

ACCESS Project Case Study: Kit Carson Electric Cooperative Providing Native American Energy Independence Through Solar Expansion



ACCESS Program

NRECA's solar energy project, *Achieving Cooperative Community Equitable Solar Sources* (ACCESS), is the flagship project of NRECA's *Advancing Energy Access for All* initiative. This initiative spotlights the innovative ways cooperatives approach community development and support for their consumer-members, as technology advancements continue to transform our industry.

ACCESS explored and amplified the use of innovative, cost-effective energy access programs to help increase solar affordability, with particular focus on assisting low and moderate income (LMI) consumers. ACCESS researched varying financing mechanisms and program designs to identify optimal solutions for small utilities, including field tests of diverse co-op solar projects around the country. Through this project, tools and resources were developed to assist electric co-ops and the broader industry as they deploy solar projects to benefit LMI consumers.

This case study provides example of how one cooperative, Kit Carson Electric Cooperative, is working to provide long-term economic benefits to a local Tribe community through solar.

Cooperative Profile

Kit Carson Electric Cooperative (KCEC), founded 1944, is a member-owned electric distribution cooperative located in north-central New Mexico (See Figure 1). KCEC serves electricity, broadband internet, and propane to a population of 44,977 in Taos, Colfax, and Rio Arriba counties (See Figure 1). KCEC maintains about 2,900 miles of lines serving 30,166 customers (83.4% residential and 16.6% commercial), with a Winter peak demand of 62 MW.¹ It has 144 employees.

New Mexico is known as the Land of Enchantment for its beautiful landscapes and rich cultural diversity. It is also a global tourist destination. But despite the wealth associated with the Santa Fe and Taos Ski Valley, and the state's high concentration



Figure 1: Kit Carson EC Service Area.

¹ Annual Electric Power Industry Report, Form EIA-861 detailed data files, 2022, <https://www.eia.gov/electricity/data/eia861/>

of PhDs at Los Alamos and Sandia National Laboratories, New Mexicans consistently rank as some of the nation's poorest.

Two of the three counties that KCEC serves, Rio Arriba and Taos, are classified as persistent poverty counties (PPCs) (See Figure 2). Additionally, within the service territory are the Taos and Picuris Native American Reservations. PPCs are those that have a long history of poverty rates above 20%.² Electric cooperatives serve 92% of the persistent poverty counties in the U.S.³ Specifically, an estimated 18.3% of the population in KCEC's service territory is living in poverty, a higher number than both the statewide poverty rate of 17.3% and the US poverty rate of 12.5%.⁴

According to 2022 US Census Bureau data, New Mexico had the eighth lowest median income in the nation at \$59,842. All three counties served by KCEC have median incomes below this statewide median and all are well below the national median of \$74,755. The racial/ethnic composition of KCEC's territory is 69.4% White, 0.5% Black, 62.3% Hispanic, 7% Indian/Native American and a 24% mix of Asian or Pacific-Islander, Mixed/other populations. Approximately 14.4% of the population (25 years and over) does not have a high school diploma which is slightly lower than the 15.8% statewide and higher than the 13.1% nationwide without a high school diploma. 21.5% of the population is over the age of 65, compared to 15.3% for New Mexico and 16.5% for the US.⁵ Approximately, 41.6% of households in KCEC's service area have incomes below 200% of the Federal Poverty Level.⁶ In addition to the historic town of Taos, Kit Carson serves a world-class ski resort, rural communities, and two Native American pueblos. In 2022, two massive wildfires in northern New Mexico impacted the co-op's territory and caused multiple power outages.

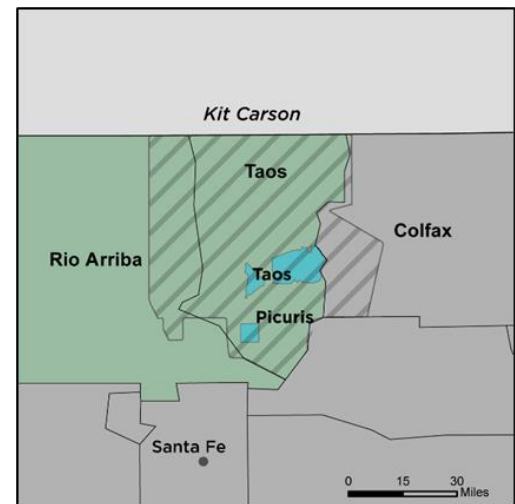


Figure 2: Kit Carson EC Counties.

Focus on Addressing Poverty and Associated Energy Cost Challenges

Research has shown that, in general, low-income⁷ households spend a disproportionately higher percentage of their income on energy bills, and that rural households throughout the U.S. spend a higher share of household income on energy bills than others in their region and urban/suburban households. In addition, about 15.6% of homes in KCEC's territory are manufactured or mobile homes, which are generally less energy efficient than other housing stock of comparable size⁸. While there is no widely

² A "persistent poverty county" is a classification for counties in the United States, as defined the United State Department of the Treasury. It is defined as any county that has had 20 percent or more of its population living in poverty over the past 30 years, as measured by the 2000, 2010, and 2020 decennial censuses.

³ See <https://www.electric.coop/electric-cooperative-fact-sheet>

⁴ 2022 American Community Survey 5-year Estimates Detailed tables, data.census.gov

⁵ 2022 American Community Survey 5-year Estimates Detailed tables, data.census.gov

⁶ <https://aspe.hhs.gov/poverty-guidelines>

⁷ "Low-income" is defined as 80 percent of the median family income for the area, subject to adjustments for areas with unusually high or low incomes or housing costs. <https://www.huduser.gov/portal/datasets/il/fmr98/sect8.html>

⁸ 2022 American Community Survey 5-year Estimates Detailed tables, data.census.gov

accepted threshold used to establish energy burden, the U.S. Department of Health and Human Services classifies the burden of energy costs greater than 6% of household income as “unaffordable.”⁹

Keeping this front of mind, KCEC has worked for years to address the intertwined problems of poverty and energy burden and the associated impacts. Luis Reyes, Kit Carson’s CEO, said, “You just continue to see this growing divide between those who have and those who have not. Electricity is part of that.” The co-op is tightly interwoven into its community and offers many programs and services to support its members in need, including:

- Donations to and collaboration with community-based organizations
- Help with applications for weatherization assistance programs, LIHEAP, unemployment, emergency relief, and other assistance programs whether they relate to energy or not.
- Community crisis support, including food delivery and building raised bed gardens for community members.
- Free financial literacy classes led by local banks.
- Financing for efficient appliances.



Figure 3: KCEC Donating to Local Community Center
(Courtesy of Kit Carson Electric Cooperative)

Reyes points out that because Kit Carson is a regulated utility, it cannot do everything it would like in terms of LMI rates and programs, but within these limitations, the co-op seeks to build trust and let members know that they truly want to help, and not just with propane and electricity. “All these other relationships actually help [members] get engaged, get empowered, and that helps their quality of life. And at the end, the stress of not paying their electric bill is not so high now that they know there are resources where they can get help.”

Background to Kit Carson’s Solar Program

As of July 2022, KCEC completed its final payment in an exit agreement with its previous power provider, Tri-State Generation and Transmission, and switched to a flat rate contract with Guzman Energy¹⁰. While rife with uncertainty at the time, this significant move provided KCEC with increased independence and expanded ability to make important energy decisions that secure a more reliable, resilient, and renewable grid for its membership. Most notably, the change allowed KCEC to install distributed generation resources – such as solar and batteries – beyond the contracted 5% cap on self-generation they were subject to under their previous power provider¹¹. Since this restriction was removed in the 2016 transition to Guzman Energy, KCEC was able to accelerate solar installation efforts and in

⁹ https://www.acf.hhs.gov/sites/default/files/documents/ocs/comm_liheap_energyburdenstudy_apprise.pdf

¹⁰ https://www.santafenewmexican.com/news/local_news/kit-carson-electric-completes-split-from-tri-state/article_d5aa2bbe-2a31-11ed-94ca-fbe7eb9134fb.html

¹¹ <https://www.utilitydive.com/news/energy-independence-co-op-kit-carson-tri-state-storage-renewables-distributed-energy/688592/>

June 2021 achieved their goal of serving 100% of daytime demand with solar generation – one year ahead of schedule.

Starting in 2009, KCEC has installed multiple solar arrays across its tri-county service area ranging from 0.5 MW to 3 MW each and connected to the distribution grid. The arrays are integrated with KCEC's fiber-optic communications network. In total, Kit Carson has developed as of late 2023 43 MW of solar generation capacity, all involving fixed-cost power purchase agreements (PPA) with developers that average under \$0.05/kWh until 2039. To complement this solar generation and provide further grid flexibility, KCEC has also installed 16.5 MW of battery storage, which is owned by KCEC and operated by Guzman Energy. This shift to a heavily renewable portfolio has resulted in significant savings for all of Kit Carson's members. In August of 2022, members' bills were 30%-35% lower on average than they had been just one year previously.



Figure 4: Taos Mesa Solar Project
(Courtesy of Kit Carson Electric Cooperative)

Part of the co-op's solar generation is obtained through a PPA associated with a 1 MW solar array located at Picuris Pueblo, a 90-home Native American pueblo within the co-op's territory. More than one-fifth of the tribe's members live in poverty, and many more are only slightly above poverty level. Tribal members also historically experience high unemployment rates. Since the first PPA took effect starting in 2018, tribal members' bills have been reduced through net metering, and the pueblo government uses proceeds to pay for propane heating in its community buildings. In addition to providing clean energy and lower bills, the project benefitted the local economy with employment and training opportunities. During construction, the workforce was largely from Picuris or other nearby pueblos. Workers received on-the-job training and can continue to participate in New Mexico's growing renewable energy industry.

After the success of their first solar array, the Picuris tribe became interested in expanding its solar ownership and is collaborating with the co-op on a phase II development plan. KCEC and the Picuris Pueblo are working to install additional solar as well as a battery energy storage system (BESS), which they consider the next step of tribal energy sovereignty. Kit Carson joined the ACCESS project to share ideas and get feedback from other ACCESS stakeholders for phase II of the Picuris Pueblo project.

Program Concept and Design

Starting in 2020, the co-op and the Pueblo discussed several options for how a new solar project could best support tribal and non-tribal LMI members. However, by 2022, all of KCEC's members began seeing electricity bills consistently reduced by 25% or more due to the co-op's recent changes with their wholesale energy supply. Because all members were now benefiting from significant savings, the vision for this new project transitioned from primarily an LMI solar project into a broader focus on tribal sovereignty.

To enable these conversations about the Pueblo's energy sovereignty, KCEC was willing to evaluate its future role in the community. Should KCEC maintain control of local generation assets – ensuring more certainty in future operations – or should they empower others within the community to have a more

active role in their energy future despite the inherent uncertainty? Because KCEC is no longer beholden to an all-requirements wholesale power supply contract, it has the flexibility to add or purchase local generation at its discretion. The co-op ultimately decided to embrace the new opportunity to support the tribe's energy independence.

In 2022, Kit Carson and Picuris Pueblo decided to move forward with a plan for the tribe to build a new solar array coupled to a BESS that is owned by the tribe but operated and maintained by KCEC. The tribe would like to create an islandable microgrid such that it would be able to utilize its solar and storage capacity to operate independently from KCEC's distribution grid if needed.

Consistent with this vision, detailed objectives for the project include the following:

- Create a replicable model with Tribes that recognizes their sovereignty
- Give the Tribe access to solar energy
- Create a new sustainable and steady revenue stream for the Tribe; funds generated are returned to members of the Pueblo
- Offset other future energy costs for tribal members. Propane and electric are the only heat resources in the area
- Produce electricity for all 90 homes and businesses of the Picuris Pueblo and nearly 600 additional homes in the surrounding area
- Contribute to meeting KCEC's renewable energy goals
- Create a resilient and reliable grid for unforeseen emergency disasters (forest fire, heat source outages)

All of these goals support the overarching need for the Tribe to have a low cost of energy to support their economic development strategies around tourism and agriculture.

Installation

The siting agreement between the Pueblo and KCEC is complete and the installation process has begun for phase II of the Picuris Pueblo generation project, which will add a 1 MW solar array and two batteries to their existing array. One battery will be sized at 1 MW/4 MWh whereas the other will be sized at 1.5 MW/2 MWh and will additionally form a microgrid, allowing the tribe to ride through outages. Together, the two batteries will provide overall grid flexibility beyond a single unit. Both the new solar and the new batteries will be located within the Pueblo, and the co-op will run a new two-mile underground line from the solar array to the point of interconnection with KCEC's distribution grid. The 1.5 MW/2 MWh BESS will be co-located with the new array, whereas the 1 MW/4 MWh BESS will connect to the distribution grid at a different interconnection point. Sandia National Laboratories has been helping with the BESS planning.

In the coming months, KCEC and the tribe will finalize the project's design, the PPA with Picuris Pueblo, and the construction schedule. Construction on the new solar array and the underground power line is

expected to begin in 2023 and is expected to be completed by the end of 2024. The co-op and the tribe are planning to release a request for proposal (RFP) for the BESS during the Summer of 2024.

Program Economics

As the system developer and a sovereign nation, the Picuris Pueblo may use public, private, tribal, or federal funding sources to finance the solar and BESS installations. Exact costs are unknown at this time but are estimated at \$1.8 million for the solar array and \$3.8 million for the BESS.

KCEC will purchase the system's generation from the tribe through a PPA. Provisions outlined in the PPA will determine the rate per kWh and the agreement duration. The PPA will ensure that KCEC has renewable generation and Picuris will secure financing for 25-30 years. Guzman Energy will operate the BESS through KCEC, and maintenance costs are expected to be minimal based on their experience with similar solar and BESS projects.

The project will serve every member of the Picuris Pueblo, consisting of 90 homes. Solar generation produced in excess of the tribe's needs will be provided to approximately 600 homes in the surrounding area through net metering with the co-op. Members of the pueblo will receive cost savings of around \$70/month in Winter and about \$50/month in Summer as a credit on their electric bill. Depending on the season, average household electricity bills range between \$60 to \$80 each month, meaning that the bill credits provided by this project yield 80% to 90% savings for the tribal participants.

Challenges and Opportunities

The novel agreement structure being developed between the Picuris Pueblo and KCEC is a first-of-its kind endeavor that leverages the unique position of the co-op to deploy distributed energy resources. Historically, electric utilities have made an effort to retain their consumers' load. Yet, as Reyes explains, they could not deny the Picuris Pueblo's desire for energy sovereignty when the co-op itself had recently fought for its own independence. While the act of pioneering a new approach to providing electricity service was at first rife with uncertainty, word travels fast and other Pueblos, tribes, and utilities are taking notice. KCEC has begun conversations with another tribe in their area, Taos Pueblo, to provide a new installation consisting of 5 MW of solar and 5 MW/10 MWh of battery storage. The co-op and the tribe are currently applying for federal funding for the project and have begun working on the land lease agreement. The additional income will help the Taos Pueblo develop a revenue stream to support their social programs. As KCEC's collaborations with the Picuris and Taos Pueblos progress, they will serve as pioneering models for other tribes and utilities to consider for their own service areas.

Key Lessons and Insights

According to Reyes, a key lesson emerging from this project is to let projects evolve so that they can have maximum community benefit. What started as an interaction about a potential community solar project has blossomed into a relationship in which the tribe and the co-op help support each other – The tribe will use the solar energy when it needs it or sell it to the co-op, and the co-op can tap into the battery storage when the sun is obscured. Said Reyes, "I think from a bigger picture, it's enabling a group of individuals, a tribe, to chart their own path." However, Reyes said, we also have to make sure that "we honor [the tribe's] requirements without the rest of the members subsidizing them." By identifying an agreement where the co-op remains whole in addition to providing new benefits to the tribe and its surrounding neighbors, all parties are satisfied with no obvious or appreciable downside. This potential could have

been realized without the consistent and open conversations KCEC has maintained with the Picuris Pueblo and the rest of the community.

Additional Resources on NRECA's ACCESS Project

- [ACCESS Project Website](#)

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