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RURAL ELECTRIC COOPERATIVES AND THE TRANSITION TO A CLEAN ENERGY FUTURE

A Guide for Cooperative Leaders

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Acknowledgements:

We would like to acknowledge and thank the many people who reviewed and provided insights for this toolkit, including:
- Erik Hatlestad, CURE
- Gabe Pacyniak, University of New Mexico School of Law
- Matthew Popkin, RMI
- Lauren Shwisberg, RMI
- Katerina Stephan, RMI
- Dr. Leah Stokes, Rewiring America
- Rick Weston, Regulatory Assistance Project
- And many others

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C. Promote Beneficial Electrification for Buildings and Transportation

Among the wide-ranging changes taking place in the power sector, one of the more striking is the opportunity for beneficial electrification: electrifying end uses historically powered by natural gas or oil. Beneficial electrification provides one of the biggest opportunities in the power sector today to connect member-owners with more affordable and cleaner resources and to improve management of the grid and reduce harm to the environment and public health. Beneficial electrification can reduce members' costs in the long run and help make more effective and efficient use of the electric grid and is a necessary prerequisite to eliminating carbon emissions from the power and transportation sectors by replacing oil and gas combustion, especially when utilizing generation from renewable sources. For electrification to be considered beneficial, it must provide a net benefit that (1) saves members money over the long run, (2) enables better grid management or (3) reduces negative environmental impacts.

First, electrifying end uses can reduce members' long-run costs because most forms of electrification are more efficient than their fossil-fueled counterparts. These efficiencies decrease overall energy use and operating costs. Additionally, depending on the level of adoption of these end uses, all electricity member-owners can enjoy these benefits through the associated system benefits, not just those who installed these innovative electrification technologies.

Due to the flexibility of many forms of electrification in buildings — including water heating, some forms of space heating and transportation electrification via EVs — these end uses can help increase grid flexibility. Because EVs and electric water heaters are flexible in when they draw power and are used, they can function like batteries. This flexibility enables a shift in load to times when there is less demand for electricity, when electricity is cheaper or when renewable energy generation is abundant and away from times when there is greater demand and the need to draw upon more expensive and often more polluting generation resources. With the electrification of EVs and space and water heating, cooperatives are in a position to improve their ability to manage loads and share cost savings with member-owners.

Beneficial electrification can help reduce environmental impacts by using less energy than fossil-fueled alternatives, by providing the ability to reduce reliance on often dirtier resources used to serve electric

system peaks and by adding the flexibility that can make the grid more capable of accommodating variable generation resources like wind and solar. A key point here is that as long as we are reducing the carbon intensity of the grid, as we have been doing since 1990, every electrical device powered by the grid is getting cleaner throughout its lifetime.[121]

All of the electrification options below may benefit from incentives to encourage member-owner adoption. Financial incentive programs for member-owner adoption of EVs, electric heat pumps and electric water heaters are widely used around the country. Incentives can come from the cooperative (typically through rebates), third-party energy efficiency providers or governmental agencies or programs (through rebates, loans or tax incentives). Riverland Energy Cooperative in Wisconsin provides members with detailed information on rebates for Energy Star appliances; electric water heaters; heating, ventilation and air-conditioning; efficient lighting; and EV chargers. Additionally, the cooperative provides links to state and federal rebates in addition to cooperative rebates.[122]

One way cooperatives can incentivize electrification is through rebates for more efficient appliances. Hutchinson Utilities Commission in Minnesota has a joint website with Bright Energy Solutions that provides information for their many rebate programs, both residential and commercial, covering multiple Energy Star appliances, air-conditioning and more — all in one convenient place.[123]

Cooperative-financed early appliance retirement programs (aka "cash for clunkers") can also motivate members to make more reasoned decisions about water heater or space heater replacement. Rather than having to make a purchase decision under duress when an appliance breaks down, member-owners can consider replacing aged appliances in a more thoughtful and reasoned manner. Early retirement programs can identify appliances that are nearing the end of their useful lives and then work with members to replace them before an emergency purchase is required.[124]

Electrification of buildings, through space and water heating, and transportation offers cooperatives a lot of flexible load that can be shifted to accommodate renewable energy and to decrease peak load. It is also an opportunity for members to save money on more efficient appliances and vehicles and is an important step in meeting clean energy goals and achieving the clean energy transition. Below are some options cooperatives may consider for beneficial electrification of buildings and transportation.

1. Building Electrification Components

While we tend to think of buildings as stationary, inflexible structures, they have the potential to dynamically interact with the electric grid. Electrification of space and water heating is key to this flexibility.

a. Electrification of Space heating

Because space heating represents such a sizable proportion of energy use in the average home, it is a key focus for electrification efforts. Electric space heating, especially with new heat pump technology, will reduce member costs, enable better grid management and lessen environmental impact. Most space heating currently relies on fossil fuels, such as home heating oil, propane and gas. Beneficial electrification of space heating represents multiple opportunities for members to save on their total energy bills by switching to a more efficient heating technology (depending on the housing type and region); for cooperatives and grid operators to secure valuable grid management benefits; and for a significant reduction of greenhouse gas emissions.[125] The Beneficial Electrification League of Colorado launched a Love Electric campaign to accelerate the adoption of heat pumps, heat pump water heaters and other efficient electric technologies in Colorado homes and businesses. The initiative connects home and business owners with rebates, financing options and registered installers.[126]

121 Roberts, D. (2017, October 27). *The key to tackling climate change: Electrify everything.* Vox. https://www.vox.com/2016/9/19/12938086/electrify-everything. For more information on beneficial electrification, see Farnsworth et al., 2018.

122 Riverland Energy Cooperative. (n.d.). *2022 rebate programs.* https://www.riverlandenergy.com/rebates

123 Bright Energy Solutions. (n.d.). *Hutchinson Utilities Commission.* https://www.brightenergysolutions.com/municipalities-container/mn/hutchinson-utilities-commission/

124 Farnsworth et al., 2018.

125 Shipley, J., Lazar, J., Farnsworth, D., & Kadoch, C. (2018). *Beneficial electrification of space heating*. Regulatory Assistance Project. https://www.raponline.org/knowledge-center/beneficial-electrification-of-space-heating/

126 Love Electric. (n.d.). *About Love Electric.* https://loveelectric.org/who-we-are/

b. Electrification of Water Heating

Water heating accounts for almost 20% of residential energy bills, and put simply, today it can take far less energy to heat a gallon of water with electricity than directly with fossil fuel. Transitioning from fossil-fueled water heaters to electric resistance and heat pump water heaters is an important step in achieving a low-carbon economy. Electric water heaters also enable improved grid management through control of their energy use or charging. Electrification load is often relatively flexible for when it draws power from the grid. Generally, as long as members can take a hot shower when desired, they do not care about when their water heater is drawing power. As a result, water heaters can serve as thermal storage of energy supplied at other times of the day, helping to balance the grid.[127] La Plata Electric Association in Durango, Colorado, will install air-source heat pump water heaters for income-qualified members to help manage local power demand. During the pilot project, the cooperative will install the water heaters in 30 homes in the Animas View Mobile Home Park, as well as other energy efficiency measures. The water heaters will run on a schedule to help the cooperative avoid the higher cost of power during peak periods, which will lower costs for all members. Availability of hot water will not be affected by this scheduling, given that water heaters typically store enough hot water for a whole day.[128]

2. Activating a Grid-Interactive Building

Buildings can be made into a valuable grid resource by focusing their energy demand reductions at high-cost times or shifting load to times of day when excess renewable energy is being produced. For buildings to be grid interactive and provide value to the grid, space and water heating needs to be electrified; however, electrification alone doesn't automatically yield grid benefits. Building electrification could adversely impact the grid if those new loads are exacerbating peaks.[130] Conversely, if electrified buildings are also grid interactive through controlled technology and policy programs, they can be part of a strategy to increase energy savings, manage grid resources and integrate more renewable energy, reduce system costs and improve member economics and productivity.

> Dakota Electric Association and Great River Energy in Minnesota partnered with a home developer, Country Joe Homes, to install grid-interactive water heaters in 81 homes in a new Minneapolis-St. Paul area subdivision. The grid-interactive water heaters will have real-time controls that have the flexibility to take advantage of intermittent and variable generation from wind farms or solar arrays whenever costs dip.[129]

Incorporating building electrification as a valuable resource to cooperative actions involves many of the strategies we have discussed above, including energy efficiency, demand management and rate design. A fundamental first step, however, is to ensure that building electrification programs are able to reach all member-owners. This will first require an understanding of all of the communities being served and the barriers different communities may face.

All building electrification programs face challenges such as the upfront costs of appliances, electrical upgrades and other building modifications, depending on local circumstances. One of the issues that needs to be addressed is assuring that the conversion from gas to electric will save members money. This can be determined by comparing the total cost of an electric and gas bill with the cost of an all-electric bill. Low-income and environmental justice communities often face additional challenges.[131] As noted in *Renovating Regulation*

127 Farnsworth, D., Lazar, J., & Shipley, J. (2019). *Beneficial electrification of water heating.* Regulatory Assistance Project. https://www.raponline.org/wp-content/uploads/2019/01/rap-farnsworth-lazar-shipley-beneficial-electrification-water-heating-2019-january-final.pdf

128 Herald Staff Report. (2022, January 14). Tri-State funds electric water heating project for La Plata County residents. *Durango Herald.* https://www.durangoherald.com/articles/tri-state-funds-electric-water-heating-project-for-la-plata-county-residents/. See also La Plata Electric Association. (2022, January 12). *Tri-state contributes $50,000 to help fund LPEA's air-source heat pump pilot project.* https://lpea.coop/tri-state-contributes-50000-help-fund-lpeas-air-source-heat-pump-pilot-project

129 Holly, D. (2017, November 17). *Unique partnership, modern energy savings.* National Rural Electric Cooperative Association. https://www.electric.coop/minnesota-grid-interactive-water-heaters

130 Shipley et al., 2021.

131 Environmental justice communities are communities that are disproportionately affected by pollution and other environmental hazards. Their residents are more likely to be people of color. See Mikati, I., Benson A. F., Luben, T. J., Sacks, J. D., & Richmond-Bryant, J. (2018, March 7). Disparities in distribution of particulate matter emission sources by race and poverty status. *American Journal of Public Health*. https://ajph.aphapublications.org/doi/10.2105/AJPH.2017.304297

to Electrify Buildings, "many low-income households rent rather than own their homes and therefore do not have the ability to make decisions about appliances like water heaters and stoves. Landlords, meanwhile, have little or no incentive to spend money on equipment upgrades that would only benefit renters who pay the utility bills. Therefore, creating programs that allow landlords to replace gas appliances with electric appliance and providing the landlord with the cost differential if there is one or providing a rebate could be helpful to incentivize landlords. Low-income households also tend to live in buildings that are in relatively greater need of weatherization and other basic upgrades and repairs, which can pose a challenge to electrifying their energy uses in ways that increase their home comforts and lower their bills. But without electrification, these households will potentially be left behind, relying on an increasingly unaffordable fossil gas system and bearing a larger and larger share of that system's fixed cost — while wealthier members electrify and disconnect from fossil gas."[132] Addressing these barriers will take explicit focus.

As not-for-profit, community-owned entities, cooperatives are uniquely situated to address many of the challenges of building electrification by working with members and local governments and without the bias toward capital investments that for-profit utilities face. To electrify buildings, cooperatives can take the following steps:

- Ensure that building electrification benefits reach everyone, including low-income members and environmental justice communities. Doing so will require an affirmative effort to reach out to affected communities to ensure that solutions will address the specific barriers to electrification that they are facing. Working with local governments to target financial incentives and address coordinated efforts on energy efficiency and weatherization along with electrification may be useful.
- Illuminate and reveal the value that demand flexibility can provide. Because all utility systems are different due to various factors — generation mix, climate and weather, member base and economics, among others — it is important to understand the value that electrified grid-interactive buildings can provide for a specific utility. Pilots or programs starting with cooperative buildings can help illuminate the various value streams produced by demand flexibility from reducing things like peak demand, grid congestion and renewable curtailment.
- Structure rate design to communicate the system value of flexible load so members are able to respond and receive benefits if they reduce demand at times of system stress and help utilities avoid associated costs (see Section II-B, "Capture Demand-Side Flexibility").
- Reassess programs and goals. Incorporating review opportunities into programs and policies can allow for reassessment and improvements in the future.

3. Transportation Electrification

Electrification of the transportation sector (cars, trucks, buses, taxis, ports, etc.) provides an opportunity to save citizens money on transport, increase local jobs and businesses, address national security concerns, improve public health and combat climate change. Real-world experience and studies show that these benefits can be achieved, but proactive policies are needed to realize the full magnitude of these benefits. Without an early and comprehensive approach, potential benefits will be lost. High levels of EV adoption with smart charging can provide benefits to all of society — not just EV owners — and the grid. The converse is also true. Inaction in this area could lead to slow penetration of EVs, problems with uncontrolled EV charging, sporadic access and forgone societal benefit.

a. Understand the Federal and State Context

Experience shows that government policies can accelerate the transition to EVs. By early 2019, 48 states plus the District of Columbia had taken action on regulation, financial incentives or market development initiatives related to electric vehicles.[133] Cooperatives should maintain awareness of federal and state activities that can augment or support cooperative actions on EVs, including checking:

- **Federal and state goals.** Federal funding requires certain state plans. If a state has set EV goals, cooperatives may need to build those goals into their planning processes. If not, cooperatives can take steps to create a plan of their own. If a cooperative has adopted EV goals, these goals may affect the utility, both for vehicles used and the amount of

132 Shipley et al., 2021.

133 Carr, A., Lips, B., Proudlove, A., & Sarkisian, D. (2019, May). *50 states of electric vehicles: Q1 2019 quarterly report.* North Carolina Clean Energy Technology Center. https://nccleantech.ncsu.edu/wp-content/uploads/2019/05/Q1-19_EV_execsummary_Final.pdf

vehicle charging the cooperative should provide and plan to provide in the future. If federal and state goals have not explicitly addressed EVs and charging infrastructure for low-income and rural communities, specific cooperative focus on this may compensate for gaps in state goals.

- **Federal and state incentives.** Cooperatives should become familiar with state and federal incentives, both for purchase of electric vehicles and EV charging infrastructure. Cooperatives can then assess gaps in incentive structure and determine in which areas to offer incentives. Cooperatives should ensure transportation benefits are shared equally, which may require incentives particularly focused on low-income communities.
- **State and third-party private EV plans.** Some states are creating statewide EV plans that may include purchase goals, infrastructure plans, and incentives. Cooperatives should also determine if any third-party private infrastructure plans would impact the utility. Understanding state-level and private EV plans, and intra-state or regional plans, particularly for EV infrastructure, can help cooperatives determine the most effective EV investments for them, such as buses or light-duty vehicles. Cooperatives, with a better focus and understanding of their community, will also be able to assess the electrification needs that will most effectively meet the needs of low-income and rural community members.
- **Public utility commission or public service commission requirements.** The regulatory commission authority over cooperatives varies by state.

Understanding of the federal and state context for EV goals, planning and incentives will help cooperatives determine the most effective steps they can take to support EVs that augment and expand state efforts.

Cooperatives have opportunities to take significant action on EVs and may provide leadership in advance of state or federal goals. Cooperative actions can also provide guidance to members to enable the benefits of transportation electrification. Key actions in the following areas are necessary to achieve this:

- Setting cooperative goals and plans for low-income, rural, urban and heavy-duty transport.
- Electrifying cooperative fleets.
- Planning for EV infrastructure development for low-income, rural, urban and heavy-duty transport.
- Ensuring benefits reach all segments of society, including low-income communities.

b. Set Cooperative Goals and Plans

After determining how state goals and policies will affect them, the first step for cooperatives committing to EVs is to make a plan for transportation electrification. For cooperatives focused on rapid decarbonization, the International Council on Clean Transportation recommends 100% EV sales for light-duty vehicles by 2035 and medium- and heavy-duty vehicles by 2040.[134] Goals set by the cooperative and local governments, along with financial incentives that help make this transition happen sooner, will enable faster decarbonization. Articulating a transportation electrification commitment in a local law or ordinance is optimal, but progress can be made even if initial local political support for a comprehensive plan or commitment is lacking at the start. For example, some cooperatives may set EV fleet goals to meet decarbonization targets, while others may start with

Rural transportation electrification

Rural America is home to 20% of the population but almost 70% of the country's road miles. This makes electrification both hugely challenging and attractive. As noted by the U.S. Department of Transportation: "Rural residents drive more than their urban counterparts, spend more on vehicle fuel and maintenance, and often have fewer alternatives to driving to meet their transportation needs. Over the long run, EVs will help residents of rural areas reduce those costs and minimize the environmental impact of transportation in their communities."[135] But ensuring charging is available to meet rural driving needs is a challenge that coordinated policy planning among federal, state and local governments will need to address. Once realized, however, rural electrification can offer individual residents lower maintenance and fuel costs and a source of power and resilience. It can also offer rural communities opportunities for economic growth, cleaner air and climate benefits.

134 Miller, J., Khan, T., Yang, Z., Sen, A., & Kohi, S. (2021, December). *Decarbonizing road transport by 2050: Accelerating the global transition to zero-emission vehicles.* The International Council on Clean Transportation. https://theicct.org/publication/zevtc-accelerating-global-transition-dec2021/

135 U.S. Department of Transportation. (2022, February 10). *Charging forward: A toolkit for planning and funding rural electric mobility infrastructure.* https://www.transportation.gov/rural/ev/toolkit

planning local infrastructure to enable EV parking. Local laws can mandate the development of a comprehensive municipal fleet electrification transition plan that starts with an assessment of the existing fleet and sets EV procurement schedules by vehicle class, special considerations for emergency and heavy-duty vehicles and infrastructure and maintenance investments. These outcomes can be achieved through a resolution, a statement of support or the adoption of a local law directing a transition to an all-electric municipal fleet by a certain date.[136] Cooperatives can facilitate local goals by ensuring the infrastructure and rate design exists to support EV integration.

Comprehensive plans and goals also need to ensure equitable access to electrified transportation. Cooperatives will need to work with low-income and rural communities to identify barriers and develop solutions that deliver on inclusivity goals specific to each cooperative. Major barriers to electrification for low- and moderate-income communities include the higher upfront cost, lack of access to EV infrastructure or payment mechanisms and lack of outreach and education. The Greenlining Institute's Equity Toolkit articulates some of the barriers these communities face:[137]

- **Cost**. EVs have a higher upfront cost than internal combustion engine vehicles but a lower total cost of ownership over the life of the vehicle. Incentives such as sales tax exemptions, after-purchase rebates and tax credits are more difficult for low-income communities to access; however, vouchers and instant rebates that reduce upfront cost are more likely to enable a low-income household to purchase an EV. It's also important to make used electric vehicles more available to the many households that cannot afford new vehicles.[138] To ensure equitable access to electric vehicles, cooperatives may want to focus first on LMI communities with fewer economic resources to ensure these communities are incorporated in the transportation electrification evolution.
- **Lack of access to charging infrastructure.** Cooperatives can overcome this barrier by working to ensure charger access in low- and moderate-income communities. Additionally, many LMI members may not have smartphones or be able to afford subscription fees, common components of private charging network applications, which can constitute an additional barrier.[139]
- **Lack of awareness and member education.** A general lack of awareness about the benefits of EVs and available vehicle purchase incentives also create barriers to adoption among lower-income households, rural populations and disadvantaged communities. Education and outreach strategies by the cooperatives that are specifically targeted to meeting the needs of underserved communities signal a strong commitment to ensuring they are prioritized in efforts to expand access to electric mobility.
- **Specific mobility needs.** Low-income rural residents may rely more on vehicle ownership or informal ride sharing because of bad public transportation services and access. Conversely, low-income residents in densely populated cities may have less of a need to own a car to get to work or complete daily tasks but may need robust public transportation.

As noted in the last point above, transport electrification will also have different implications in rural communities. Rural communities differ in significant ways from cities, and their transportation needs differ as well. In general, rural communities have significantly less EV charging infrastructure, which is largely concentrated in major cities.[140] While other factors such as limited EV models for trucks and limited dealership networks[141] are outside cooperatives' scope of influence, cooperatives can help increase EV charging in rural areas. Rural residents may be more likely to be physically or financially dependent on shared transit rather than private car ownership.[142] Broad and ongoing

136 Electrify NY. (n.d.). *EV municipal toolkit.* https://electrifyny.org/ev-municipal-toolkit/#1595974225040-92bfb940-320e

137 The Greenlining Institute. (n.d.). *Electric vehicles for all: An equity toolkit*. https://greenlining.org/resources/electric-vehicles-for-all/

138 The Greenlining Institute, n.d.

139 Northeast States for Coordinated Air Use Management. (2020, September 21). *Expanding equitable access to electric vehicle mobility: Examples of innovative policies and programs.* https://www.nescaum.org/documents/expanding-equitable-access-to-ev-mobility-examples_9-21-20.pdf/

140 Tolbert, J. (2021, October 22). *Beyond cities: Breaking through barriers to rural electric vehicle adoption.* Environmental and Energy Study Institute. https://www.eesi.org/articles/view/beyond-cities-breaking-through-barriers-to-rural-electric-vehicle-adoption

141 Northeast States for Coordinated Air Use Management, 2020.

142 Kadoch, C. (2020). R*oadmap for electric transportation: Policy guide.* Regulatory Assistance Project. www.raponline.org/EV-roadmap

Electric cooperatives can also work together to meet gaps. Twenty-nine electric cooperatives have created a regional EV charging network across Wisconsin, Minnesota, Illinois and Iowa. The Charge EV network provides 40 Level 2 and Level 3 chargers installed near major highways and interstates across the upper Midwest.[143]

stakeholder engagement and specific outreach to these communities will help cooperatives develop EV plans that meet the needs of all member-owners.

c. Electrify Cooperative Fleet Vehicles

Cooperatives will need to consider their particular needs, the scope of state fleet electrification and the type of provision that will work best for their particular cooperative. Fleet electrification can be achieved through various actions at the state or local level. Some jurisdictions have set goals to electrify a certain percentage of fleet vehicles by a certain date. A variation of this type is to specify a rate of purchase of electric, hybrid or alternative fuel vehicles — for example, 5% of all new motor vehicles per year.[144] Others require the purchase of an electric vehicle if the total cost of ownership is less than that of a comparable internal combustion engine vehicle. The total cost of ownership of electric versus internal combustion vehicles will vary depending upon the financial incentives for EVs, but as technology costs decrease, the total cost of EVs will also decrease. Others simply require the purchase of electric and hybrid vehicles "to the maximum extent feasible." This approach allows more discretion in determining which vehicles should be electric or hybrid and which can be internal combustion.

d. Plan for EV Infrastructure

Member concern about the lack of available charging infrastructure is a significant barrier to electrification of the light-duty transport sector. The lack of widespread charging stations leads to a chicken-and-egg problem for EV adoption. Federal funding may provide an opportunity to promote more widespread EV infrastructure. Optimally, states would facilitate a coordinated planning process on provision of EV infrastructure among state agencies, investor-owned utilities, third-party providers, private interests and cooperatives. Some states are in the process of starting or planning for this type of coordinated plan, and cooperatives should check with state energy offices or other state agencies to determine whether a process exists or suggest implementing one. Regardless of whether a statewide effort exists, cooperatives can plan for their own EV charging infrastructure needs and may incorporate or consult many of the stakeholders listed above.

Particular attention must be paid to low-income communities for EV charging infrastructure planning. Low- and moderate-income communities may have fewer EVs due to higher upfront cost. The state or cooperative may also create policies aimed at lowering the cost for LMI members through rebates at the time of sale that directly reduce the cost of the EV. Lack of charging infrastructure in LMI areas, perhaps as a result of there being fewer EVs per capita, would lock in the status quo and provide a significant barrier to transportation electrification. A specifically coordinated effort on the part of the cooperative and state or local efforts is necessary to ensure that LMI communities have equitable access to electric vehicles and the charging infrastructure to support them. The cooperative also needs to be sensitive to the impact that cooperative-built infrastructure may have on electric rates for LMI members. With good planning, a cooperative can ensure that all members receive the benefits and that costs

Seventeen electric cooperatives and the National Rural Electric Cooperative Association are applying for federal grants to bring electric vehicles to low-income rural communities. These cooperatives recognize the need to install public EV charging stations at various locations, such as low-income apartment complexes, medical facilities, parks and highway corridors.[145]

143 Kelly, E. (2021, January 14). *Co-ops create electric vehicle charging network in upper Midwest.* National Rural Electric Cooperative Association. https://www.electric.coop/co-ops-create-electric-vehicle-charging-network-in-upper-midwest#:~:text=A%20coalition%20of%2029%20electric%20cooperatives%20has%20created%20a%20regional,provided%20by%20ZEF%20Energy%20Inc. See also Charge EV. https://charge.coop/

144 An act relative to green communities, Chapter 169, 191st General Court, (Mass. 2008). https://malegislature.gov/laws/sessionlaws/acts/2008/chapter169

145 Kelly, E. (2021, July 19). NRECA, *Co-ops apply for federal grants to bring EVs to low-income rural areas.* National Rural Electric Cooperative Association. https://www.electric.coop/nreca-co-ops-apply-for-federal-grants-to-bring-evs-to-poor-rural-areas

are shared equitably, which may mean LMI members do not pay for EV infrastructure because it would prohibitively increase costs on the members that can least afford it. Electrification has the opportunity to provide LMI members with clean, reliable and affordable transportation. Proactive planning now can make this a reality.

Cooperatives' goals will likely guide EV infrastructure planning and needs, along with identifying gaps in the infrastructure plans of the state, utilities or third-party providers. Cooperatives may also want to think of EV infrastructure planning in phases, recognizing that EV adoption will increase. The resources at the end of this chapter provide more information on developing EV infrastructure plans, but a few considerations will help development of an EV infrastructure plan:

- Develop a plan to switch cooperative internal combustion engine vehicles to EVs by a certain date.
- Develop plans for EV-powered public transportation and school buses. For example, the Beneficial Electrification League is offering to help 300+ cooperatives bring electric school buses to their communities.
- Assess cooperative service area needs. Understanding EV driver and cooperative demographics and existing needs will help cooperatives prioritize EV charging needs. This includes specific outreach to diverse residents of a cooperative. Ensuring that the benefits of transportation electrification are shared equitably will require states to consider the degree to which all members have access to electricity as a transportation fuel, regardless of their economic and geographic circumstances.
- Plan for steady growth in EV charging infrastructure needs. State and cooperative goals could spur EV growth. Although EVs are currently 2% of global sales, they are projected to grow to 24% of global sales or higher by 2030, even absent specific EV goals.[146]
- Assess gaps in existing EV charging infrastructure, ideally after consultation with state agencies, commercial third-party providers and utilities. Cooperatives should also engage EV drivers, local councils, low-income communities, rural communities, public and private fleet owners and EV advocates to identify barriers and opportunities and specifically prioritize equitable access to EV charging.[147]
- Assess grid infrastructure to determine the sites with the greatest grid capacity for installing EV charging infrastructure, particularly direct-current fast chargers.
- Streamline permitting processes and identify preapproved sites. Streamlining and expediting permitting and installation of charging infrastructure can improve the business case for private EV infrastructure construction.[148] This can be further expedited by identification of preapproved sites, which may also encourage charging in locations that are ideal from a cooperative grid perspective.
- Secure investment from local businesses. Communities and businesses that host public charging stations may also see economic benefits as EV drivers eat or shop while their vehicles charge.[149] Cooperatives can engage local coalitions of businesses to install EV charging at their businesses and promote awareness of the business case for their investment. Strategic use of incentives can also increase charging infrastructure.[150]

e. Empower Members Through Rate Design

Because electric vehicles do not need to be charged at the same time they will be used, they are inherently flexible and can serve as energy storage. As a result, the power system can serve this new load at cleaner and less expensive times of the day. This flexibility means that EVs can actually improve the utilization of the transmission and distribution system, shifting loads that would otherwise add to system peaks, which ultimately drive grid investment and increase cost. The need for

146 Shepardson, D. (2021, August 4). *U.S. automakers to say they aspire to up to 50% of EV sales by 2030-sources.* Reuters. https://www.reuters.com/business/autos-transportation/us-automakers-say-they-aspire-up-50-ev-sales-by-2030-sources-2021-08-04/

147 The International Council on Clean Transportation & C40 Cities Climate Leadership Group. (n.d.). *Electric vehicle charging infrastructure: A quick guide for cities* [Factsheet]. https://c40.my.salesforce.com/sfc/p/#36000001Enhz/a/1Q000000Mp2p/2r2iFhMbXlgoqFFnxWsycjub2dEp.PKxHbs0_tFHhyI

148 Hall, D., & Lutsey, N. (2020). *Electric vehicle charging guide for cities.* The International Council on Clean Transportation. https://theicct.org/sites/default/files/publications/EV_charging_guide_03162020.pdf

149 Crotty, F., Jordan, B., McFarlane, D., Sexton, T., & Simons, S. (2019). *Accelerating electric vehicle adoption: A vision for Minnesota.* Minnesota Department of Transportation, Minnesota Pollution Control Agency and Great Plains Institute. http://www.dot.state.mn.us/ sustainability/docs/mn-ev-vision.pdf

150 C40 Cities Climate Leadership Group. (2021, August). *How to build an electric vehicle city: Deploying charging infrastructure.* https://www.c40knowledgehub.org/s/article/How-to-build-an-electric-vehicle-city-deploying-charging-infrastructure?language=en_US. In Berlin, small- and medium-sized businesses can get a 50% subsidy for building public charging stations.

system upgrades can be minimized if EVs are charged during off-peak periods, either through smart charging, time-of-use pricing or some combination of both.

Shifting the load to less expensive times can produce savings that members can share in through appropriately designed electricity rates. Cooperatives can develop smart charging programs and rate designs to encourage members to charge their EVs at lower-emission and lower-cost times of the day and year. Given that members will typically charge their cars overnight after they get home, the member charging time is compatible with taking advantage of off-peak pricing. (See Section II-B-2 on rate design.) For example, Cobb Electric Membership Corp in Georgia offers NiteFlex, which allows EV drivers to pay a lower rate for electricity during certain times of the day and provides 400 kWh of free energy use each month for overnight charging.[151]

f. Financing and Incentives

Federal funding under the National Electric Vehicle Infrastructure Formula Program is available to build out national EV infrastructure.[152] Competitive funding is available for electric cooperatives, also funding opportunities for rural transportation electrification that focuses on disadvantaged communities. NRECA is working with cooperatives to apply for federal funding for big electric vehicle projects.[153]

Electrification of transportation is a multisectoral effort and provides benefits across the energy, transport and building sectors, as well as environmental and health benefits. Cooperatives can think broadly in terms of how these costs and benefits are paid for and shared. Although transportation electrification is often thought of as an expense that is worthwhile to support because of the public benefits it can yield, cooperatives can also think of targeted use of electrification (transportation and otherwise) as a means to reduce costs they would otherwise face. Targeting is possible in a number of areas:[154]

- Air quality is a significant concern in many regions, and transportation-related emissions are a main contributor to regional pollution. Targeted transportation electrification in these areas can address air quality issues, often at a lower cost than other options. Federal funding is also available for air quality improvement through transportation projects. The Congestion Mitigation and Air Quality Improvement Program is one element of the Federal-Aid Highway Program that provides a funding source for states, local governments and transit agencies to fund transportation projects and programs that help meet the requirements of the Clean Air Act and help reduce regional congestion in transportation networks.[155]
- State efforts to spur job growth generally focus on building things for public benefit, such as hospitals and roads that provide construction jobs and tax breaks for corporations relocating to a state. In cooperation with states and municipalities, cooperatives can provide EV incentives and infrastructure as a method to increase local jobs or focus on encouraging EV manufacturing and related industry jobs throughout the state.
- Private investment is a largely untapped source of funding for EV charging infrastructure. Installing charging infrastructure at retail locations allows EV owners to power up while shopping, eating and resting, as well as providing local business owners with an additional marketing tool and a revenue source.
- Additional federal funding may also become available through further efforts on infrastructure. Electric cooperatives with existing EV plans may be better situated to apply for and receive federal money when it becomes available.[156]

151 Cobb EMC. (n.d.). *NiteFlex.* https://cobbemc.com/niteflex

152 U.S. Department of Transportation. (2022, February 10). *President Biden, USDOT and USDOE Announce $5 Billion over Five Years for National EV Charging Network, Made Possible by Bipartisan Infrastructure Law.* https://highways.dot.gov/newsroom/president-biden-usdot-and-usdoe-announce-5-billion-over-five-years-national-ev-charging#:~:text=The%20program%20will%20provide%20nearly,Formula%20Program%20is%20%24615%20million

153 Kelly, E. (2021, April 27). *NRECA seeks co-ops to apply for federal funding for big electric vehicle projects.* National Rural Electric Cooperative Association. https://www.cooperative.com/news/Pages/NRECA-Seeks-Co-ops-to-Apply-for-Federal-Funding-for-Big-Electric-Vehicle-Projects.aspx

154 Kadoch, 2020.

155 U.S. Department of Energy & U.S. Department of Transportation. (2016). *Guide to federal funding, financing, and technical assistance for plug-in electric vehicles and charging stations.* https://www.energy.gov/eere/vehicles/downloads/guide-federal-funding-financing-and-technical-assistance-plug-electric

156 See Electrification Coalition. (n.d.). *Federal funding guidance for cities.* https://www.electrificationcoalition.org/work/federal-ev-policy/federal-funding-guidance-for-cities/

Recognizing the wide range of benefits that EVs can provide, jurisdictions around the world have provided direct financial support to encourage the electrification of transportation. Cooperatives with specific EV goals may wish to provide financial incentives to encourage equitable EV adoption. Best practices for structuring EV incentives include:

- Applying incentives at the point of purchase.
- Making incentives simple, transparent and understandable.
- Making incentive programs durable.

Gunnison County Electric Association in Colorado recognizes that lack of experience with an EV is a disincentive. Accordingly, the cooperative offers an electric vehicle "test drive" program. Members can drive an EV (depending on the model) either as a loaner for a day or for a short test drive with a cooperative representative, to learn how it fits in with their lifestyle. The cooperative offers an online sign-up form.[157]

Useful Resources on Transportation Electrification

Atlas Public Policy. (2021, November). *Dashboard for Rapid Vehicle Electrification (DRVE).* https://atlaspolicy.com/dashboard-for-rapid-vehicle-electrification-drve/. DRVE is a powerful tool that equips users with decision-relevant information on the financial viability and environmental impact of light-, medium-, and heavy-duty vehicle fleet procurements across an entire fleet.

American Public Power Association. (n.d.). *Exploring Electric Vehicle Rates for Public Power*. https://www.publicpower.org/topic/electric-vehicles

Brinker, C. (2019, June 20). *A New Model of Energy Codes in Home Rule States.* Southwest Energy Efficiency Project. https://www.swenergy.org/a-new-model-for-energy-codes-in-home-rule-states.

Electrification Coalition. (n.d.). *Federal Funding Guidance for Cities.* https://www.electrificationcoalition.org/work/federal-ev-policy/federal-funding-guidance-for-cities/

The Greenlining Institute. (n.d.). *Electric Vehicles for All: An Equity Toolkit.* https://greenlining.org/resources/electric-vehicles-for-all/

Hall, D., & Lutsey, N. (2020). *Electric Vehicle Charging Guide for Cities.* The International Council on Clean Transportation. https://theicct.org/sites/default/files/publications/EV_charging_guide_03162020.pdf

Kadoch, C. (2020, February). *Roadmap for Electric Transportation: Legislative Options.* Regulatory Assistance Project. https://www.raponline.org/wp-content/uploads/2020/03/rap-roadmap-electric-transportation-legislative-options-2020-february.pdf. This guide and legislative kit contains state legislation, all of which can be amended to apply to a cooperative.

Kelly, E. (2021, August 2). *NRECA Report: What Co-ops Can Do to Benefit From Electric Vehicle Rise* [Press release]. National Rural Electric Cooperative Association. https://www.cooperative.com/news/pages/nreca-report-what-co-ops-can-do-to-benefit-from-electric-vehicle-rise.aspx

Northeast States for Coordinated Air Use Management. (2020, September 21). *Expanding Equitable Access to Electric Vehicle Mobility: Examples of Innovative Policies and Programs.* https://www.nescaum.org/documents/expanding-equitable-access-to-ev-mobility-examples_9-21-20.pdf/

Office of Energy Efficiency & Renewable Energy. (n.d.). *Energy Standard and Code Determinations.* https://www.energycodes.gov/

U.S. Department of Transportation. (2022, February 10). *Charging Forward: A Toolkit for Planning and Funding Rural Electric Mobility Infrastructure.* https://www.transportation.gov/rural/ev/toolkit

Cooperatives with useful EV program examples:

- Beneficial Electrification League. *Electric Cooperative School Bus Initiative: Electrifying America's Rural School Buses.* https://be-league.org/buses/
- Cobb EMC. *Electric Vehicles.* https://cobbemc.com/electric-vehicles
- Great River Energy. *Electric Vehicles.* https://greatriverenergy.com/smart-energy-use/beneficial-electrification/electric-vehicles/

157 Gunnison County Electric Association. (n.d.). *EV test drive program.* https://www.gcea.coop/energy-efficiency/electric-vehicles/ev-test-drive-program/. For more examples of electric cooperatives' innovative EV programs, see Kelly, E. (2019, July 31) *Getting in front of EVs.* National Rural Electric Cooperative Association. https://www.cooperative.com/remagazine/articles/pages/getting-in-front-of-electric-vehicles.aspx