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Teri Viswanath

*Lead Economist
Power, Energy and Water*



From Underdogs to Leaders: Co-ops in Energy Transition

Key Points:

- Despite an absence of financial incentives, electric co-ops are transitioning to low or zero-carbon resources at a similar or faster than average pace. What's more, the delayed start in developing these resources possibly contributed to keeping member-rates low.
- The next chapter of the nation's transition to clean energy will require greater supply-side adoption of renewable generation as well as profound consumer coordination. And, given their unique governance structure, rural electric cooperatives are possibly better positioned to excel at this phase.
- Electric cooperatives have quietly emerged as laboratories for clean grid innovation, outpacing investor-owned utilities on smart meter installations, time-based pricing pilots, and experimental storage solutions.
- All told, rural communities could begin to aggressively close the energy transition gap over the next decade – pivoting from underdog to leader on clean energy.



Introduction

With the recent passage of the U.S. landmark \$1.2 trillion federal infrastructure spending package to shore up the country’s roads, bridges, pipes, ports and transmission grid, now is an opportune time to reflect on the state of our rural electric infrastructure. In particular, the progress rural communities have made in clean energy transition deserves a closer look.

A recent article in *The Wall Street Journal* suggested that rural electric cooperatives were falling behind in transitioning their communities to cleaner, low-cost, renewable energy. According to that report, the lack of financial means and at times, intransient community leadership, has slowed progress in replacing aging coal plants. With official estimates indicating that electric cooperatives still source 32% of their power from coal compared to the national average of about 23%, it would appear that rural electric cooperatives are indeed lagging behind.

Yet, while acknowledging the headline estimates, we believe that this story is more nuanced. In our opinion, the authors of that piece fail to recognize the hard-won gains these communities have made in their energy transition or the strong community leadership that has brought about this change. More to the point, the next round of climate action will require significant consumer engagement, with the electric cooperatives better positioned to claim pole position in the race toward zero-emissions.

Much of the country’s emissions reductions have been achieved by switching from coal to natural gas – a bridge strategy that doesn’t have a second act. The next significant drop in emissions will require even greater supply-side adoption of renewable generation but also profound consumer coordination. The admittedly slower start toward clean energy transition possibly enables rural communities to now more fully take advantage of the falling cost of renewables. Moreover, given their unique governance structure based on member alignment, rural electric cooperatives are possibly better positioned to work with consumers on the last mile of de-carbonization.

All told, rural communities could begin to aggressively close the energy transition gap over the next decade – pivoting from underdog to leader on clean energy.

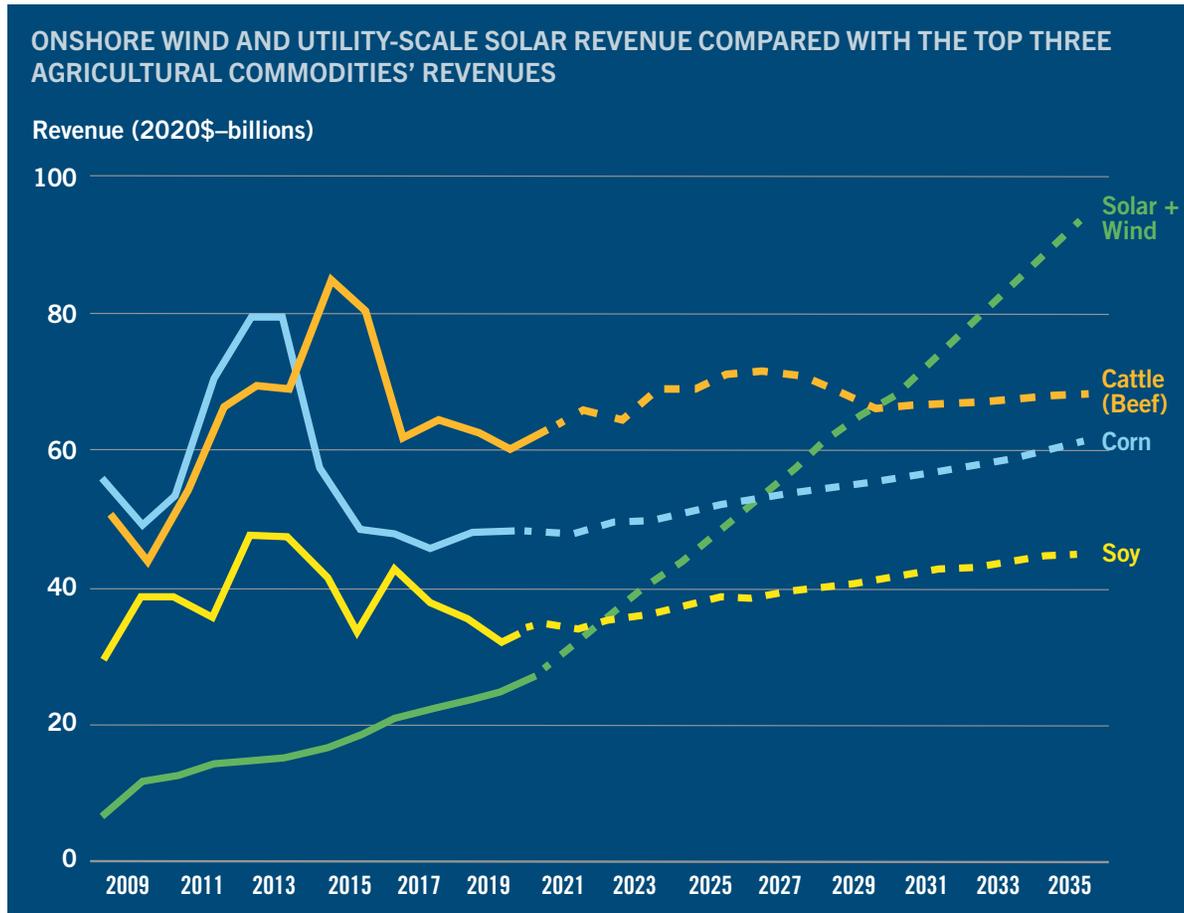
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Energy Transition Translates to Rural Economic Growth

As home to 99% of onshore wind projects and a growing share of utility-scale solar projects, rural communities stand to receive a sizable economic boost as surrounding communities and, more broadly, the country transitions to cleaner energy. In fact, the Rocky Mountain Institute suggests that wind and solar-driven economic development could generate tens of billions of dollars – potentially outpacing the three leading agriculture sectors (cattle, corn and soy).¹

The scope of this opportunity is large. The Department of Energy suggests that by 2035, solar energy has the potential to power 40% of the nation's electricity.² Solar now makes up 5% or about 96 GW of the utility-scale electricity supply. To achieve the 40% solar target, the U.S. would have to double the annual average installations or install 30 GW of solar capacity each year between now and 2025 and 60 GW per year from 2025 to 2030. For rural communities, this accelerated development could spur a new cycle of economic development.

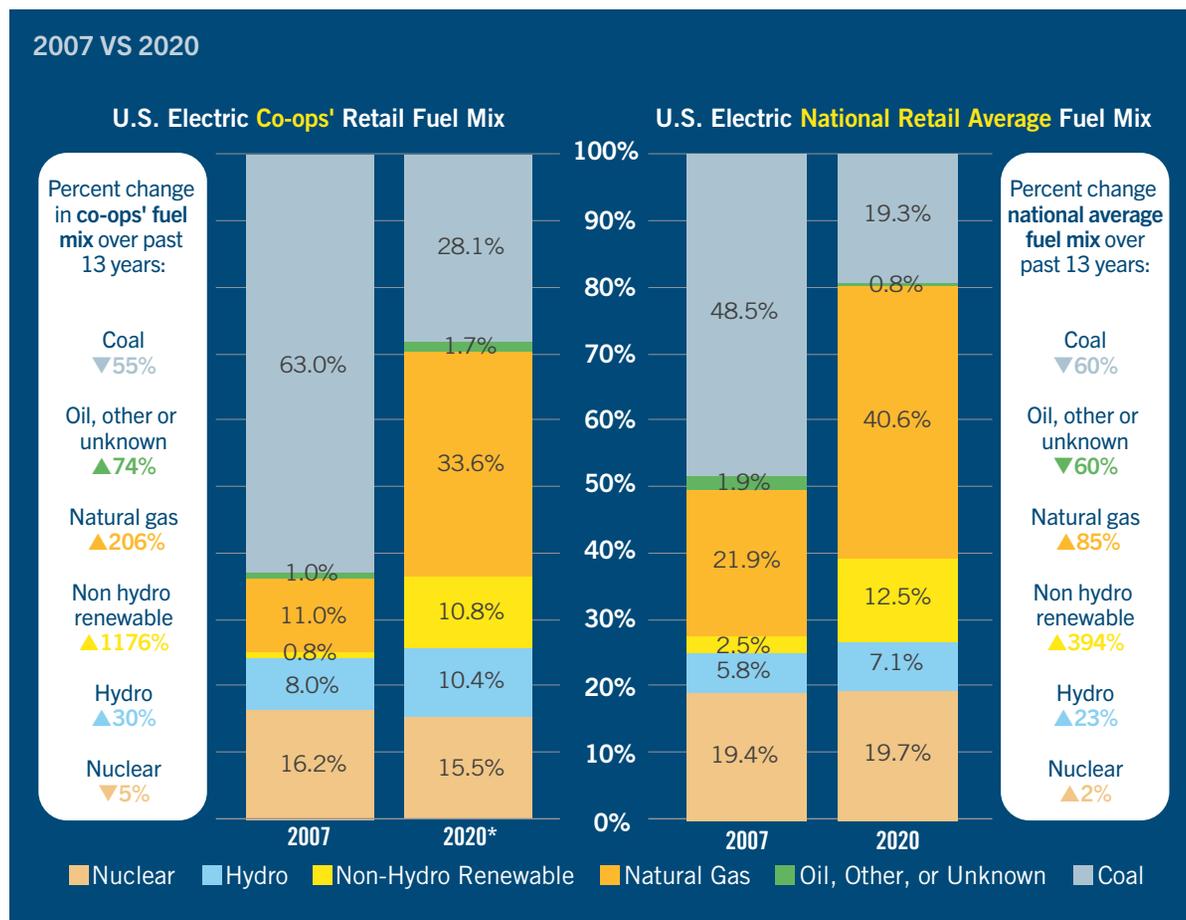


Source: Rocky Mountain Institute, *Seeds of Opportunity*, 2021.

US Electric Cooperatives in Transition

Electric co-ops are actually transitioning to low or zero-carbon resources at a similar or faster pace than their investor-owned utility equivalents. Annual data from the National Rural Electric Cooperative Association (NRECA) and CoBank's analysis show that co-ops' dependence on coal is declining at a rate roughly aligned with the national average.

In 2007, 63% of electricity for electric co-op members came from coal plants, compared to the national retail average of just 48.5%. By 2020, those numbers had dropped to 28% for electric co-op members compared to the 19% average. That's a decline of 55.4% compared to 60.2% drop in the national average. Cost considerations – directly borne by co-op membership as opposed to utility shareholders – have been the primary factor influencing the timing of energy transition for rural communities. And, the delayed investment likely kept member-rates low, as these communities could take advantage of falling wind and solar development costs. Such considerations also likely delayed investment in natural gas plants, side stepping the real problem of stranded assets in the early 2000s.



Sources: NRECA, International Energy Agency (IEA), and *CoBank estimates

The High Cost of Rural Coal Plant Development

There is also a need to acknowledge the role policy has played in the make-up of rural generation resources. Federal policies in the late 1970s limited natural gas power plant development, forcing electric co-ops at the time to develop coal resources to meet the growing needs of their communities. About 65% of rural electric co-op coal plant capacity today was developed between 1978 and 1987, coinciding with the highest contemporary window of interest rates – and burdening co-ops with double-digit interest rate debt. While it's unclear how much is still on the books, the financial drag of those decade-old commitments may explain why electric cooperatives have moved more slowly in retiring coal-fired assets in favor of now lower-cost renewable generation.

These coal plants were considered a safe investment at the time; not so today. Perhaps more important is the fact that building and operating a new large-scale wind or solar plant could be cheaper than continuing to run an existing coal or gas-fired power plant.³

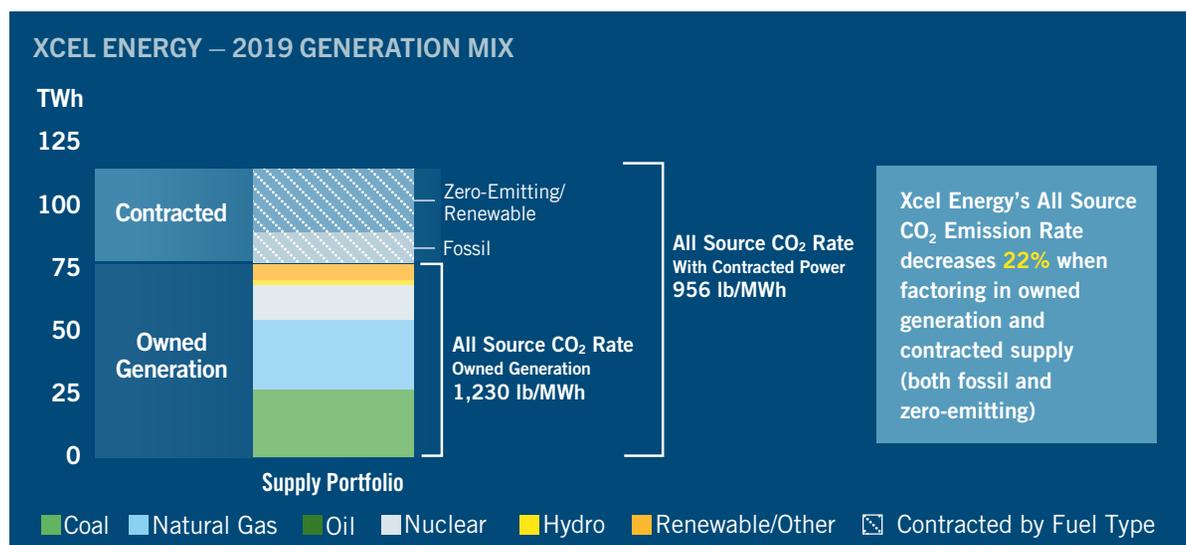
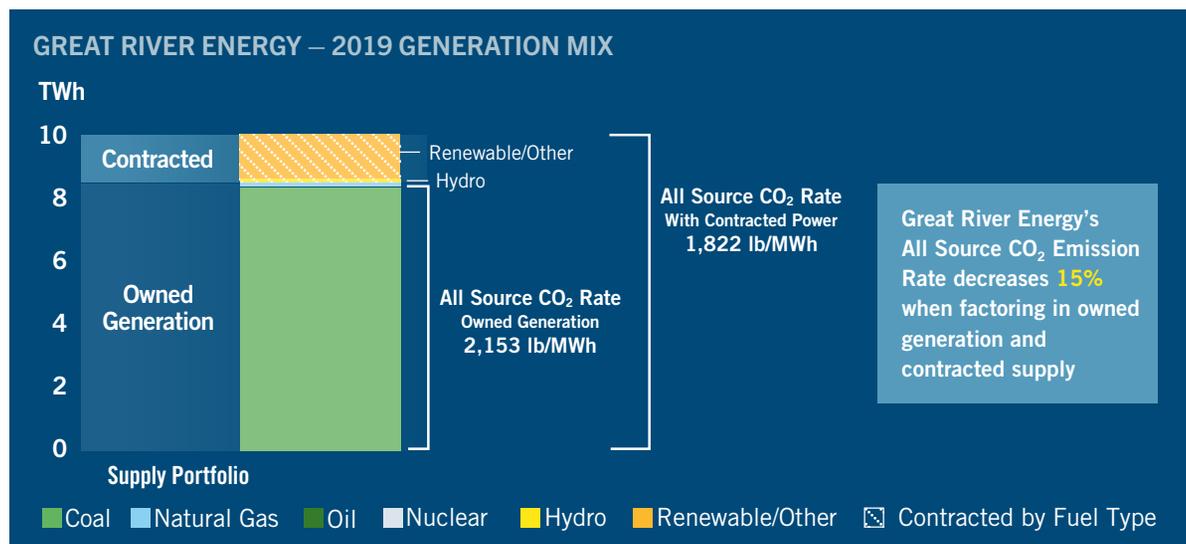


Source: Investing.com

New Supply Contracts Favor Renewables

Generation and transmission (G&T) electric cooperatives own roughly 10% of the nation's coal fleet. The difference between the output of these plants and electric cooperatives' actual coal dependency (28%) appears to be the output from contracted purchase power agreements. Recent emissions case studies⁴ show contracted supply might be a quick and effective means for lowering carbon intensity by pegging new contracts to renewable supply.

The timing for contracted supply could explain the fuel-mix difference between two recent case studies: Great River Energy, an electric cooperative, and Xcel Energy, a large investor-owned utility. Roughly 60% of Xcel's contracted supply consists of renewable generation whereas Great River can boast of 100%. Xcel likely contracted during a period when greater natural gas capacity was being developed – but its greater exposure to contracted supply might increase its flexibility for reducing its emissions profile. Generally, unwinding a physical asset involves not only decommissioning the generating unit, but also workforce and other considerations that might keep carbon emissions locked in.



Source: M.J. Bradley, *Benchmarking Air Emissions of the 100 Largest Electric Power Producers in the U.S.* pgs 40-41, July 2021.

Commitments Suggest Greater Co-op Transition Ahead

At present, 38 states have defined renewable or clean energy electricity mandates, with roughly half of U.S. renewable generation growth attributable to these requirements. In turn, the regulatory and public pressure applied by these programs, as well as more favorable economics, have prompted utilities and electric cooperatives to adopt clean energy goals.

According to NRECA, roughly 16 G&T and distribution cooperatives have defined energy transition plans, with a handful being able to boast of adopting more aggressive targets than required by their states. Our management interviews have emphasized that co-op members were behind the drive toward transitioning to zero-carbon energy supply. Looking ahead, the research suggests to us that a greater number of member-consumers will seek agency over their electricity supply, electing access to renewables. To be sure, according to the annual Deloitte surveys, 2020 was probably a tipping point for this environmental activism, with even greater pressure building for energy transition over the next decade.⁵

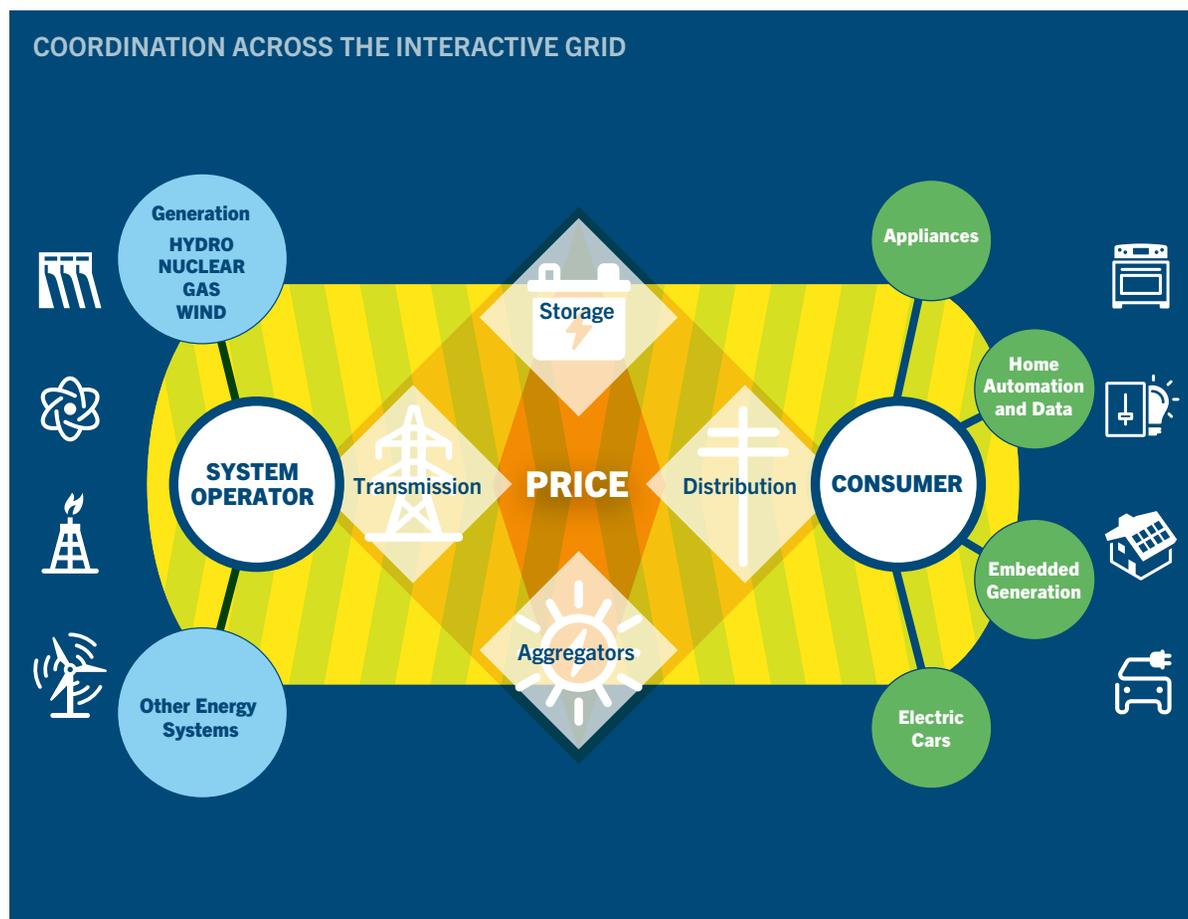
Co-op Commitments	
G&T Cooperatives	Distribution Cooperatives
East Kentucky Power Cooperative (KY)	BARC Electric Cooperative (VA)
Great River Energy (MN)	Blue Ridge Energy (NC)
North Carolina Electric Cooperative	Cobb Electric Cooperative (GA)
Old Dominion Electric Cooperative (VA)	Grand Valley Power (CO)
Tri-State G&T Association (CO)	Holy Cross Energy (CO)
Hoosier Energy (IN)	Kauai Island Utility Cooperative (HI)
Wabash Valley Power Alliance (IN)	Kit Carson Electric Association (NM)
	Kodiak Electric Association (AK)
	Vermont Electric Cooperative (VT)

Source: NRECA

“Last Mile” of Transition Requires Consumer Load Flexibility

In addition to asserting greater agency over the choice of electric generation, consumers will likely make other critical environmental elections that will impact upstream energy suppliers – such as switching from gasoline to electric cars and possibly replacing natural gas appliances.⁶ To be sure, nearly two-thirds of the deep de-carbonization ahead on the path to net-zero emissions will require significant consumer adaptation, according to IEA.⁷ Consequently, vertical coordination across the interactive grid, which will integrate these new consumer elections, will play an increasingly important role in lowering emissions.

Smart meters and automated control technologies enable consumers to shift electricity demand to take advantage of cleaner and cheaper supplies without sacrificing service. These new grid-edge technologies create a two-way flow between suppliers and consumers, but they also disrupt predictable customer demand. Real-time load forecasting variation is now subject to the choices that consumers make behind the meter but are unknown to the supplier – choices that will ultimately redefine the very relationship between energy buyers and sellers.

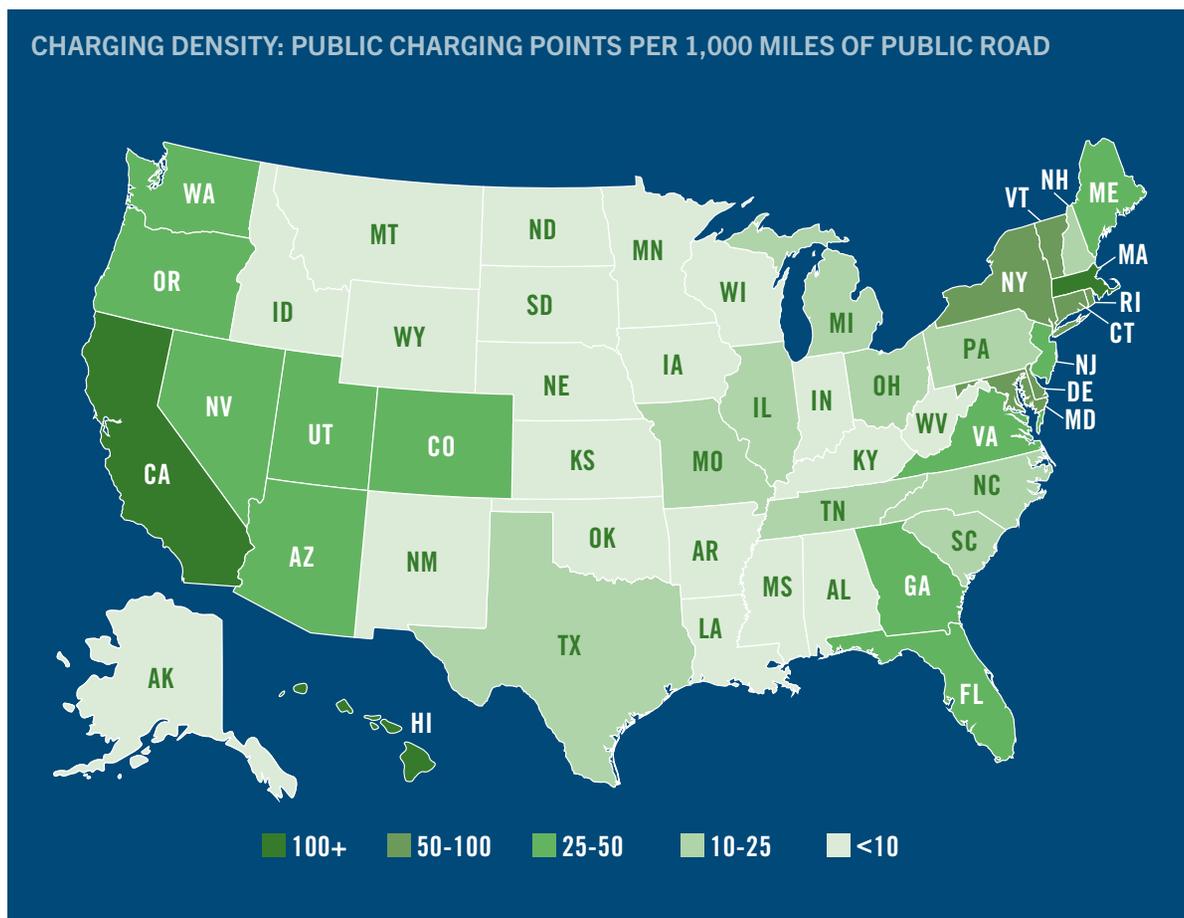


Source: CoBank

Community Re-Investment Encourages Co-op EV Support

As we consider consumer choices for lowering emissions, transportation looms large – but, just how quickly will consumers adopt electric vehicles and what are the broader implications for rural communities?

Nearly non-existent a decade ago, new electric vehicle sales in the U.S. have steadily risen. When the dust settles on the 2021 data, nearly 4% of all new vehicle sales were likely electric or double the average sales over the past three years. Recent House committee testimony, however, focused on the obstacles for rural adoption. Yet, what was missing from that discussion was the inherent economic incentives for those communities and the role policy could play.* Rural communities have a greater share of low-income households and they spend nearly one-fifth of their income on gasoline, three times more than the average U.S. household. Consequently, EV adoption could help rural communities retain a larger portion of transportation spending and lower their monthly fuel bills – economic factors that have galvanized support from co-op managers.



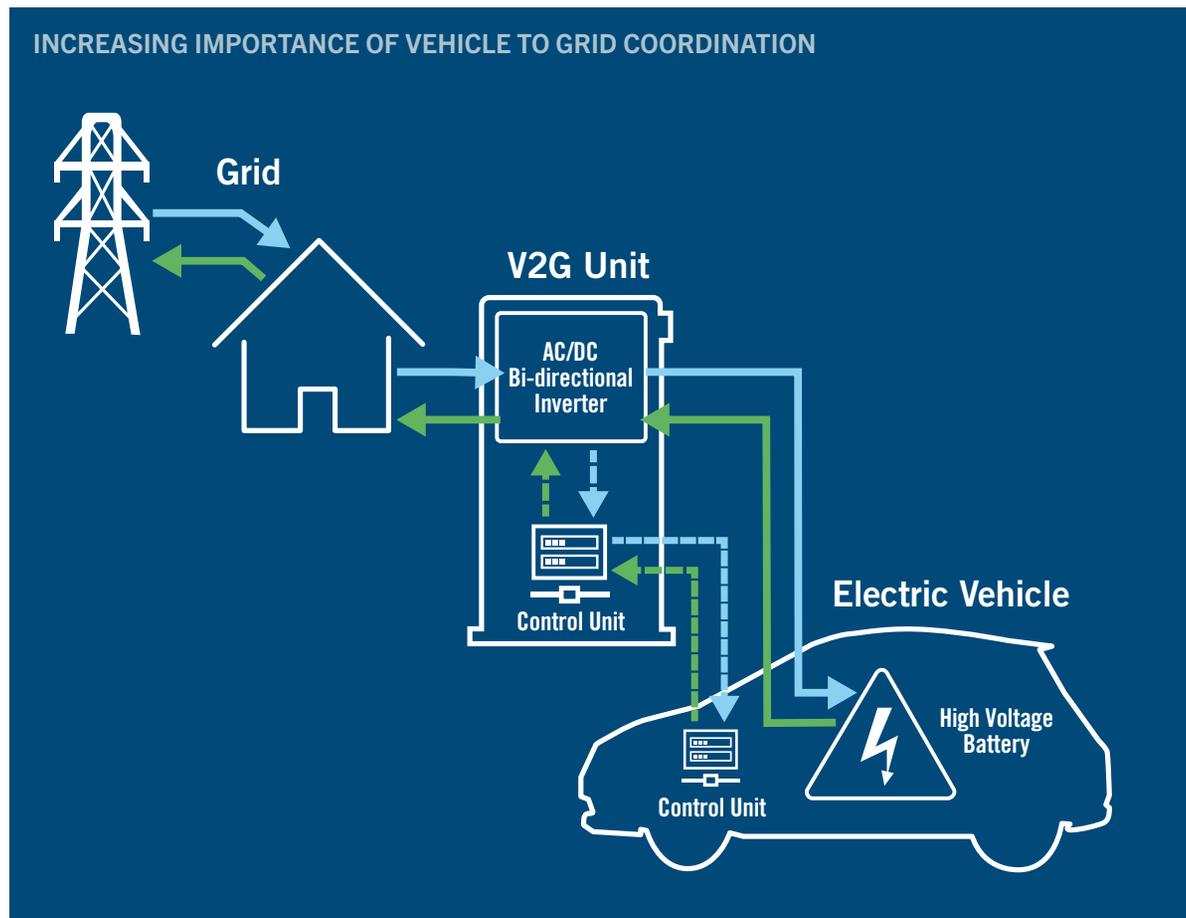
Source: Alternative Fuels Data Center, Federal Highway Administration (Public level 2 and DC fast-charge points per 1,000 miles of public road)

*Public funding will play an important role in rectifying the chicken-and-egg problem of chargers and EV adoption by kick-starting a cycle of investment in rural chargers and purchase of EVs. The recent EV charging infrastructure investment of \$7.5 billion under the federal infrastructure act is a welcomed development but the difficult part is ensuring monies are funneled where they are needed most.

Electric Co-ops Likely to Lead on Clean Grid Coordination

In 2020, 39% of total U.S. electricity came from zero-carbon emitting sources such as nuclear, hydro, wind and solar, up from 30% a decade earlier. And, while the next significant decline in U.S. emission will require even greater renewable development, profound consumer coordination will also be necessary – this is where electric cooperatives excel.

Advanced communication and management systems can help consumers manage usage, or load, to efficiently optimize the grid. Cooperatives are already leveraging these systems to lower consumer energy bills, maximize the value of renewable energy generation and reduce overall system costs. Moreover, given their unique governance structure based on member alignment, electric cooperatives are possibly better positioned to work with consumers on the last mile of decarbonization. A recent feature article, showcasing innovative cooperatives, emphasized this unique positioning: “Electric cooperatives have quietly emerged as laboratories for clean grid innovation, outpacing investor-owned utilities on smart meter installations, time-based pricing pilots, and experimental storage solutions.”⁸



Source: Ford Motor Company and Sunrun

Summary

Rural communities have always produced the majority of America's energy, from coal mining and oil and gas production to the more recent development of wind and solar resources. The importance of these communities in sourcing the nation's energy will be further reinforced as an accelerated cycle of renewable development gets underway.

In rural America's own energy transition journey, hard-won gains and thoughtful leadership have enabled communities to overcome the financial drag of decade-old commitments to coal plant development. Indeed, it could be argued that the delayed start in developing alternate natural gas and renewable resources could be attributed to the lessons learned from these earlier obligations. Nevertheless, the lag in development probably kept member-rates low and possibly even contributed to reliability. As we look ahead, the limited window between the development of renewable resources and the emergence of more cost-effective storage solutions will simply reinforce future resilience while continuing to keep co-op member costs low.

During the next chapter of energy transition, we see a need for both greater supply-side renewable development but also profound consumer coordination. The greatest opportunity for lowering emissions likely rests on changing consumer behavior, with significant opportunities emerging for lowering emissions through greater vertical coordination. It is here, during the last mile of de-carbonization, that electric cooperatives are better positioned for greater gains.

All told, rural communities could begin to aggressively close the energy transition gap over the next decade – pivoting from underdog to leader on clean energy.

References

- ¹ Seeds of Opportunity: How Rural America is Reaping Economic Development Benefits from the Growth of Renewables. Rocky Mountain Institute, 2021. <http://www.rmi.org/insight/seeds-of-opportunity>
- ² DOE Releases Solar Futures Study Providing the Blueprint for a Zero-Carbon Grid. U.S. Department of Energy, Sept. 8, 2021. <https://www.energy.gov/articles/doe-releases-solar-futures-study-providing-blueprint-zero-carbon-grid>
- ³ Building New Renewables Is Cheaper Than Burning Fossil Fuel. Bloomberg, June 23, 2021. <https://www.bloomberg.com/news/articles/2021-06-23/building-new-renewables-cheaper-than-running-fossil-fuel-plants>
- ⁴ Benchmarking Air Emissions of the 100 Largest Electric Power Producers in the United States. M.J. Bradley & Associates, July 2021. <https://www.mjbradley.com/reports/benchmarking-air-emissions-report>
- ⁵ Consumers Expect Brands to Address Climate Change. Deloitte, April 20, 2021. <https://deloitte.wsj.com/articles/consumers-expect-brands-to-address-climate-change-01618945334>
- ⁶ Sources of Greenhouse Gas Emissions, U.S. Environmental Protection Agency. Accessed Jan. 21, 2022. <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>
- ⁷ IEA: Behavior Change is Critical for Reaching Net-Zero Energy. American Council for Energy-Efficient Economy, June 3, 2021. <https://www.aceee.org/blog-post/2021/06/iea-behavior-change-critical-reaching-net-zero-energy>
- ⁸ From smart meters to big batteries, co-ops emerge as clean grid laboratories. Energy News Network, Aug. 26, 2021. <https://energynews.us/2021/08/26/from-smart-meters-to-big-batteries-co-ops-emerge-as-clean-grid-laboratories/>

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