

# An Integrated Partnership Between High-Speed Fiber Optic Networks and Renewable Energy

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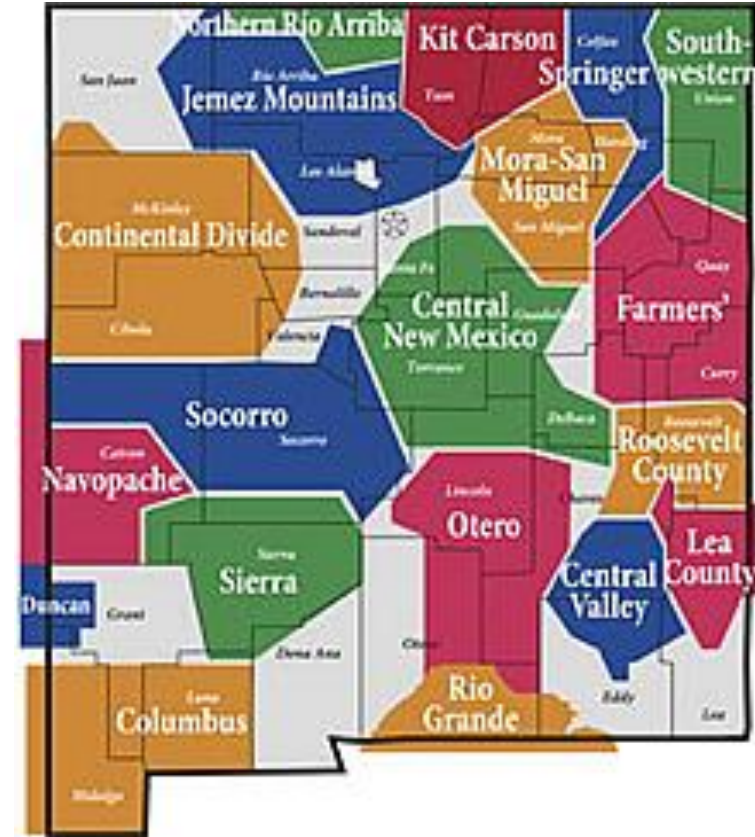
Science, Technology and Telecommunications Committee



Kit Carson Electric Cooperative, Inc. (KCEC) has 29,500 electric members, 6,700 Broadband members and 3,100 propane members serving Taos, Colfax and Rio Arriba counties, including 2 Pueblos in North Central New Mexico. KCEC has approximately 2900 miles of electric and high speed fiber optic lines.

KCEC has recently begun constructing a distributed solar fleet with storage integration to service 100% of KCEC's daytime peak kW by 2022.

In 2016 Kit Carson exited from its long term All-Requirements Power Contract with its G & T, Tristate, and contracted with a Power Marketer, Guzman Energy, for KCEC power supply for the next 10 years.



# Solar Plan Timeline

- Achieve 100% Daytime Renewables by 2023
  - 2016 - 2017 – Announcement of the Solar Plan, 10 MW installed and activated.
  - 2018 - 4-6 MW installed and activated, RFI / RFP for a storage partner, NREL Solar Energy Innovation Network participation.
  - 2019 - Integrating New Technologies: EV charging stations, additional 4-6 MW, locate optimal place for battery storage.
  - 2020 - 2021 - Add 4-6 MW, analyze first financial savings.
  - 2022 - Greater System Reliability, Emergency Preparedness and approximately a 40% Cost Savings energy savings.
  - Partnerships – Town of Taos, Village of Red River, Village of Angel Fire, Village of Eagle Nest, Village of Questa, Picuris Pueblo, Taos Pueblo, UNM, NNMC, Chevron, RCCLA, School Districts, Private land owners, a truly community project
  - Built by a local solar company



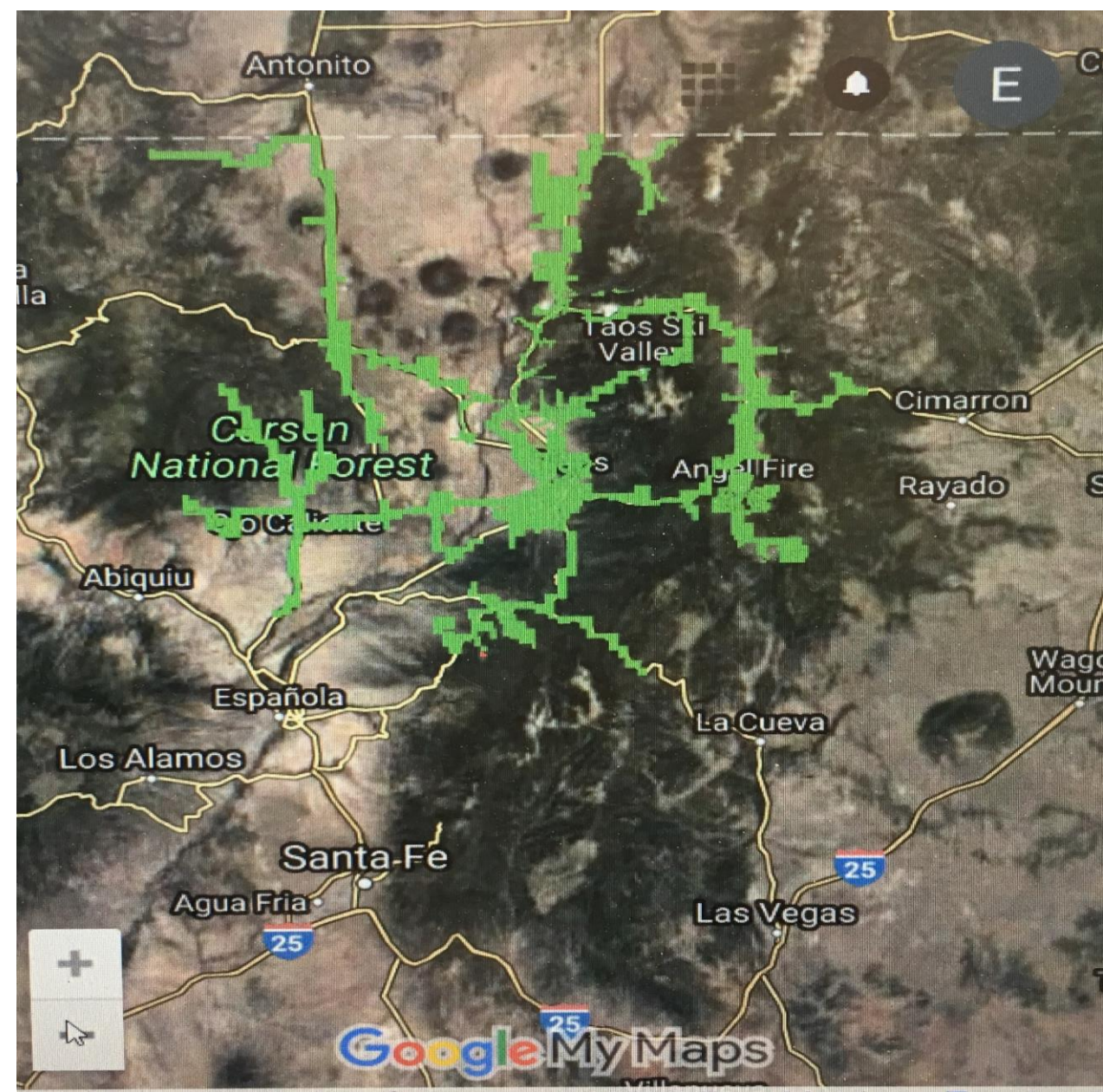


# Baseline Infrastructure is a High Speed Fiber Network

Kit Carson Internet serves over 6,700 customers including members who reside in areas where broadband was not available or service was limited. Additionally, to date the project has created 405 jobs, 90% which have been local; which were tied to physical main line construction. It has also given our local contractors and their laborers the experience and the skill sets to bid, and obtain projects outside the KCI service territory. This endeavor has greatly added to the economic viability of our surrounding communities. Broadband is the foundation for future economic development. KCEC has been deploying Fiber Services for electric operation since 2005.

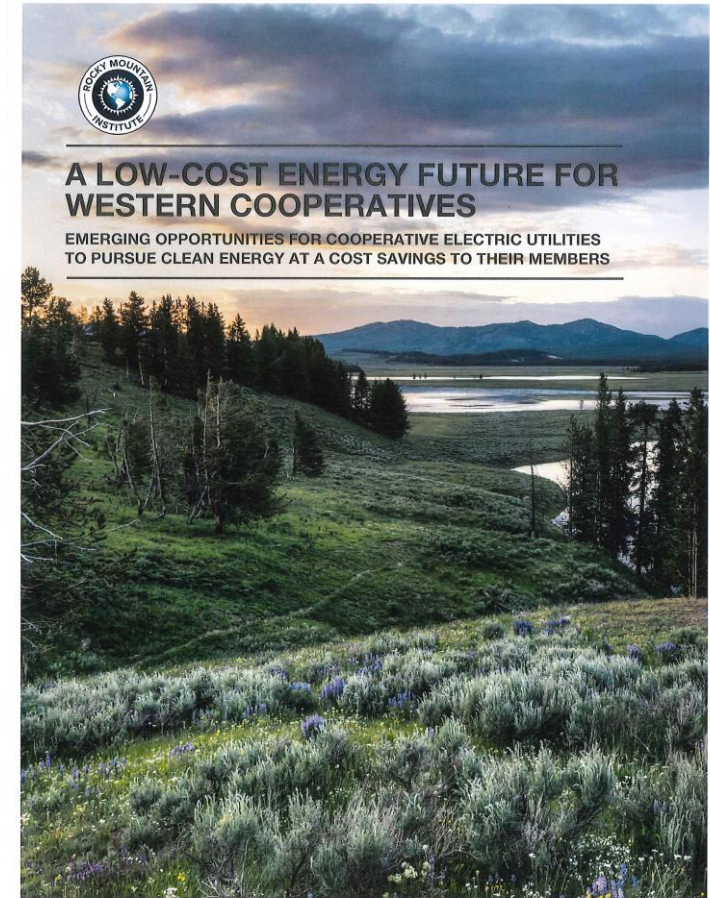
## Benefits of High Speed Fiber

- Real Time Pricing
- Enable Smart Grid
- Matching and Adjusting Solar Loads with Battery Storage
- GB Commercial Service





# The Landscape Is Changing



# National Renewable Energy Labs

National Renewable Energy Laboratory (NREL), the U.S. Department of Energy (DOE) Solar Energy Technologies Office's Solar Energy Innovation Network (SEIN) and Kit Carson Electric Cooperative, Inc. will be working together for the next 18 months to on a project called, the *Resilient Renewable Energy Roadmap for Rural Electric Cooperatives*. The focus is to pilot KCEC's 35MW solar project with battery storage and model how to address the nation's rapidly changing electricity needs.

## Goals

- Develop solutions for improving reliability and affordability of solar energy through options analysis and systems design.
- Focus on evaluating the grid impacts and costs anticipated for various penetration levels of solar and other distributed energy resources (DER).
- Provide available data and work in coordination with program staff to model approaches to minimize costs for combinations of solar and other DERs.
- Pilot and test approaches and document through case studies.



## Project Outcomes

- Develop a KCEC service area energy roadmap to achieve goal of 35 to 40 megawatts (MW) of renewable energy electricity supply by 2022.
- Complete one case study of a pilot solar PV technology system installation with the intent of broader replication.
- Demonstrate an operations model for rural electric cooperatives (RECs) to integrate DERs with storage into their portfolios including behind the meter application.
- Participate in regional resilient energy planning efforts.
- Develop a business model with best practices and build the internal capacity to make the resilient and renewable energy transition.
- Advance an education program on options for integrating resilient, renewable electricity supply for cooperatives.

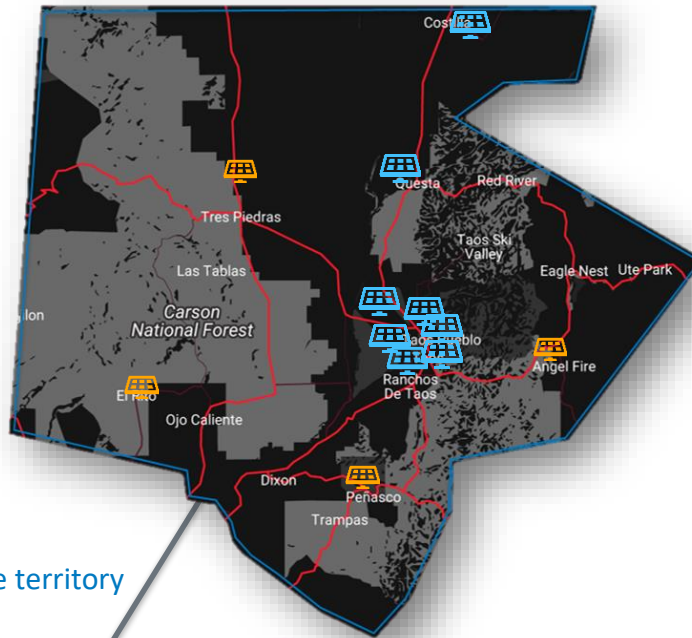


# NREL Modeling Project Summary

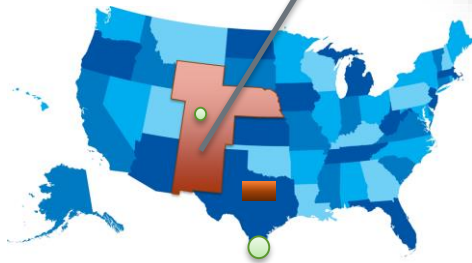
 Solar arrays KCEC owns and operates

 Solar arrays under development

KCEC operation region (New Mexico)



TRI-STATE G&T service territory



Kit-Carson plans to install up to 35 to 40 megawatts of solar generation by 2022 this summer around Taos, with a goal of achieving 100% day time solar

To achieve even higher PV penetration levels, NREL will develop a planning tool for KCEC that helps plan and achieve this goal.

## The tool should be able to :

Ensure that any new PV installations complies with applicable interconnection standards

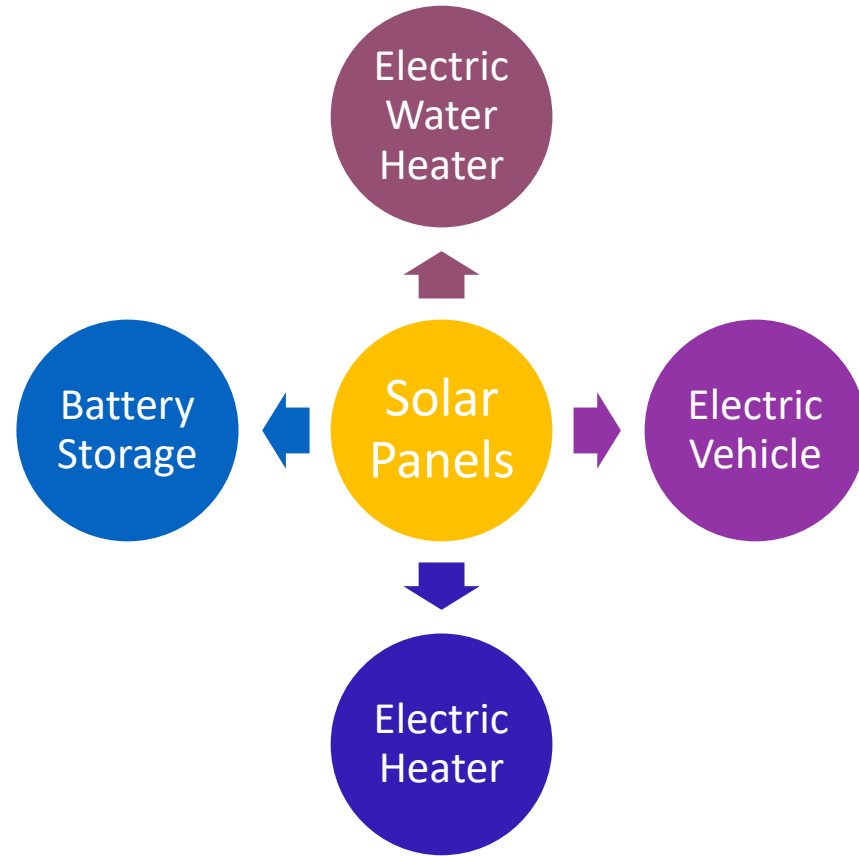
Estimate reverse power flows at the substation level for a given load and PV forecast

Identify potential bottlenecks in the network (both current and voltage constraint elements)



# Electrify Everything

*Future Innovation*



*Economic Development*



# Battery Storage

**Currently Underway** - Power storage and diversification of power sources are a key to future price stability. Solar is our members' supply of source but intermittent, thus storage is key.

- RFI
- RFP
- Estimating 3-4 MW of Storage in 2019
- 4-6 MW in 2020



## Potential Benefits

- Intelligent energy storage and frequency regulation
- Increased grid resilience and Stability
- Enhanced efficiency of renewables
- Cost Savings
  - Reduce KCEC peak energy demand by at least 3MWs as metered for transmission purposes
  - Self-supply Spinning Reserves Schedule 5 as defined in PNM OATT
  - Peak Shaving
  - Rate Design Enhancements
  - Rates around an asset
  - Dynamic pricing



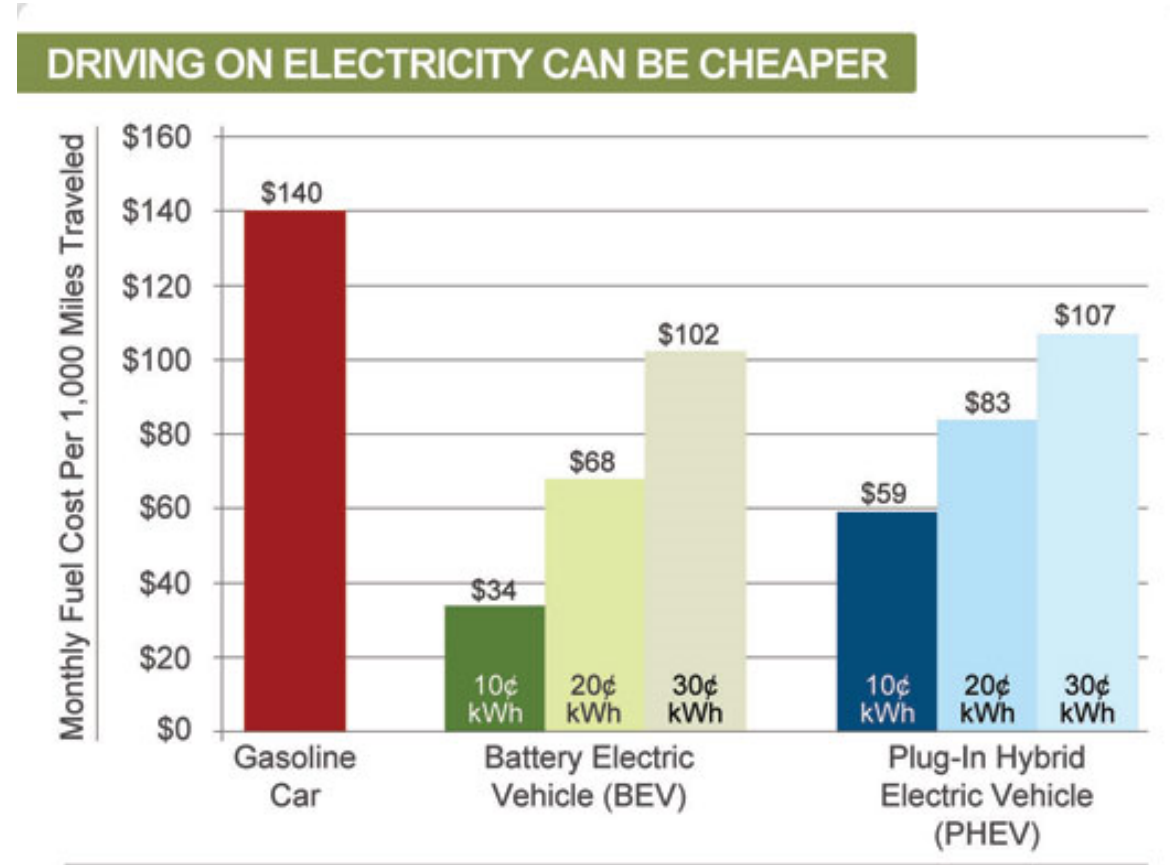
# Electric Vehicles are the Future

## Nationally

The Fourth Industrial Revolution in energy and transportation systems is upon us and New Mexico must deploy critical charging infrastructure today while anticipating the mobility transformation.

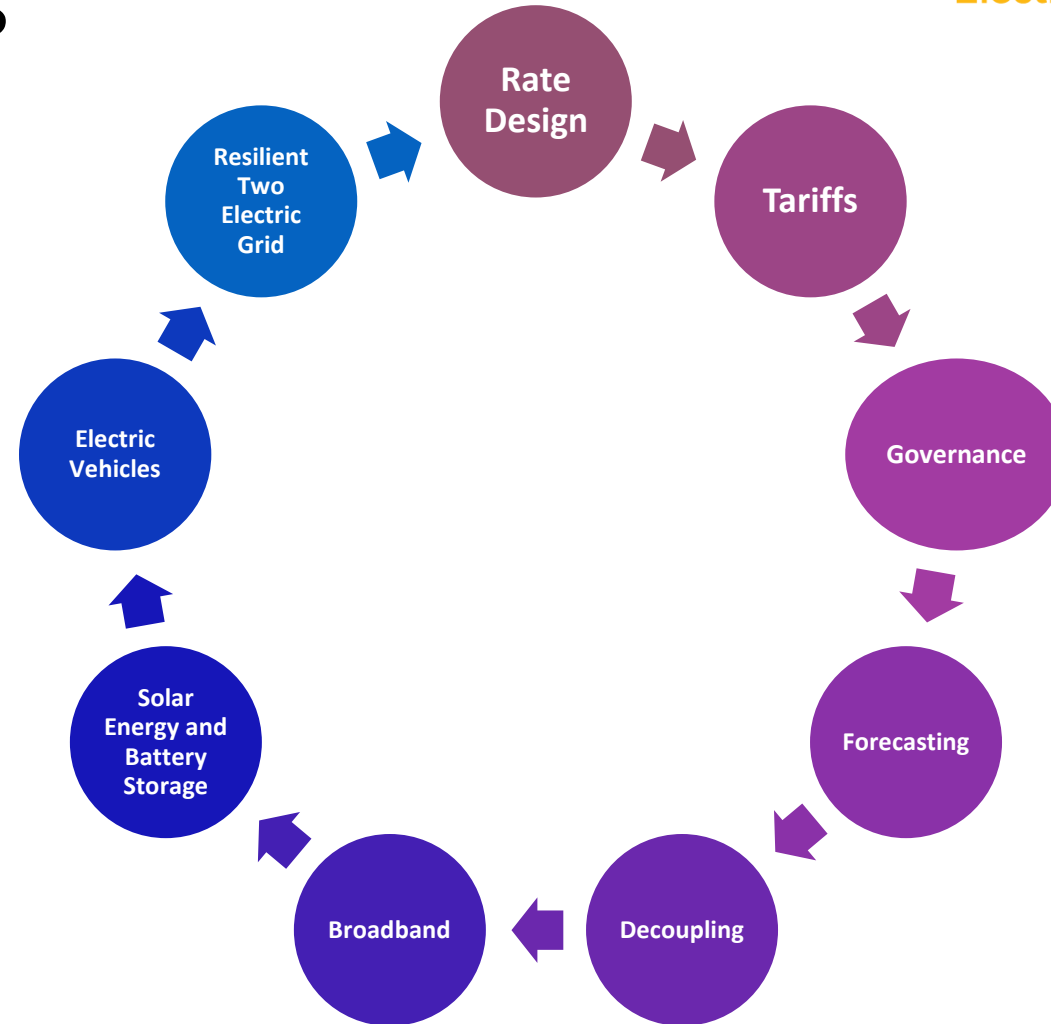
## Locally

Deploying the first charging stations in the KCEC Service Area in anticipation of the transportation transformation and as a tool to encourage tourism.





# A New Business Model Is Emerging



# Policy Discussion Areas

- PRC Regulatory Reform
  - Structural
  - Emerging Technologies
    - Power Storage
    - Electric Vehicles
    - *Behind the Meter* Applications
- Access to USF and Other Funding for *Last Mile* Deployment
- Facilitate Partnerships with Cities and Counties for a Statewide High-Speed Fiber Optic Network
- Decoupling of Rates
- Creation of a Statewide Database and Maps for EV Charging Stations
- Taxation Transition Plan



# *The New Energy Future*





Thank you



# Power Supply History

- 2000 - Plains/Tri-State G & T's merge, creates a 44 member G & T.
- 2002 - WESC term increases from 2020 to 2040.
- 2006 - WESC term increase to 2050. KCEC refuses to extend.
- 2013 -1st Rate Case for Tri-State in NM before NMPRC.
- 2014 - Begin Discussion with Tri-State on Exit of WESC.
- 2014 - 2016 – Due Diligence and Exit Work with Tri-State, Third Parties, RUS & CoBank
- 2016 - Solicit a New Power Supplier
- July 2016 - Exit from TS complete, New PPA with Guzman Energy Commences
- December 2016 - Begin 100 % Solar Daytime Peak Project
- March 2018 - Release Storage RFP

