Rural Electric Cooperatives' Role in the Energy Transition

An STS Research Paper
presented to the faculty of the
School of Engineering and Applied Science
University of Virginia

by

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March 27, 2020

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Electric cooperatives played an important role in electrifying rural America. In the 1930s, President Roosevelt established and supported rural electric cooperatives through the Rural Electrification Administration (REA) to extend electricity to rural areas that were overlooked by other utilities. Rural electric cooperatives are consumer-owned, not-for-profit utilities that exist for the benefit of their members. They operate based on seven cooperative principles including democratic member control, autonomy and independence, and concern for community (NRECA, n.d. f). REA is now administered by the USDA Rural Utilities Service (RUS), which continues to financially support electric cooperatives. The National Rural Electric Cooperative Association (NRECA), the national trade association for electric cooperatives, was formed in 1942 and currently works "to provide a unified voice for cooperatives and to represent their interests in Washington, D.C." (NRECA, n.d. d). Over 900 rural electric cooperatives now serve more than 42 million customers in 48 states (fig. 1) (NRECA, 2018b; Rocha, 2019).

Rural electric cooperatives are a part of a larger movement of energy flux, where emerging energy technologies have begun to overtake fossil fuels. This shift is a global movement known as the energy transition. At the heart of the transition is the need to reduce carbon dioxide (CO_2) emissions to mitigate the effects of climate change. Renewable energy technologies and energy efficiency improvements can potentially achieve 90% of those necessary reductions (IRENA, n.d.). Electric cooperatives are in a unique position to influence America's adoption of renewable energy and overall role in the energy transition. Rural electric cooperatives support the energy transition by reframing it in a way that encourages community

support. This is done through energy efficiency and community solar programs that adapt the goal of mitigating climate change to fit their local context. However, the effectiveness of electric cooperatives is hindered by their historical reliance on coal.

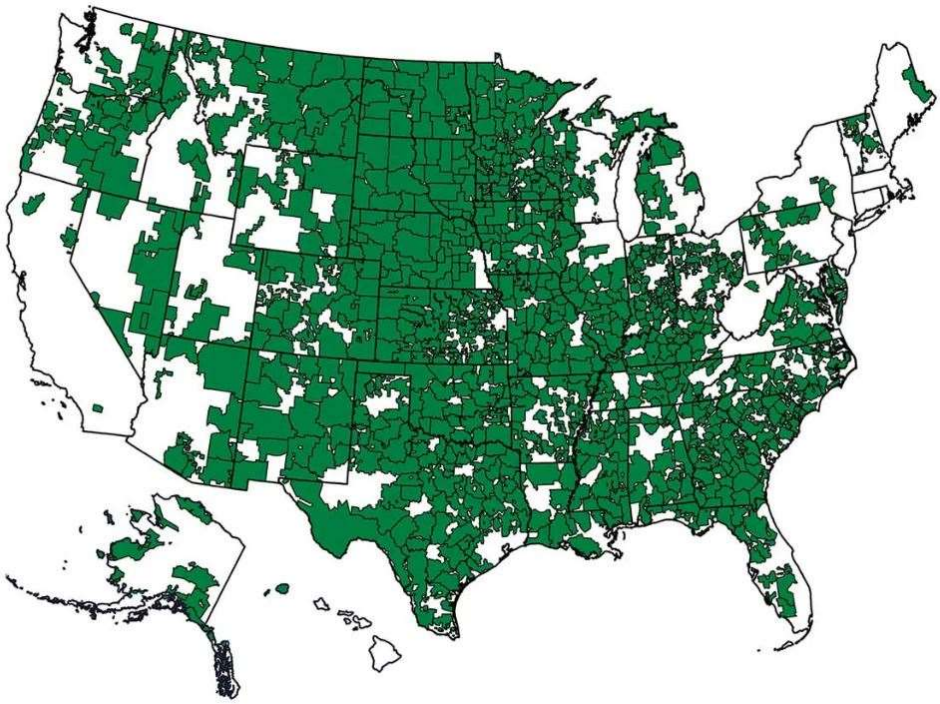

Figure 1. Territory served by rural electric cooperatives (shown in green) (Cooperative.com, n.d. a).

Review of Research

Nye and Spinak both analyzed the historical roots of rural electric cooperatives, contending that an unintended consequence of the REA was the reduction of local self-governance. Nye (1990) argues that while electrification was a technological success, the REA "threatened local autonomy" by imposing Washington's values on rural America. Spinak (2014) agrees, arguing that REA was designed with "an orientation towards economic growth at the expense of local democracy." She argues that REA "oversight...ultimately undermined the ability

of co-ops to act as independent institutions" (Spinak, 2014). REA caused national energy policy to be associated with dependence and created rural distrust of federally mandated renewable energy. Emerging technologies such as community solar present opportunities to reclaim local autonomy and energy independence.

Spinak and Taylor (2019) argue that electric cooperatives are in a unique position to strengthen local democracy due to their member-owned structure. Taylor states that "the electric cooperative provides a venue by which citizens may actually participate in democracy." Spinak agrees but adds that for members to participate, electric cooperatives must address issues of community concern. She contends, "it is only when energy policy becomes tied to possibilities for local development - local innovation and job creation, social justice, local as well as global environmental health… - that electric co-ops have become meaningful democratic forums" (Spinak, 2014). Energy efficiency programs and community solar are examples of this success.

Researchers have criticized the efforts of rural electric cooperatives. Taylor contends that "electric co-ops are suspiciously silent," and have been using their "clout" to "limit change" rather than "grow the cooperative movement," especially about the shift from coal to renewables (Taylor, 2019). Spinak argues that historically, "[member] growth has not been matched by participation, nor was there ever much participation, even at the beginning" (Spinak, 2014). She points to this lack of member participation as a barrier to electric co-ops, concluding that they "reflect the assumptions and desires of their membership, including, too often, apathy" (Spinak, 2014). Cooper (2008) goes further, contending that cooperatives have "sought to conceal information from their members" and "free of member scrutiny, co-op managers have often failed to serve their members' interests." Cooperatives have found success by responding to

member interest in renewable energy, but they would be more effective if they reduced their dependence on coal.

Jolivet and Heiskanen (2010) emphasize reframing national energy goals as an essential step to achieving success in a local context. In a case study on a wind farm, they concluded that "a successful project manager is precisely an actor who is continuously reframing and adapting his or her project" to the local context. This conclusion applies to rural electric cooperatives who act as the reframing actor. Spinak and Taylor both allude to electric cooperatives implementing reframing techniques. According to Taylor, "electric cooperatives operate as a gateway, an access point" between local and national energy policy. Spinak contends that since NRECA plans give little attention to the local scale, "small actions that refocus electric co-ops more towards local issues tend to have big results" (Spinak, 2014). By reframing the energy transition and NRECA goals to fit local needs through energy efficiency programs and community solar, electric cooperatives have achieved meaningful local results.

Modernizing Rural America through Energy Efficiency Programs

Rural electric cooperatives utilize energy efficiency programs to upgrade aging infrastructure while reducing members' utility bills. Policies that increase energy efficiency help to reduce energy intensity, a key driver in reducing greenhouse gas emission and combating climate change (Cross, 2019). They are the least expensive and most effective way to support the energy transition in often neglected, low-income rural communities. According to the general manager, Michigan's Cherryland Electric Cooperative's program "serves a segment of our membership that often gets left behind in the move toward renewable energy and energy efficiency" (Holly, 2018a). Rural communities face an increased energy burden and growing

utility bills as a share of income, and rural electric cooperatives serve 364 of the nation's 395 (92%) persistently impoverished counties (NRECA, n.d. c). Most of the people cooperatives serve earn less than the national average income (fig. 2).

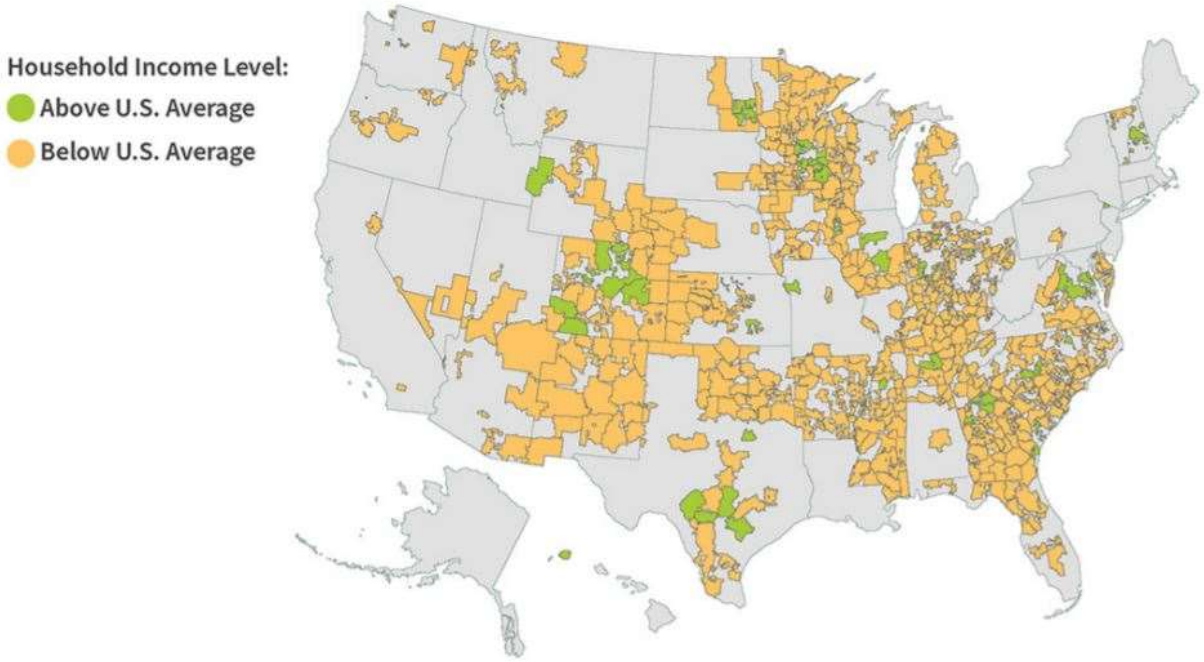

Figure 2. Cooperative Service Areas and Household Income Levels (NRECA, 2018b).

A participant in Roanoke Electric Cooperative's Upgrade to $ave program faced bills as high as $1,100, stating "we were working just to pay our utility bill" (Roanoke EC, 2017). A Cherryland member expressed that the savings from the program "mean that I don't have to worry about how my dogs are going to eat." (Holly, 2018a). In regions where members work an extra job just to pay their utility bills, implementing renewable energy economically seems impossible, so energy efficiency can help bridge that gap. In some communities, renewable energy policy is seen as an attack on local values, and energy efficiency upgrades can save

energy while “avoiding purchasing solar, poultry, swine and wind renewable energy credits that are mandated by the state” or federal government (Wynn, 2016).

Electric cooperatives implement energy efficiency programs with the help of local contractors and USDA loans, such as RUS’ Energy Efficiency & Conservation Loan Program. The programs help to bring jobs to the region and revitalize rural economies. A USDA representative specified, “funding commercial, farm and residential energy efficiency investments supports rural economies…these investments save money for consumers, create jobs in the community and help energy providers better manage costs.” (Johnson, 2017). Electric cooperatives have confirmed this. The CEO of the Roanoke Electric Cooperative stated that in his program “local contractors are doing the work and we are feeding them with a steady flow of jobs" (Stark, 2017). Similarly, the general manager of the Ouachita Electric Cooperative in Arkansas said “we try and use as many local contractors as we can. We want to reinvest everything in our community, if we can” (Walton, 2017). These jobs are connected to the local community, as representative of the How$martKY program involving four Kentucky electric cooperatives described, “you can’t send your house to China to be weatherized” (Rocha, 2017). Most programs include a free energy audit and a tariff-based on-bill financing offer based off of the Pay-As-You-Save (PAYS) method for upgrades such as weatherization or new HVAC systems. The tariffs are tied to the meter, allowing renters to participate. The programs can also be provided without credit scoring, a usual barrier for low-income members (Farrell et al., 2017). The economic and energy benefits from these energy efficiency programs are undeniable, as one program coordinator described, “it is really hard to argue against energy efficiency" (Stark, 2017).

Increased energy efficiency reduces energy use, which in turn leads to lower utility bills for members. In the How$martKY program, participants have lowered their annual energy usage by an average of 5,500 kWh, or 30%, saving an average of $624 per year (Farrell et al., 2016). An Ouachita Electric Cooperative program reports energy savings of 30% from upgrades for single-family homes, and 35% for apartments (Walton, 2017). When weatherization upgrades are combined with efficiency HVAC systems, members can save up to 40% in their average energy usage (EEtility, n.d.). The CEO of the Roanoke Electric Cooperative praised their program's success, saying "this project is helping the utility, is helping the member-consumers who own the utility, and is sustaining the environment. It doesn't get much better than that." (UC Davis Energy, 2019). Overall, their program has saved the cooperative over $2 million through reduced energy demand (Farrell et al., 2016). This reduces demand for power produced at distant power plants, keeping money in the community. Cooperative leaders have described these programs as "a foot in the door to renewable energy," and proclaim that "the next step is moving beyond energy efficiency [towards renewable energy]" (Stark, 2017; UC Davis Energy, 2019).

Electric Cooperatives Embrace Renewable Energy and Community Solar

Falling Cost of Solar Drives Change

In addition to energy efficiency, many rural electric cooperatives have embraced renewable energy, especially solar. This has been driven by the falling cost of solar energy, as well as the economic benefits it brings to rural America. The cost of utility-scale solar has fallen about 13% per year for a total of 89% between 2009 and 2019 (Lazard, 2019). It is projected that by 2030, it will be cheaper to build new solar or wind capacity than to continue operating coal anywhere (Scott, 2020). These falling costs have led to a rapidly growing industry. It is projected

that by 2040, renewable energy will lead global electricity production, with solar energy generation growing the fastest, an average of 8.3% per year (EIA, 2019). Solar energy provides both environmental and economic benefits to rural America. Clean energy technologies reduce the carbon intensity of the energy supply, a significant way to reduce carbon emissions and fight climate change (Cross, 2019). Between 2017 and 2018, there were 2.81 as many jobs in the solar industry than in coal, and a recent report by the NRDC documents a "booming clean energy economy" throughout the Midwest that supports 158,000 jobs (NASEO & EFI, 2019; NRDC, 2018). The rapidly falling cost of solar energy and the economic and environmental benefits it supplies make it an attractive technology to rural electric cooperatives.

Cooperatives as an industry are market-driven and have followed the market towards solar energy. Even when local communities may resist renewables, their interests in affordable electricity can outweigh their conservative values. As the NRECA board president stated, "as bad as in some cases we might want to deny that fact, we live in a sustainable driven society, and as utilities, as cooperatives, we have to acknowledge that clean, affordable power is the rule of the day moving forward" (UC Davis Energy, 2019). In addition to the market, co-op members have an increasing demand for renewable energy, especially solar. When asked why they offer renewable energy programs, 68% of cooperatives responded that they wished to increased member satisfaction, 59% named member demand for solar offerings as their primary consideration for offering the programs, and 43% said the declining cost of solar was their driving force (NRECA, 2018a). The CEO of the Eau Claire Electric Cooperative in Wisconsin described their motivation as "making decisions for our grandchildren and for our members that are going to be a part of this cooperative 20, 30, 40 years from now." He argues that "clean, renewable energy is one way to guarantee confidence in their future" (Eau Claire Electric

Cooperative, 2015). While consumer demand and customer satisfaction were cited as major drivers for implementing renewable energy projects, the cost of participating is most important to members. “Signing up can’t result in a net loss to my wallet” stated a member to the NRECA, and the ability to save money ranked first among the benefits that could affect a member’s decision to participate in a program (NRECA, 2018a).

Cooperatives have implemented renewable energy programs with NRECA support and the help of USDA loans through programs such as Rural Energy for America (USDA, n.d.). NRECA’s Solar Utility Network Deployment Acceleration (SUNDA) program has helped introduce solar to cooperatives and advance the community solar model. The final report documenting the SUNDA project described a “solar revolution in rural America;” the project saw total solar capacity increase nine-fold during the project lifetime (2013-2018) (NRECA, 2018a). Currently, the combined capacity of cooperative solar is enough to power 200,000 homes (Holly, 2018b). Much of this capacity comes from utility-scale projects hosted by generation and transmission (G&T) cooperatives that sell wholesale power to distribution cooperatives. The SUNDA report concludes “G&Ts are responsible for substantially driving up the combined total capacity. And by going big, G&Ts have been able to drive down costs” (NRECA, 2018a). Through SUNDA, NRECA has developed toolkits and supplies for cooperatives to implement solar projects (Cooperative.com, n.d. b; Cooperative.com n.d. c).

Community Solar Creates an Equitable Model for Rural Renewable Energy

In particular, SUNDA found success through community solar projects. Rural electric cooperatives currently host 75% of all utility-sponsored community solar projects (fig. 3; Holly, 2018b). These consist of centrally installed solar panels that co-op members can buy into

voluntarily. Members share the benefits of the project without the large upfront costs, maintenance, and land required of a traditional home solar project. The community solar model works well for cooperatives, providing a low-risk way model for providing members the renewable energy they desire. Cooperative members "have expressed strong interest in solar energy," and "are looking for affordable, sustainable energy" (Eau Claire Electric Cooperative, 2015). According to a member of the Eau Claire Electric Cooperative, community solar is "a great thing for sustainability [and] another great thing for your pocketbook" (Eau Claire Electric Cooperative, 2015). NRECA describes the benefits of community solar by comparing it to electric cooperatives themselves, stating "like co-ops themselves, community solar programs have open membership, they are local, and they are consumer-owned" (NRECA, 2018).

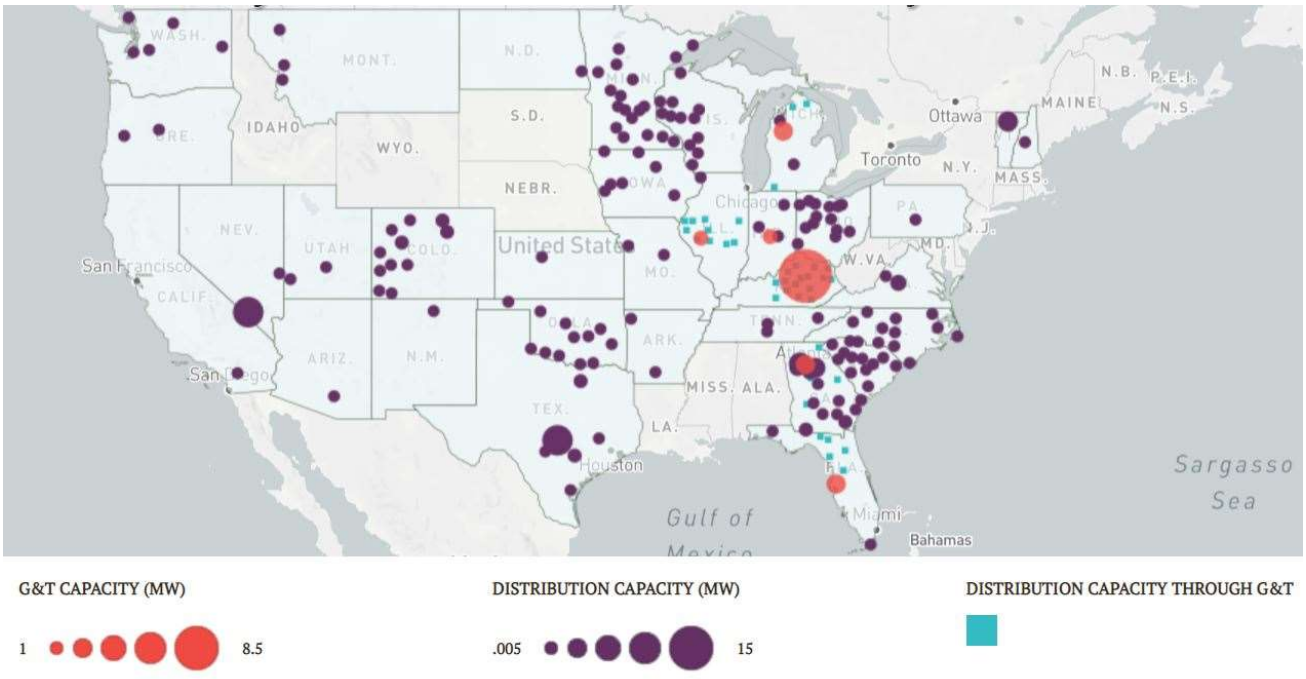

Figure 3. Electric Cooperative Community Solar Projects (as of Jan 2017), (NRECA, n.d. a)

Community solar lowers the per-unit cost of solar energy using economies of scale, which can lower utility bills and decrease member's energy burdens (Krishnaswami, 2018). Many cooperatives have adopted an on-bill financing plan similar to the PAYS plan. Pioneered by the Eau Claire Energy Cooperative, this monthly subscription option allows all members the option to participate. It also ensures that members will realize the benefits of future declines in the price of solar (NRECA, 2018a). The CEO of the Hancock-Wood Electric Cooperative in Ohio said that due to on-bill financing, their community solar project "allows us to offer a cheaper alternative for our members, one in which they can participate no matter what income level they're at" (Hancock-Wood Electric Cooperative, 2017). This reduced cost does not reduce reliability. The Farmers Electric Cooperatives in Iowa is the leading solar utility in the state of Iowa, and among the top utilities in the country for local solar capacity per customer (3rd in 2017). It also boasts the best reliability indices among Iowa utilities, proving that incorporating solar does not necessarily mean reducing reliable service (Farmers Electric Cooperative, n.d.).

Community solar also provides a boost for local economies. A member of the Eau Claire Electric Cooperative described how the project supports "locally produced power being maintained by local people, which puts money back into the community" (Eau Claire Electric Cooperative, 2015). The Otero County Electric Cooperative in New Mexico reports that their community solar project "will provide co-op member savings...property tax revenues...and local jobs during site development and construction" (Steel, 2017). That project saw record-low rates for distributed solar in 2017, with members paying less than 4.5 cents per kilowatt-hour (Steel, 2017). The project is expected to achieve annual savings of over $250,000, which "will automatically be passed directly to our members," allowing all 14,000 members to benefit (Smythe, 2018; Steel, 2017). Community solar works well for the cooperative model, reducing

members' bills and diversifying their power generation. It brings jobs and money to the local community and helps members feel that they are "investing in their kid's future" (Hancock-Wood Electric Cooperative, 2017).

Rural Electric Cooperatives and Coal

Cooperatives are held back by their historical reliance on coal. While NRECA and USDA both outwardly support renewable energy, NRECA admits they have "significant interests in coal-fired generation, due in large part to earlier federally mandated requirements essentially forcing [cooperatives to invest in] coal-fired generating facilities" in the 1970s (NRECA, 2018b). These investments have left rural electric cooperatives billions of dollars in debt to increasingly uneconomical coal plants (Smythe, 2019). NRECA has fought against EPA regulations supporting clean energy, supporting the repeal of PURPA and the Clean Power Plan (English, 1997; NRECA, 2018b). These policies would force the premature shutdown of coal plants, which would "result in stranded assets, drive up electric rates, and hurt local economies" (NRECA, n.d. e).

However, in many areas of rural America, it is economically viable to phase out coal and replace it with solar. Tri-State, a G&T cooperative that serves Colorado, New Mexico, Nebraska, and Wyoming distribution cooperatives, announced it would be closing a major coal plant by the end of 2020, stating "the low costs of renewable energy and operating cost reductions help to counterbalance the cost to retire our coal assets early" (Holly, 2020). Coal debt stands in the way of other cooperatives following Tri-State's lead. A 2019 report by the Center for Rural Affairs outlined five major options for addressing coal debt, including federal regulatory action, debt absolution, credit asset swap, securitization, and RUS refinancing. The authors recommend that

the RUS take ownership of cooperative coal assets in exchange for debt forgiveness and further investments in energy efficiency and renewable energy. This solution requires no legislative action due to a legal precedent. They also support the plans outlined in the Green New Deal (Hatlestad, et al., 2019). Increasing investments in energy efficiency programs and community solar would continue to benefit rural communities and support the energy transition.

Coal debt affects cooperatives beyond those who directly own the plants. Large G&T cooperatives, such as Tri-State, impose caps on the amount of renewable energy their distribution cooperatives can generate. This ensures that the energy from their coal-fired generation plants will stay in demand (Logan, 2016). During the SUNDA project, over 66% of distribution cooperatives cited these generation caps as a barrier to developing solar projects (NRECA, 2018a). Tri-State's cap is 5%, and many distribution cooperatives feel this is too low. In 2016, Kit Carson Electric Cooperative ended its contract with Tri-State, as they were "the principal obstacle to expanding renewable energy in our community" (Logan, 2016). Four Colorado cooperatives have reached that 5% cap, including Delta-Montrose Electric who have spoken to Tri-State about the "feasibility and costs of withdrawing from their membership," La Plata Electric, whose board passed a resolution urging Tri-State to increase their cap, and United Power who lobbied Tri-State to raise the cap up to 10% (Smythe, 2018). The caps imposed by G&Ts limit renewable energy projects that could bring environmental and economic benefits to rural communities.

Conclusion

Rural electric cooperatives are as important to the 21st century as they were to the 20th century. In the 1930s, they extended electricity to rural areas, increasing the standard of living

and benefiting local economies. Today, they support the energy transition through projects that revitalize rural economies and lower members' utility bills. Energy efficiency projects bring necessary upgrades to low-income communities that are often left behind in the energy transition. They reduce electricity demand, cut utility bills, and lower cooperative members' carbon footprints. Community solar is an equitable form of renewable energy that allows any interested member to benefit. It increases local autonomy and boosts the economy. These projects prove how imperative it is for global movements to find connections to local communities. Rural electric cooperatives act as a bridge between the global goal of mitigating climate change and local goals for a strong economy and a stable future. Energy efficiency programs and community solar are examples of initiatives that accomplish both sets of goals.

However, these projects rely on support from the federal government. In his 2021 budget proposal, President Trump recommended eliminating funding for all USDA Rural Business and Cooperative programs. This includes the Rural Energy for America program which provides financial support to cooperative's renewable energy projects (Kelly, 2020). These projects boost local economies, lower utility bills, and satisfy member demand, and it would be a disservice to rural America to defund them. Rural cooperatives can be further supported through policies that address coal debt. Alleviating their dependence on this increasingly uneconomical resource would provide further flexibility to respond to member demand for renewable energy. Due to their connection to the local community, rural electric cooperatives are in a unique position to advocate for what is best for their members. When addressing matters of national or global concern, it is vital to utilize this type of resource that represents the concerns of overlooked areas. Rural electric cooperatives do their part to ensure that no one is left behind in the energy transition.

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