



Kit Carson is building the grid of the future: WHAT THIS MEANS FOR YOU

TEXT AND PHOTOS BY **VISHU MAGEE**

THE ENERGY LANDSCAPE IS CHANGING

By early 2021, Kit Carson Electrical Cooperative (KCEC) will complete the installation of a 15 megawatt solar array near the airport, reaching its goal of 100 percent daytime solar.

This is a huge milestone: 100 percent of our daytime electrical needs will be solar-generated on a sunny midsummer day. In effect, about 42 percent of our annual load will be renewable energy – mere shouting distance from the 50 percent goal mandated for 2030 by the New Mexico Energy Transition Act. Kudos to Kit Carson and CEO Luis Reyes!

But that's just the start. The ETA requires 80 percent renewables by 2040, and 100 percent by 2050. The ultimate goal – not yet mandated, but critical to counter climate change – is to become completely carbon-free by 2050. That entails a gargantuan shift from fossil fuels to all-electric homes and vehicles, powered by renewables including solar, wind and geothermal.

WHAT THIS MEANS FOR YOU

On the face of it, you and I won't have to do anything different: just flip the switch, and your lights will be increasingly powered by clean, renewable energy. But under the hood it's not so simple: the energy transition presents dozens of choices, countless opportunities – and not a few growing pains.

For most of us, electricity rates are likely to come down. This is partly because locally produced solar electricity is cheaper than imported power. Ideally, we'll also be able to export and sell surplus solar energy.

Next are the opportunities: Incentives are being reviewed to encourage shifting power usage to daylight hours when solar production is peaking – laundry, dishwashers, etc. Those who conserve electricity may be rewarded by lower rates, while guzzling may cost you more. There may also be incentives for installing energy-efficient appliances, smart controls and whole-house batteries.

Further out, one can imagine incentives for upgrading home insulation or for converting from gas to all-electrical heating and cooling. This will have sweeping implications for the construction industry – new systems, new building codes, new green jobs. To that you could add possible incentives for purchasing electric vehicles and letting their batteries be part of the grid. EV fleets for schools, town, county and the pueblos seem like sure bets, as do charging stations at places of business.

And, importantly: lower income co-op members must not be left behind. As rates are redesigned, the intention is to create a fund to help everyone reach the goal of zero carbon. It's a golden opportunity to narrow the inequality gap.

THE GROWING PAINS

Change seldom comes without challenges – and behind-the-meter (BTM) systems are a case in point. Rooftop solar has blossomed during 40 years of tax credits and favorable “net metering” rates. But as the grid goes solar, many utility companies see private systems as expendable. BTM rates are likely to become less favorable. Last fall, the co-op abruptly ceased approving full-size installations, igniting a vehement protest. As of this writing, applications will be reviewed beginning in mid-May.

Kit Carson faces massive technical challenges as solar electricity collides with a grid infrastructure that has fundamentally not changed for decades. Unlike coal-generated power that flows on demand and at a steady voltage, solar energy is subject to surges as clouds come and go. Energy from a dozen grid-scale arrays plus 540 BTM systems has to be managed minute by minute. The risk is that surges in voltage might damage transformers, injure workers or possibly spark forest fires.

There are similar risks if solar production exceeds demand. Excess energy has to be stored, exported or dumped into the ground. Although KCEC’s build-out does include substantial battery storage, the ultimate *safeguard* is to simply curtail (shut down) production to avoid excess energy. The ultimate *solution* (not presently available) is to export and sell the excess power.

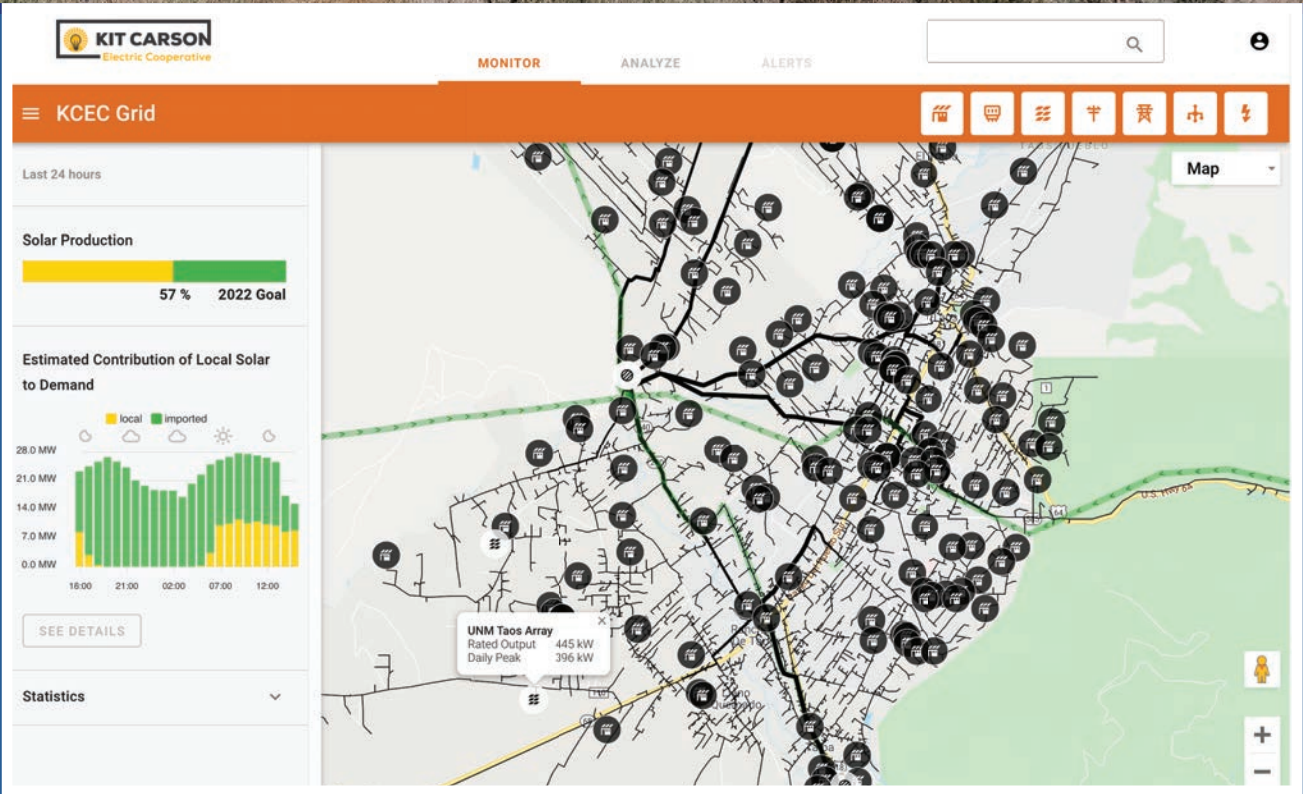
The flip side is that at night, in the winter or during cloudy weather, our power has to come from storage or be imported from wind farms in eastern New Mexico. This introduces environmental and economic issues having to do with transmission lines, the energy markets and agreements with other cooperatives and utilities, to whom KCEC is very much linked.

Finally, there is cost. It’s going to take an enormous package of financing and incentives for homeowners, businesses and communities to invest in this sweeping energy transition. If we do it right, we can create a stronger, green economy for Taos.



ABOVE: The 1,250 kW Blue Sky array was built in 2012 near Taos Mesa Brewing. It features 5,280 panels, capable of powering 350 homes. A single-axis tracking system allows the panels to face the morning sun in the east and then pivot to face the sun as it sets in the west.

RIGHT: A slide from the Camus Energy dashboard.



CAMUS ENERGY

It all adds up to a mind-boggling challenge. To meet it, the co-op has called in Camus Energy, a Bay Area group offering “zero carbon grid orchestration.” When you hire Camus, you get a dazzling team of software engineers and energy experts with years of experience at the likes of Google, SpaceX, Uber and the National Renewable Energy Lab (NREL).

I attended a demo of the Camus dashboard in early March – truly a Silicon Valley-meets-Taos moment. With Camus’ CEO chiming in online, COO Michael Ryan proceeded to blow our renewable energy minds. On a huge monitor, the software displayed the output, in real time, from all 10 solar arrays in the county. Switch screens, and you can track the effect of clouds passing overhead. You can read how much current is passing through the transmission lines, and at what voltage. If the co-op’s output falls short of demand, you can see what wind power is available for import, and at what price. All such data builds a historical database, affording greater ability to forecast energy flows and head off potential problems. It’s a grid operator’s dream.

Closer to your home and mine: Camus’ software can zoom in to our individual meters and see what our real-time usage is, then compare it to the historical data to help spot anomalies or to inform decisions about incentives or upgrades. For BTM owners, it can model whether there is a safety risk and pinpoint what smart controls or hardware might mitigate it. Interested in having your own rooftop collectors? Camus is the tool that puts the review of applications on an objective, case-by-case basis. Thinking of buying an electric vehicle and letting the battery be part of the grid? Eventually, Camus will help quantify the benefits to both you and the co-op.

“The grid connects us. How do we create an energy transition that benefits everyone?” - CAMUS ENERGY

WHAT YOU CAN DO

The solution to climate change is fundamentally this: **do everything in your power to eliminate carbon emissions now.** Taos’ energy transition is the perfect place to start. Here’s how to inform yourself and find ways to participate:

Kit Carson Electrical Cooperative’s website includes a media kit describing the solar project, forms for behind-the-meter applications and much more. Go to **kitcarson.com**.

Renewable Taos is a nonprofit dedicated to a full transition to renewable energy. The group includes an impressive crew of electrical engineers retired from Sandia Labs, Colorado School of Mines and elsewhere. RT is incredibly dedicated, and meets every Monday afternoon. Volunteers and visitors are welcome. Go to **renewabletaos.org**.

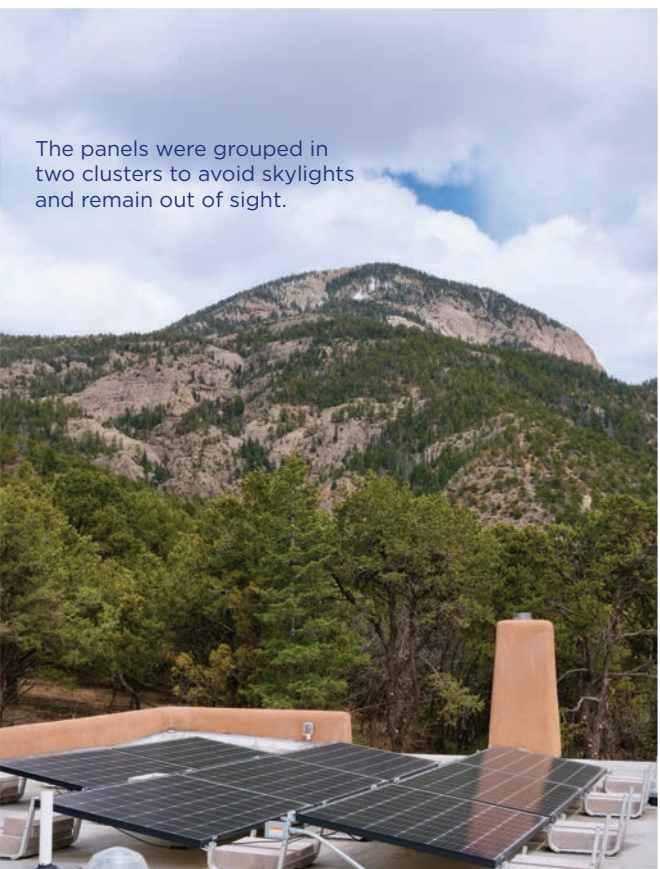
The Net Metering Advisory formed in January to advocate for behind-the-meter systems and work with the co-op to achieve a win-win solution. It has developed a position paper that includes a comprehensive action list. For information or a copy of the paper, contact **vishu@vishumagee.com**.

Camus Energy has a fascinating website with detailed descriptions of its mission, its staff and its technology at **camus.energy**.

The Regulatory Assistance Project (RAP) is the nonprofit selected by Kit Carson to assist with rate design. Visit them at **raponline.org**.



This house in El Salto has 20 rooftop panels well-concealed behind the parapets.



The panels were grouped in two clusters to avoid skylights and remain out of sight.



The inverter converts the power to direct current, and is the only piece of hardware that had to be indoors.

Vishu Magee has designed homes in Taos for nearly 50 years and currently serves as informal co-ordinator for the Net Metering Advisory. Contact **vishu@vishumagee.com**