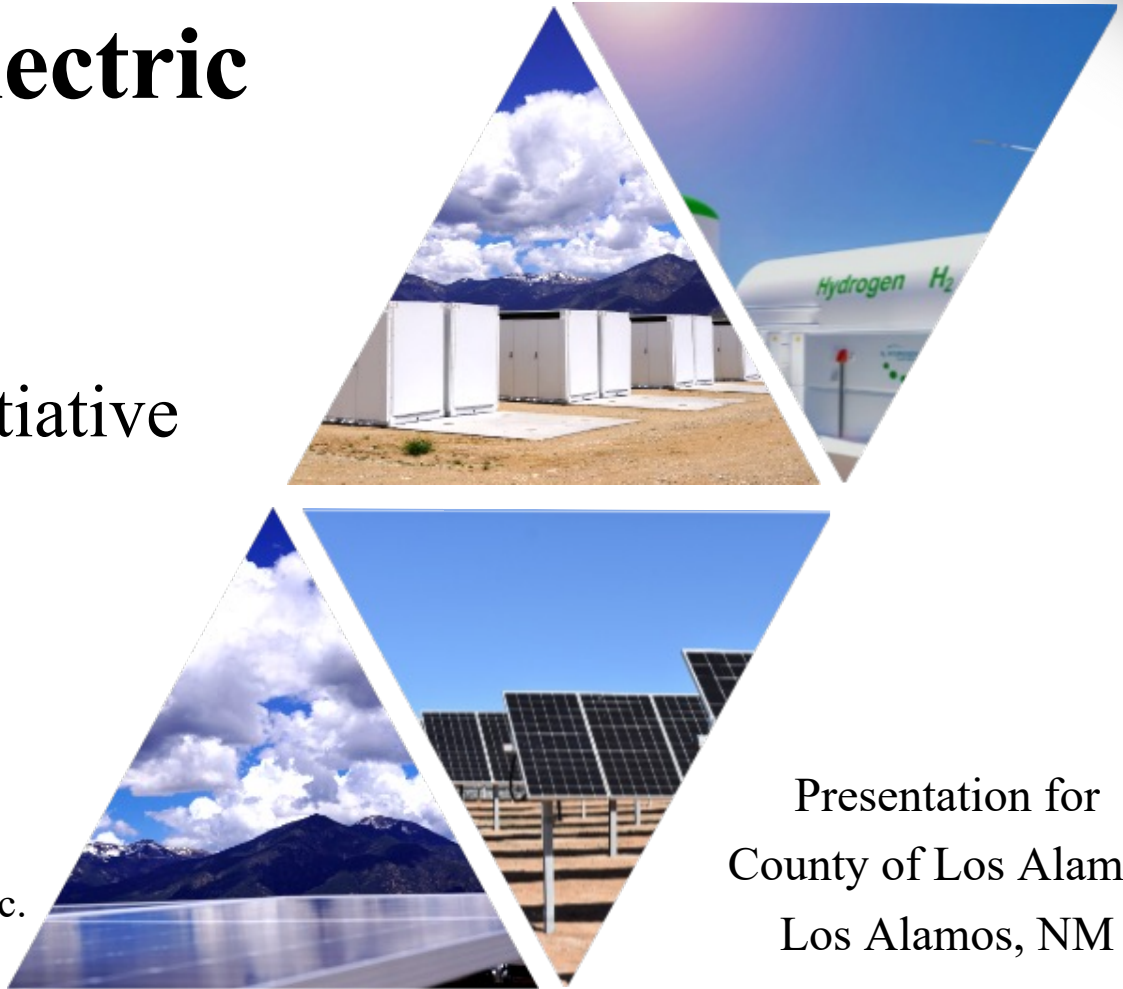


# Kit Carson Electric Cooperative

Green Hydrogen Initiative  
October 2, 2024

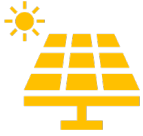
Luis A. Reyes Jr.  
Chief Executive Officer  
Kit Carson Electric Cooperative, Inc.



Presentation for  
County of Los Alamos  
Los Alamos, NM



# KCEC TODAY



**42 MW+**  
Solar  
Generation



**16.25 MW+**  
Battery Generation



**36**  
EV Charging  
Stations



**65 MW**  
System Peak  
(Nighttime  
Winter Peak)

## KCEC at-a-glance

Electric Cooperative was **founded in 1937** ( formerly Eagle Nest Electric Cooperative)

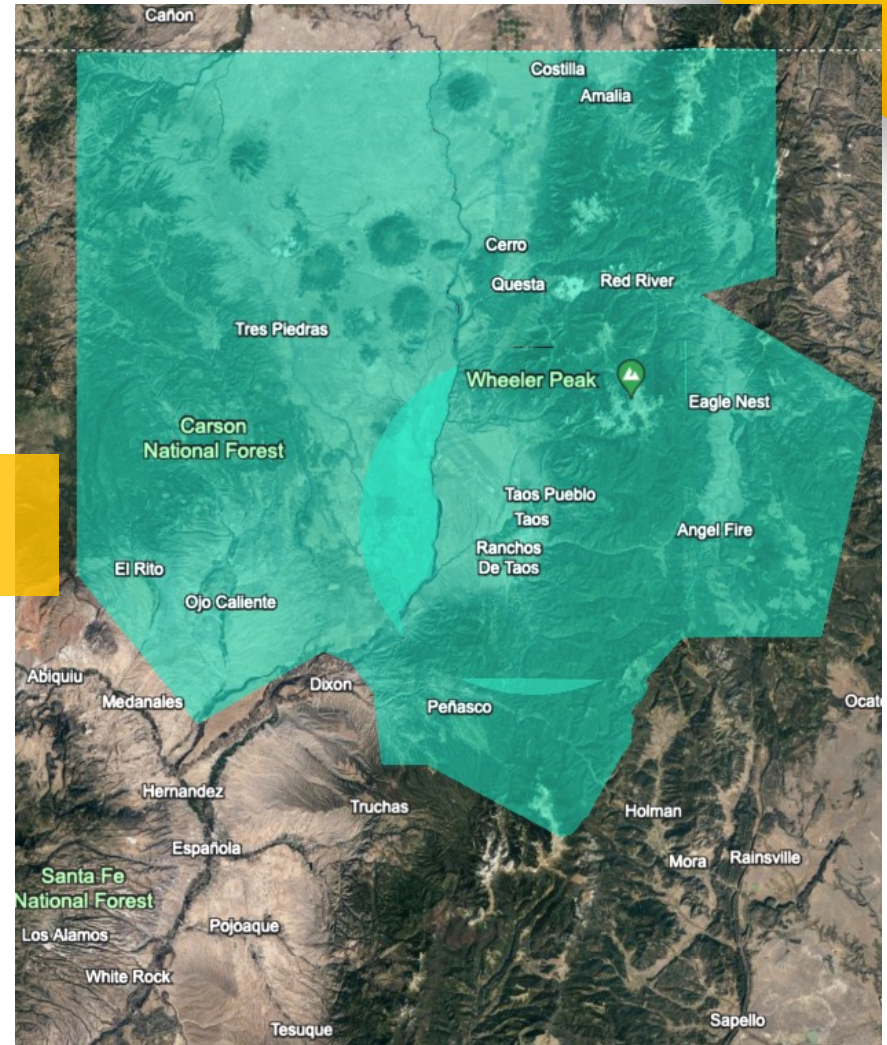
One of the most **diverse and unique** co-ops in the nation

Serving **30,720 Electric Members** in NM

**3,011** miles of electric line and **2,500** miles of fiber optic line

**Second largest co-op** in NM

**100% Daytime Solar** Distributed + **16.25 MW BESS**



# Kit Carson Company Profile

## Where We Serve

- Taos County
- Colfax County
- Rio Arriba
- Taos Pueblo
- Picuris Pueblo
- Six Municipalities (Taos, Angel Fire, Questa, Eagle Nest, Red, Taos Ski Valley) River

## Electric

- 30,720 Electric Meters
- 3,011 Miles of Electric Line

## Innovation

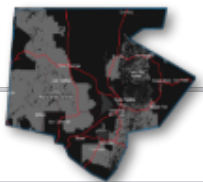
- 100% Daytime Solar
- 42 MW of Solar Generation
- 16.25 MW of Battery Energy Storage
- 36 Electric Vehicle Charging Stations with 58 Points. (Charging 10 Level 3 DC Fast Chargers)
- Proposed Green Hydrogen Facilities

## Internet

- 14,000 Internet Customers
- 100 GB Network
- Three Redundant Broadband Paths for Resiliency
- Serves over 30 cell phone tower sites

## Propane

- 3,400 Customers
- Serves Approximately 25 Northern NM Communities
- Affordable Propane Rates
- Stabilizes Rates Throughout the Northern NM Region



KCEC provides essential services to improve the quality of life for our members and communities in Northcentral, New Mexico.

# KCEC Received Funding Grants

## Grants Received for KCEC Infrastructure Projects

• 2005 Clean Renewable Energy Bonds (CREB) for Solar	\$5,000,000
• 2011 RUS USDA Advancing Broadband Grant	\$64,000,000
• 2020 VW EV Settlement Grant	\$200,000
• 2021 PRC Broadband Grant	\$700,000
• 2021 Rural Digital Opportunity Fund (RDOF) Grant for Broadband	\$23,600,000
• 2022 NM DOT EV Charging Station Grant	\$800,000
• 2022 Reconnect Program – USDA Rural Development Broadband	\$18,200,000
• 2023 DOE GRIP Microgrid BESS Fire Mitigation Grant	\$23,000,000
• 2023 Taos Pueblo Solar DOE Grant ( ICAST & KCEC)	\$10,000,000
• 2023 EMNRD Forest Fire Prevention Grant	\$125,000
• 2024 DOE Congressionally Direct Spending Grant Green Hydrogen	\$500,000

**Total: \$146,000,000**

KCEC has received over \$146 million in grants and awards for projects in Solar, BESS, Broadband EV and other infrastructure projects. Most of these projects have been completed or are in progress of being completed.



# KCEC Future Projects

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## Announced projects

- Taos Pueblo (5 MW Solar and 5 MW BESS)
  - The project started in 2022 and is projected to finish in 2025
- Amalia II ( 8.75 MW Solar and 8.75 MW BESS)
  - The project started in 2021 and is projected to finish in 2025
- KCEC Microgrid Project Fire Mitigation (7.5 MW BESS)
  - Project locations include Taos Ski Valley, Penasco and El Rito
  - The project started in 2023 and is projected to finish in 2026

## KCEC Green Hydrogen Proposed Project

- Questa Green Hydrogen Main Hub
  - 60 MW Solar, 57 MW H2 Electrolyzer and 25 MW H2 Fuel Cell Battery
- Taos Hydrogen Hub
  - 17 MW H2 Electrolyzer and 7.5 MW H2 Fuel Cell Battery
- Penasco Hydrogen Hub
  - 3.5 MW H2 Electrolyzer and 1.5 MW H2 Fuel Cell Battery

\*All H2 projects are expandable



# KCEC Generation & Transmission Route to Los Alamos

## KCEC Conceptual Route to Los Alamos County and LANL

Questa Proposed Green Hydrogen Substation (KCEC)



69 kV (KCEC)

Taos 115 kV Substation (KCEC)



345 kV (Tri-State)

Ojo 345 kV Substation (PNM)



115 kV (PNM)

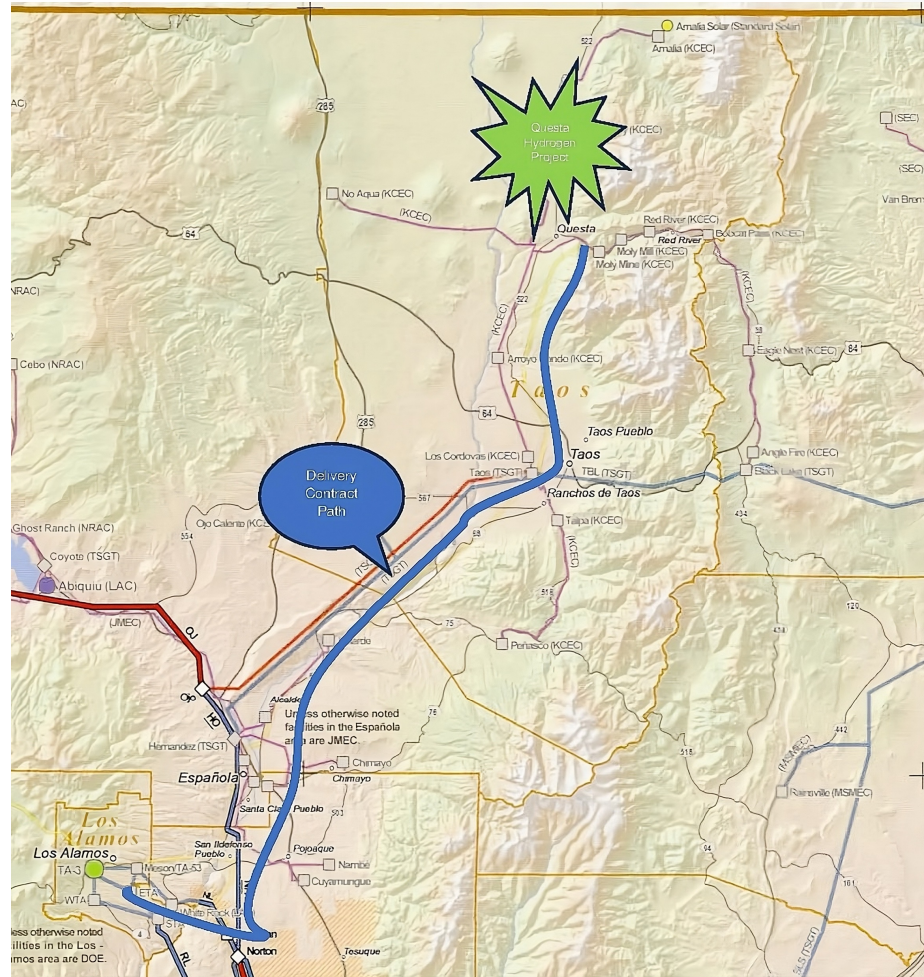
Norton Substation



115 kV(LAC)

White Rock Substation

\*Network Integration Transmission Service Agreement (NITSA) with PNM, Tri-State, KCEC and Los Alamos County



# KCEC Generation and Capacity Power to Los Alamos County & LANL

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A contract for energy delivery from KCEC to LAC could be established through the Tri-State and PNM transmission systems. Transmission capacity is available from Taos to Ojo stations on the Tri-State system. LAC could establish a point-of-receipt (POR) at Ojo station under the LAC/PNM Network Integration Transmission Service Agreement (NITSA). The KCEC energy would become a new designated network resource under the LAC/PNM NITSA.

The energy transaction could be established through KCEC's third-party energy supplier, Guzman Energy. Guzman would purchase the green hydrogen energy and the Tri-State transmission for delivery to Los Alamos County at the new POR with PNM.

To complement green energy deliveries from KCEC, Guzman Energy could integrate energy from Guzman's purchases from solar and storage resources located on the Jicarilla Apache Nation, which will commence operation in mid-2025.

## Network Integrated Transmission Service Agreements

- KCEC - PNM
- KCEC - TSGT
- LAC - PNM

## Other Transmission Arrangements

- LAC - TSGT (Non-Tariff)



# KCEC Green Hydrogen Project & Proposal

KCEC's system currently runs on 100% solar during daytime hours. The initiative will substantially reduce greenhouse gas emissions and serve as a model for what green hydrogen production can be in the United States.

## Components of the Green Hydrogen Project include:

- Utilizing solar generation to power facilities
- Co-siting facilities alongside non-potable water resources and wastewater treatment plants
- Creating long-duration (up to 24 hours) storage technology
- In this distributed model, system resilience gets boosted during extreme weather and non-solar times, ensuring a reliable power supply even in challenging conditions
- Accelerate national goals of actualizing green hydrogen production by eliminating known barriers to production
- Sited on some of the most economically challenged communities (*Tribal lands and counties that have been economically devastated by the declining coal industry*)



This is not a pilot project but a bold step towards integrating green hydrogen into KCEC's entire system, including connecting facilities to one of the largest substations in Taos County. Maintaining power for first responders, evacuees, and communication systems is critical in the wake of a recent forest fire.



# KCEC Green Hydrogen Project

KCEC's Green Hydrogen Distributed Project Model will utilize water resources from reclaimed mine sites and wastewater treatment facilities. These projects are distributed with capabilities of long-duration storage and load peak shaving. The green hydrogen generation and capacity can be implemented in numerous application scenarios.

## Questa Green Hydrogen Main Hub

The primary location for KCEC's ambitious green hydrogen plan is the Village of Questa.

- This site encompasses approximately 2,000 acres; the project will span over 600 acres. It has been identified as the most scalable location due to its vast property and existing 69 kV transmission facilities that go east-west and north-south.
- 25 MW Green H<sub>2</sub> Plant using a water treatment plant and the former tailings facility site.
- 57 MW electrolyzer with 29-ton hydrogen gas storage
- 25 MW fuel cell
- 60 MW solar PV array
- KCEC plans to construct a substation and a half-mile transmission line to connect the facility to the existing system. This substation will be strategically sited next to the proposed green hydrogen plant to ensure seamless integration and operation
- Estimated Production is **44,806 MWh/yr**
- Estimated Facility Operation Date: **End of 2027, Q1 2028**



**\*All H<sub>2</sub> projects are expandable**



# KCEC Green Hydrogen Project Cont..

## Town of Taos Wastewater Treatment Hydrogen Hub

Town of Taos (Wastewater Treatment facility): A smaller green hydrogen facility is proposed to be constructed at the Taos Valley Regional Wastewater Treatment and Reclamation Facility.

- Leverage an existing solar facility for power, using solar energy during the day and tapping into stored energy at night. The facility will also site a Battery Energy Storage System (BESS).
- The plan is to use the water from the local treatment facility, which, although high in nitrates, is abundant. In the initial phase, well water will be used while equipment to remove nitrates is purchased and installed. Then, treated effluent water will be used, eliminating water as a barrier to green hydrogen production.
- 17 MW electrolyzer with an 8.5-ton hydrogen gas storage
- 7.5 MW fuel cell
- KCEC plans to perform infrastructure upgrades in its system to handle generation and capacity
- Estimated Production is **13,335 MWh/yr**
- Estimated Facility Operation Date: **End of 2027, Q1 2028**

\*All H2 projects are expandable



# KCEC Green Hydrogen Project Cont..

## Picuris Pueblo Wastewater Treatment Hydrogen Hub

KCEC is extending its partnership with Picuris Pueblo, one of the smallest and most economically challenged tribes in New Mexico, to foster green independence. This initiative includes the development of a unique solar and battery storage infrastructure, which is already underway, and the siting of solar facilities. Future plans involve the installation of a BESS, which will be integrated into a microgrid for more efficient and sustainable energy distribution and cultural integrity.

- The Picuris tribe's geographical location, bordering another community with established infrastructure, provides an added advantage. In emergencies, such as fire evacuations, there is a safe place for them to go if they must shut down power.
- 3.5 MW electrolyzer with a 2-ton hydrogen gas storage
- 1.5 MW fuel cell
- Estimated Production is **2,745 MWh/yr**
- Estimated Facility Operation Date: **End of 2027, Q1 2028**

**\*All H2 projects are expandable**



# KCEC Green Hydrogen Model

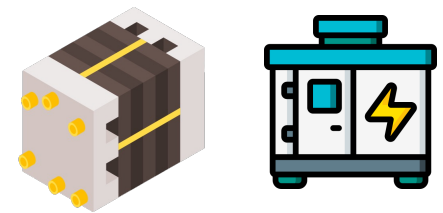
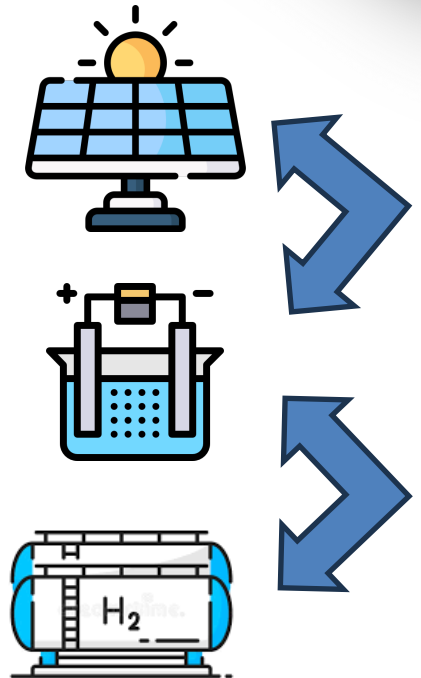
**1. New or Existing Solar Renewable Resources Utilized to Power Green Hydrogen Facilities:** Solar output will be directly connected to electrolyzers.

**2. Electrolyzer Receives Solar Input & Reclaimed Water** KCEC will use effluent water from identified resources (Third-party mining facilities and wastewater treatment plants). The water goes through a filtration process to achieve the desired specifications.

**3. Extract Produced Hydrogen Gas into Storage Tanks**  
Hydrogen storage is a long-term duration energy storage solution (LDES)

**4. Hydrogen Gas is Released Through Full Cell or Linear Generator to Produce Power**

**5. Power is Delivered to the Grid for Transmission**





# Alternative Renewable Sources for LANL

KCEC can potentially deliver green hydrogen capacity and solar and storage resources to LANL and Los Alamos County. Partnering with Northern NM communities to provide green hydrogen generation and capacity will positively impact Los Alamos County's needs while supporting energy economic opportunities in Rio Arriba and Taos County.

Options for renewable energy resources located in Los Alamos County are insufficient to meet near-term demand:

- **Solar:** A 2017 feasibility study identified nine sites totaling 795 acres as potentially suitable, each with unique challenges (ongoing environmental remediation efforts, archaeological resources, floodplains, and endangered species habitat) that affect feasibility or time required for development. Over 2,000 acres (>3 square miles) would be required to generate sufficient and reliable power.
- **Wind:** Based on an analysis of the average 30-meter height wind velocity using National Renewable Energy Laboratory data, the LANL campus is not ideal for wind power generation
- **Geothermal energy production:** This is technically feasible but would involve large-scale clearing of forest land in Santa Fe National Forest and the Valles Caldera National Preserve to accommodate the required wells, generator buildings, and access roads, as well as a new transmission line and a seismic study. A geothermal option would require hundreds of acres and the removal of significant water rights from public usage.
- **Nuclear power:** Micro-reactors would not produce sufficient energy, and Small Modular Reactor technology is not yet licensed or ready for deployment.

# Next Steps for KCEC & Los Alamos County

- 1. Enter into a process and agreement with due diligence and viability, determining the best path forward to deliver green hydrogen capacity and associated energy to Los Alamos County**
- 2. Upon completion of due diligence, initiate negotiations to supply green hydrogen to Los Alamos County through a long-term Power Purchase Agreement (PPA).**

# Questions?

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## Contact Me

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Luis A. Reyes Jr.

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Luis Reyes



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