tracking, and Visualization Map **100% implemented.**

- **Project Schedule (Gantt chart or similar)**

PROJECT TIME TABLE		Budget Y1				Budget Y2				Budget Y3				Budget Y4				Budget Y5			
	Quarter Ending Month	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	39	42	45	48
Task 1	Project Management, Planning and Reporting																				
	Final Report																				
Task 2	RFP, purchase and implementation of Energy Solutions Platform (ESP) software																				
Task 2.1	Develop/Approve an RFP for ESP with detailed requirement specifications																				
Task 2.2	Select ESP Vendor for provision, installation, and implementation of software based on ability to meet Tri-State's identified requirements in a cost-effective manner																				
Task 3	RFP, Purchase and implementation of DERMS software																				
Task 3.1	Develop/Approve an RFP for DERMS with detailed requirement specifications																				
Task 3.2	Select DERMS Vendor for provision, installation, and implementation of software																				
Task 4	Energy Services Programs																				
Task 4.1	platform																				
Task 4.2	Energy efficiency and electrification incentive programs (rebates, subscription, or rate signal programs) designed and integrated into ESP platform																				
Task 4.3	Mid-stream trade-ally (contractor) program developed and integrated into ESP platform																				
Task 5	Demand Response Programs																				
Task 5.1	Design and implement base-level programs including irrigation, residential and commercial offerings																				
Task 5.2	technology such as residential battery energy storage and electric vehicles																				
Task 5.3	equipment for programs. This includes communications devices (where necessary), load control switches, moisture sensors, and other necessary equipment as identified in programs development																				
Task 6	software and Energy Services / Demand Response programs																				
Task 6.1	Identify and select up to 4 distribution members to pilot ESP and DERMS software and programs developed in																				
Task 6.2	Use feedback and cost-effectiveness metrics (TRC test) from pilot members to ensure proper program design and implementation. Adjust as needed																				
Task 7	Member Training & Marketing Program																				
Task 7.1	and programs available through Cooperative Energy Ecosystem																				
Task 8	Outage Cost Reliability Benchmarking, Visualization and data analytics (PwrMetrix) :																				

Buy America Requirements – Tri-State will include on all RFP (Request for Proposal) detailed specifications of the "Buy America Requirements". All software and hardware requirements for

DERMS, ESP, PwrMetrix AI, and components of CEE that will be purchased by this project shall meet the "Buy America Requirements".

Project Management – Tri-State will be the prime-lead organization, with the 42 distribution members from 4 states as team-partners, and Aerinet Solutions Corp (Aerinet) as the contractor providing key technical & financial grant project management/DOE reporting support, and PwrMetrix AI software implementation, deployment, and training. **Tri-State Project Manager, Aerinet key personnel, and distribution staff members** are experienced and qualified program managers, finance, software, hardware technology, Smart Grid, cybersecurity, and power system industry leaders who have successfully managed **hundreds of millions of dollars of federal-state grants** (see personnel resume and experience), collaborated successful **multi-year projects** with various teams across the nation, partnered with hundreds of co-ops on **impactful projects,** commercialized innovative software, programs and technologies, and provided **measurable solutions to communities across the nation**. Tri-State PM will manage all technical tasks. He will monitor progress, identify challenges/risks, and implement solutions with the Tri-State team leaders, with guidance from DOE, to mitigate risks. PM will work with Aerinet, DERMS/ESP vendors, and 42 distribution members to track progress on yearly deliverables, milestones and Go-NoGo SMART goals as shown on the SOPO. Tri-State PM and technical team, accompanied by DOE staff, will also visit some of the participating distribution members during their installation/training phase to ensure proposed work and milestones are achieved as planned. PM and team members will conduct periodic virtual or in-person meetings with the project leader of each participating co-op and vendors to clarify roles of each project team member, track progress of their work plans, and address each specific responsibilities and expectations as defined by the SOPO and yearly work plan. The PI will meet with DOE (virtually or in-person), on schedule as shown in the Work Plan and to explain progress, address issues, and collaborate on decision making. There are no critical hand-offs required in this project.

4. TECHNICAL QUALIFICATIONS & RESOURCES - The following shows how the project meets the **tech-review CRITERION 3** *"Management team & Project Partners."*

b(4) [redacted] **Reginal** [redacted]	b(4) [redacted]
Mike b(4) [redacted]	[redacted]
Member Services Team Member:	[redacted]

	Tri-State's 42 distribution members will provide ample opportunity for engagement and participation.
Coop Team Member(s):	Tri-State is working with our members to identify the best cooperative employees to participate and provide insight into this project. This role will be crucial to ensuring accurate program design and implementation to achieve quick and coordinated success.
Teaming Partners:	Tri-State's most impactful team is the **collection of 42 distribution members and their multi-talented teams**. Each of these groups is **uniquely familiar with the communities they serve in four states**, and they bring a broad set of capabilities in customer services, operations, engineering, and construction which makes all the difference in the success

Teaming Partners: Tri-State's most impactful team is the collection of 42 distribution members and their multi-talented teams. Each of these groups is uniquely familiar with the communities they serve in four states, and they bring a broad set of capabilities in customer services, operations, engineering, and construction which makes all the difference in the success of this project.

1. Big Horn Rural Electric Company 2. Carbon Power & Light, Inc. 3. Central New Mexico Electric Cooperative 4. Chimney Rock Public Power District 5. Columbus Electric Cooperative, Inc. 6. Continental Divide Electric Cooperative 7. Empire Electric Association, Inc. 8. Garland Light & Power Company 9. Gunnison County Electric Association 10. High Plains Power, Inc. 11. High West Energy, Inc. 12. Highline Electric Association 13. Jemez Mountains Electric Cooperative, 14. K.C. Electric Association, Inc. 15. La Plata Electric Association, Inc. 16. The Midwest Electric Coop Corporation 17. Mora-San Miguel Electric Cooperative, Inc. 18. Morgan County Rural Electric Association 19. Mountain Parks Electric, Inc. 20. Mountain View Electric Association, Inc. 21. Niobrara Electric Association, Inc.	22. Northern Rio Arriba Electric Cooperative, Inc. 23. Northwest Rural Public Power District 24. Otero County Electric Cooperative, Inc. 25. Panhandle Rural Electric Membership Assoc. 26. Poudre Valley Rural Electric Association, Inc. 27. Roosevelt Public Power District 28. San Isabel Electric Association, Inc. 29. San Luis Valley Rural Electric Coop, Inc. 30. San Miguel Power Association, Inc. 31. Sangre de Cristo Electric Association, Inc. 32. Sierra Electric Cooperative, Inc. 33. Socorro Electric Cooperative, Inc. 34. Southeast Colorado Power Association 35. Southwestern Electric Cooperative, Inc. 36. Springer Electric Cooperative, Inc. 37. United Power 38. Wheat Belt Public Power District 39. Wheatland Rural Electric Association 40. White River Electric Association, Inc. 41. Wyrulec Company 42. Y-W Electric Association, Inc.

Beyond Tri-State's member cooperatives, the project team consists of **world-class software and hardware partners, technical and grant project management consultants,** as well as community organizations. **Aerinet Solutions Corp** brings more than **100+ years** of combined **GRANT, TECHNICAL, ACCOUNTING, FINANCE AND PROJECT MANAGEMENT** experience to help Tri-State ensure that the project and DOE reporting are successful.

Alvin b(4) [redacted]	b(4) [redacted]
Ranga b(4) [redacted]	[redacted]
Eduardo b(4) [redacted]	b(4) [redacted]
Marlon b(4)	[redacted]
Tracey b(4)	[redacted]
Michael b(4) [redacted]	[redacted]
Farhad b(4) [redacted]	b(4) [redacted] .

Tri-State is engaging with b(4) [redacted], and others. Tri-State maintains ongoing **community relationships** with **state legislators and county commissioners, farm bureaus and cattlemen's associations, economic development groups and chambers of commerce, affordable energy advocates, environmental organizations, community colleges**, and other local anchor institutions across the **four states** in which Tri-State operates.

Project team's **existing equipment and facilities**, or equipment or facilities already in place on the proposed project site, that will facilitate the successful completion of the proposed project; include a **justification of any new equipment or facilities** requested as part of the project - Tri-State has the IT resources to host the DERMS and Energy Services Platform or use cloud-based services. Additionally, Tri-State has the communication network with member cooperatives to support communications of the DERMS with member AMI systems. Tri-State also has facilities in place to manage the purchase and deployment of load management equipment in a manner similar to how they have deployed first generation load management equipment for years. As an

energy and transmission provider, Tri-State has the facilities in place to meet all regulatory requirements for resiliency, security, and infrastructure protection. Tri-State's 42 distribution members hold strong retail relationships with consumers. Combined with the previously mentioned Energy Services Platform, the CEE platform will enable strong participation and communication of value surrounding these programs.

Relevant, **previous work efforts, demonstrated innovations**, and how these enable the applicant to achieve the project objectives. Tri-State has been working with its 42 member cooperatives on the integration of Smart Grid systems, including SCADA, AMI, and load management, for over a decade. Over the past 10 years, the team at Tri-State has deployed traditional load control systems based on internal development. This internal development had allowed Tri-State to learn firsthand what worked well and what is needed from a new system.

Program Design:	Tri-State has a very strong and experienced team of professionals who are able to design distributed energy resource and demand response programs that account for member pricing programs as well as wholesale power purchase agreements and transmission capacity objectives.
Multi-Tenancy:	Tri-State and its members have years of experience in independently deploying load control. Team understands the importance of the multi-tenant approach to the success of this project.
AMI & Communications:	Tri-State and its members have deployed AMI & communication infrastructure that spans their 4-state territory. The many systems that have been deployed have allowed the team to gain a comprehensive understanding of the most effective ways to utilize AMI data and develop reliable networks for communicating with grid-edge devices.
Critical Infrastructure & Cybersecurity:	Tri-State's IT team hosts multiple critical infrastructure software systems, including their Energy Management System (EMS) for managing their 5,700 miles of transmission. Tri-State is confident with designing NERC CIP compliant networks and systems with cybersecurity from the ground up.
Integration:	Tri-State and its members have already deployed SCADA and load control systems that integrate with AMI and field load control equipment. They have extensive experience designing and specifying API interfaces between systems
Field Equipment:	Tri-State's team brings extensive experience in successfully deploying field equipment, including load control receivers for irrigation and in-home equipment such as controls for water heaters. Tri-State has the benefit of 42 distribution members that have many years of experience with customer engagement and program execution that will help make this rollout successful, including: Highline, La Plata, Midwest, Northwest Rural Public Power, Panhandle, Poudre Valle, and Sangre de Cristo. **Collectively, Tri-State and its 42 members have hundreds of years of experience** in deploying similar systems.

- **Time commitment**

		Y1	Y2	Y3	Y4	Y5	Total
b(4) [redacted]	Mike b(4)	720	720	400	400	400	2640
b(4) [redacted]	[redacted] b(4)	400	400	400	400	400	2000