Business & Technology Report

January 2021

ACCESS PROJECT REPORT SERIES:

Evaluation of Existing Financing Mechanisms & Program Designs for Low to Moderate Income Solar PV Programs

How Cooperatives Are Supporting Their Members In Need

Programs, Rates and Partnerships to
Benefit Low- to Moderate-Income Members

NRECA
America's Electric Cooperatives

Business & Technology Report

January 2021

ACCESS PROJECT REPORT SERIES:
Evaluation of Existing Financing Mechanisms & Program Designs for Low to Moderate Income Solar PV Programs

How Cooperatives Are Supporting Their Members In Need

Programs, Rates and Partnerships for Low- to Moderate-Income Members

Prepared By:

The National Rural Electric Cooperative Association (NRECA)
In partnership with Solar Energy Technologies Office, U.S. Department of Energy
Award Number DE-EE0009010

Author:

Laura Moorefield, Moorefield Research & Consulting, LLC

NRECA Subject Matter Expert:

Adaora Ifebigh
ACCESS Project PM
Program Director, Energy Access
Adaora.Ifebigh@nreca.coop

Debra Roepke
ACCESS PI/Technical Advisor
Debra.Roepke-contractor@nreca.coop

NRECA
America's Electric Cooperatives

About this Report Series

Solar costs have declined dramatically in recent years to surpass the goals set by Department of Energy (DOE) for the year 2020. The cost of hardware, as well as soft costs including installation labor, permits and overhead costs, have both declined, but the soft costs are still substantial and result in a cost barrier that limits access to the benefits of solar for all. These higher costs are particularly important in a cooperative (co-op) territory where average incomes are lower than national averages and poverty rates are higher.

Many co-ops have been able to develop solar generation for their members as a result of prior DOE programs and action. DOE and NRECA's success with the **Solar Utility Network Deployment Acceleration (SUNDA)** project demonstrated that innovations in co-op solar business models could quickly move solar resources from niche-based to widely deployed technology nationally.

Recently, NRECA launched its initiative **Advancing Energy Access for All**, which spotlights cooperatives' involvement in facilitating healthy communities, explores the innovative ways they do it, and uncovers new directions that community assistance programs are taking. Advancing Energy Access for All helps ensure rural communities are not left behind and is also an essential element of every cooperative's existence. The flagship project from this initiative is the **Achieving Cooperative Community Equitable Solar Sources (ACCESS)** project, a federally funded three-year research project and collaboration among U.S. electric cooperatives, CoBank, the National Rural Utilities Cooperative Finance Corporation (NRUCFC/CFC), Pacific Northwest National Laboratory (PNNL), GRID Alternatives, and NRECA. The ACCESS project is funded by the U.S. Department of Energy's Solar Energy Technologies Office (SETO) whose overarching goal is to improve the affordability, performance, and value of solar technologies on the grid. Through this project, tools and resources will be developed to assist electric co-ops and the broader industry deploy solar projects to benefit low- to moderate-income (LMI) consumers.

This report is the first in a series of three white papers. The purpose of this first report is to explore the variety of programs and services offered by co-ops to help LMI members, while often simultaneously benefiting other members, the co-op, and the grid. The second report will evaluate which of these existing program and financing structures may best facilitate access to solar energy for LMI members. The third and final report in this series will profile co-op projects that combine solar energy with battery storage. The series will include a gap analysis that reviews challenges around LMI access to solar energy, and solutions and pathways for tackling the challenges.

For questions or inquiries, please contact our team at: SolarAccessProject@nreca.coop

Acknowledgments

This material is based upon work supported by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) under the Solar Energy Technologies Office (SETO) Award Number DE-EE0009010.

The ACCESS Project includes seven lead cooperatives and a broad group of industry stakeholders who provide diverse expertise that is essential to the project's analysis and resulting tools and resources. The participating cooperatives include the following:

- Anza Electric Cooperative, Anza, CA
- BARC Electric Cooperative, Millboro, VA
- Kit Carson Electric Cooperative, Taos, NM
- Oklahoma Electric Cooperative, Oklahoma City, OK
- Orcas Power and Light Cooperative, San Juan Island, WA
- Ouachita Electric Cooperative Corporation, Camden, AR
- Roanoke Electric Cooperative, Aulander, NC

The list of participating stakeholders can be found on the ACCESS website on cooperative.com. Stakeholders who reviewed and provided feedback to this report are: Clean Energy Works, Environmental and Energy Study Institute (EESI), American Council for an Energy-Efficient Economy (ACEEE), Vote Solar, and the Regulatory Assistance Project (RAP)

Contributors to this specific report are mentioned throughout the report, and include:

- Jo-Carroll Energy
- Tri-State Generation and Transmission Association
- Electric Cooperatives of South Carolina
- Midwest Energy
- La Plata Electric Association
- Kit Carson Electric Cooperative
- EESI
- 1st Southwest Bank

We would like to thank all of these cooperatives and other industry stakeholders for sharing their experiences and ideas to support the success of the ACCESS project and for the benefit of cooperatives nationwide.

Disclaimer

Table of Contents

Background: The ACCESS Project

NRECA's solar energy project, *Achieving Cooperative Community Equitable Solar Sources* (ACCESS), is the flagship project of NRECA's *Advancing Energy Access for All* initiative. This initiative spotlights the innovative ways cooperatives approach community development and support for their consumer-members, as technology advancements continue to transform our industry.

ACCESS will explore and amplify the use of innovative, cost-effective energy access programs to help increase solar affordability, with particular focus on assisting low and moderate income (LMI) consumers. ACCESS will research varying financing mechanisms and program designs to help identify solutions for electric cooperatives and other small utilities, including field tests of diverse co-op solar projects around the country. Through this project, tools and resources will be developed to assist electric co-ops and the broader industry deploy solar projects to benefit LMI consumers.

Introduction

Electric cooperatives are deeply familiar with serving families in need. The nearly 900 electric cooperative members of the National Rural Electric Cooperative Association (NRECA) provide electricity and other services to 56% of the U.S. land mass, but only 11% of the population. In the U.S., rural families are, on average, less well-off than those in cities. According to a 2018 report by the American Council on an Energy Efficient Economy (ACEEE), "About 41% of households in rural areas have incomes below 200% of the federal poverty level (FPL), compared with roughly one-third of urban households."[1]

It follows, then, that most Persistent Poverty Counties[2] fall within NRECA's members' territories.[3] The USDA reports that one in four rural counties is high-poverty, compared to one in ten urban counties.[4] Furthermore, co-ops serve many areas of the country where poverty is most concentrated – the South, Southeast, and Native American lands – although these are by no means the only areas of highly concentrated poverty.[5]

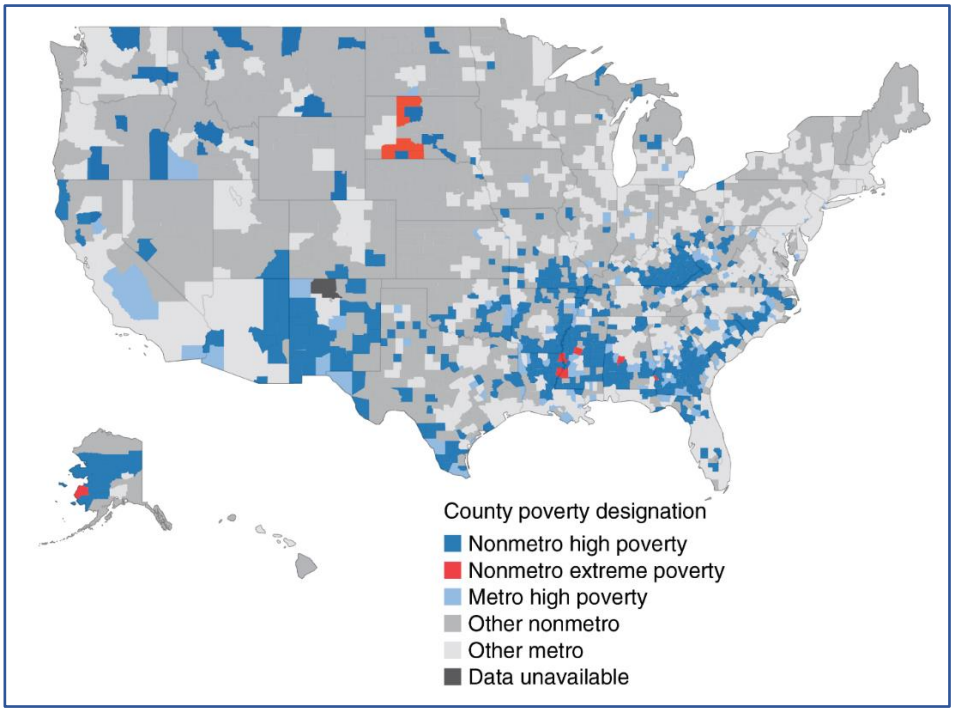

Figure 1. High and Extreme Poverty Areas by Nonmetro and Metro County Designation, 2018. Source: USDA[4]

[1] Ross et al. 2018, p. 8
[2] Federal designation for counties with a poverty rate of 20% or higher that has persisted for at least 30 years.
[3] https://www.cooperative.com/remagazine/articles/Pages/essential-services-help-low-moderate-income-members.aspx
[4] *High-poverty* is defined as 20% or more poverty rate since 2014, see: https://www.ers.usda.gov/amber-waves/2020/may/extreme-poverty-counties-found-solely-in-rural-areas-in-2018/
[5] https://www.ers.usda.gov/topics/rural-economy-population/rural-poverty-well-being/

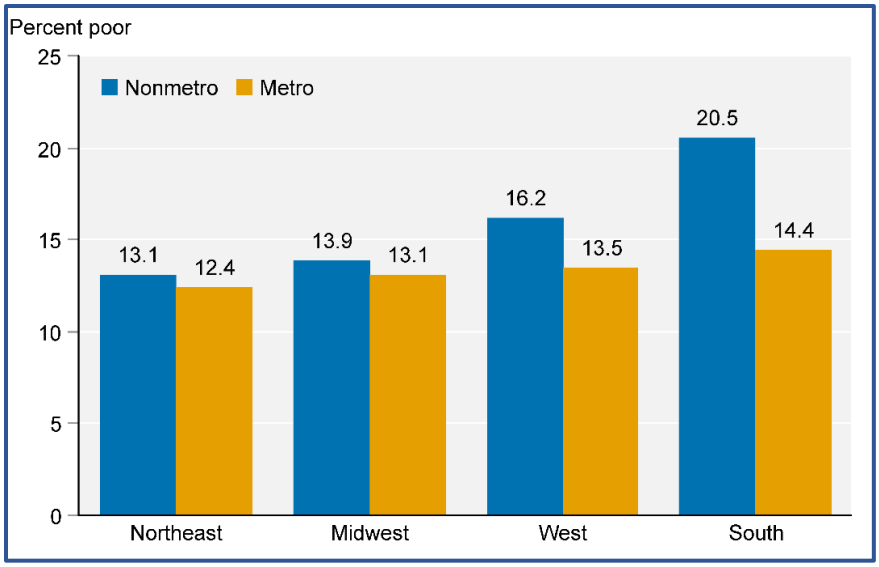

Figure 2. Poverty Rates by Region and Metro/Nonmetro Status, 2014 - 18 Average. Source: USDA[6]

Compounding this, low-income households often have high energy burdens, defined as the percentage of gross household income spent on energy costs.[7] Low-income rural areas have the oldest and least efficient housing stock. A 2020 ACEEE study found that while non-low-income households spend just over 2% of their income on energy bills, low-income households devote 7% to more than 9% – more than three times as much. In addition, Native American, Black, and Hispanic households spend a higher share than non-Hispanic White households, and families who live in manufactured homes and low-income multi-family housing spend a greater share of their income on energy bills than those in single family homes.[8] Rural poverty and energy use are intertwined, and this is where co-ops can play a role.

In addition to providing reliable power, open membership, and democratic member control, electric cooperatives are tasked to "work for the sustainable development of their communities through policies supported by the membership," as described in Cooperative Principle #7, "Concern for Community".[9] Many co-ops of all sizes take this mission to heart by offering programs and services to help members-in-need improve their homes, finances, and communities.

While these programs are rarely exclusively for low- and moderate-income (LMI) members, they can be particularly important for this group. The United States Department of Housing and Urban Development (HUD) defines a family of four as LMI if total earnings are 80% or less than the median area income.[10]

---

[6] Source: USDA, Economic Research Service using U.S. Census Bureau, American Community Survey 5-year average county-level data for 2014 – 18 and 2018 Office of Management and Budget nonmetro/metro county designations.
[7] https://www.energy.gov/eere/slsc/low-income-community-energy-solutions#:~:text=Energy%20burden%20is%20defined%20as,income%20spent%20on%20energy%20costs
[8] Drehobl et al. 2020
[9] https://www.electric.coop/seven-cooperative-principles%E2%80%8B/
[10] https://www.hudexchange.info/sites/onecpd/assets/File/CDBG-State-National-Objectives-Eligible-Activities-Chapter-3.pdf, See section 3.4.1. Definitions.

Services to support LMI members have become even more important this year. The Coronavirus pandemic is exacerbating poverty in America. Separate studies at Columbia University and the University of Chicago found that between six and eight million Americans fell into poverty between May and October 2020.[11] On November 12, 2020, the U.S. Census reported that nearly 10 million adults are behind on rent or mortgage payments.[12]

Co-ops experience these vulnerabilities first-hand, as more and more members fall behind on bills. One of many examples is an East Coast distribution co-op[13] with fewer than 15,000 members. The co-op now has more than 1,000 past-due accounts. Since March of 2020, delinquencies at the co-op have increased by 500% – from $80,000 to $400,000.

The silver lining is that because co-ops have been leading efforts to help members in need for a long time, they are in a prime position to continue providing support when it is needed more than ever.

[11] https://www.nytimes.com/2020/10/15/us/politics/federal-aid-poverty-levels.html?searchResultPosition=1
[12] https://www.census.gov/data-tools/demo/hhp/#/?measures=HIR
[13] Co-op name withheld for privacy.

Why Cooperatives Offer LMI Programs

Most electric cooperatives are not mandated by states or regulators to provide programs specifically for LMI members, and with few exceptions, co-op programs that *benefit* LMI members are not *restricted* to LMI members. Programs that benefit LMI members can also benefit non-LMI members. State and federal agencies and non-profits are more likely to have income caps for energy-related support programs. But many co-ops will tailor some program designs to remove barriers for those with lower incomes. The reasons co-ops do this are as varied as co-ops are, but there are common threads:

- **Helping Members Pay Bills**

  Lowering bills for people who struggle to pay may increase the likelihood of payment, saving the co-op time and money on shut offs or collections. These efforts may promote member satisfaction, position the co-op as a trusted resource, and may reduce reliance on state and federal emergency bill payment funds.

- **Reducing Energy Burden**

  Some co-ops see families living in poorly insulated older homes and manufactured homes paying hundreds of dollars every month to heat or cool their homes, furthering the cycle of poverty. But many homes can be vastly improved with basic weatherization and energy efficiency measures, and co-ops may be well poised to support these measures.

- **Reducing Peak Demand**

  Incentivizing members to reduce on-peak usage through demand response programs can help keep co-op costs low by avoiding expensive on-peak wholesale power purchases. Money saved by co-ops benefits all members.

- **Supporting Economic Development**

  Collectively, electric cooperatives invest $12 billion a year, on average, in the communities they serve. In 2017 alone, they supported more than 600,000 jobs. Of those, nearly 270,000 are local contractor and supplier jobs and about 275,000 more are in consumer spending.[14] By offering programs that directly support LMI and other members, co-ops indirectly help strengthen communities with good jobs.

- **Championing Energy and Environmental Innovation**

  According to the 2018 Fourth National Climate Assessment, “People who are already vulnerable, including lower-income and other marginalized communities, have lower capacity to prepare for and cope with extreme weather and climate-related events and are expected to experience greater impacts.”[15] Providing innovative programs can help keep the co-op center-stage as a community leader and may prevent members from looking elsewhere for this leadership.

[14] https://www.electric.coop/wp-content/uploads/2020/06/Coop_FactsAndFigures_June2020.pdf
[15] https://nca2018.globalchange.gov/

Underlying all these reasons for helping LMI members is Cooperative Principle #7, "Concern for Community". Electric co-ops are member-owned non-profits with stated values beyond profits. Improving the well-being of the most vulnerable community members supports the co-op mission and bottom line. Healthy communities support strong and vital co-ops.[16]

[16] For example, Withlacoochee River Electric Cooperative actively supports local community development efforts, see: https://www.cooperative.com/remagazine/articles/Pages/electric-co-ops-lead-efforts-rural-health-care-access.aspx and https://www.cooperative.com/remagazine/articles/Pages/Florida-Electric-Co-op-Leads-the-Way-on-Community-Development.aspx

How Cooperatives Support LMI Members

There is no comprehensive data on exactly how many, and which programs and services co-ops offer that help LMI members exclusively. In fact, programs that help LMI members are often available to all members. This approach has the advantage of not giving preference to one member over another and removes the burden on the co-op to qualify participants, as well as removing the potential to stigmatize those participants.

This section provides an overview of many co-op programs, services, and partnerships that benefit LMI members. But with nearly 900 co-ops determining how best to serve their communities, this section is not all-inclusive.

Share Your Experiences

Has your cooperative used innovative ways to serve LMI consumer-member needs? If so, we want to hear from you! Your insights will be very helpful to our ACCESS project research to identify ways to provide affordable solar energy options for communities in need.

Please email our team at: SolarAccessProject@nreca.coop.

Free Products and Services

Many electric cooperatives provide free services to help members manage their energy use. For example, energy-efficient light bulb giveaways used to be very common several years ago. Members could look forward to free buckets of CFLs at annual meetings. As prices for efficient light bulbs have dropped dramatically over the past few years, CFL and now LED light bulb giveaways are phasing out.

One potentially free co-op service is researching causes of high bills and possibly making site visits. During a site visit, a co-op staff member or hired contractor looks for obvious areas of excess energy use, and may provide energy saving equipment for free, including LED light bulbs, pipe insulation, weather-stripping, or faucet aerators. Many co-ops also now offer free energy-use tracking apps and websites to their members.

Through high-bill reviews and site visits, co-ops might identify homes that qualify for assistance from community assistance programs (CAPs) for health and safety upgrades or emergency bill payment. Staff can also educate members on other financial support available from the co-op for in-depth energy audits (with blower door tests, infra-red imaging, etc.), weatherization, or other energy efficiency improvements.

Rebates

To reduce costs for services and upgrades like home energy audits and new appliances, many co-ops offer rebates on a variety of energy-saving offerings. Rebates can be classified as: *consumer*, *midstream*, or *upstream/buy-down*.

Consumer rebates are discounts on the purchase price of new, pre-approved energy saving appliances, equipment, or services. Members pay full price for the item or service, then submit proof of purchase to receive the rebate in the form of a check or a bill credit. Co-ops may offer consumer rebates for:

- ENERGY STAR® appliances like refrigerators, dishwashers, clothes dryers
- Energy efficient electric HVAC equipment like heat pumps and mini-splits
- Load-shifting equipment like electric thermal storage (ETS) heaters and water heater timers
- Programable and/or smart thermostats
- Weatherization equipment and labor

Some co-ops have also started offering rebates for the following products:

- Electric vehicles and electric vehicle charging equipment
- Solar photovoltaic (PV) panels[17]
- Electric accessories like lawn mowers and e-bikes

Midstream rebates are paid to retailers or installers for each piece of efficient equipment sold to members. Installers are incentivized to help members choose efficient equipment on-site, when and where decisions are often being made. Midstream rebates can be very cost-effective since co-ops need to educate only installers about the opportunity, not their entire membership. Investor-owned utilities (IOUs) have used midstream rebates successfully for years for consumer electronics and heat pumps.[18] These programs are starting to gain traction at co-ops as well. Jo-Carroll Energy offers rebates to local contractors who install geothermal or air-source heat pumps,[19] and Tri-State G&T will pilot a heat pump contractor rebate program in 2021.[20]

Upstream/buy down rebate programs are also offered widely by IOUs since they work well in large territories. They require participation from the utility, area retailers, and manufacturers. Utilities pay rebates to manufacturers for energy-efficient products sold in their territory and manufacturers pass that along to consumers through discounted retail prices. Retailers provide sales data to the utility so that it can determine the amount due to the manufacturer. ENERGY STAR® LED light bulbs are often rebated this way. Upstream/buy down programs are seamless for customers, who simply see discounted prices on store shelves. There is no proof-of-purchase paperwork, rebate check, or bill credit.

For LMI members, rebates on items they would normally buy, like light bulbs and consumer electronics, can be very helpful. For larger purchases, rebates may be less influential because the member must pay the upfront cost out-of-pocket. Despite future savings and rebates, the initial cost is often the deciding factor.

[17] For examples, see: Mohave Electric Cooperative , Duncan Valley Electric Cooperative , and Dakota Electric Association
[18] For more information and examples, see: https://www.energystar.gov/ia/partners/downloads/CE_Guide.pdf and https://www.pse.com/rebates/midstream
[19] For more information, contact John Scott, Jo-Carroll Energy, jscott@jocarroll.com
[20] For more information, contact Matt Fitzgibbon, Tri-State Generation & Transmission Association, mfitzgibbon@tristategt.org

On-Bill Financing

On-bill financing (OBF), which includes on-bill loans and on-bill tariffs,[21] could be a game changer for LMI members because it removes the upfront costs of energy efficiency measures. Through OBF, the co-op or lending partner pays the full cost of the measures upfront. OBF measures include weatherization, energy efficient appliances, beneficial electrification,[22] and rooftop solar.[23] In many OBF programs, co-ops conduct on-site energy audits to determine which measures are likely to be cost effective. Members pay monthly installments on their bills until the co-op or lender recuperates their cost. At the end of the term, the member owns the new equipment.

Co-ops are early adopters of OBF, with some programs dating back to the 1980s.[24] Nearly 100 electric cooperatives across the country now offer OBF[25] for many of the same products included in rebate programs, but instead of *reducing* upfront costs, it *removes* upfront costs. While these programs are particularly meaningful for members on tight budgets, most OBF programs are available to all members in good standing with the co-op, regardless of income.

Co-ops have many options for OBF program design, but some elements are common to most. OBF programs typically use bill payment history, not credit scores, to make programs accessible to as many members as possible. Also, co-ops can shut off power for non-payment in most areas, subject to state utility disconnection laws, where applicable. Table 1 shows common OBF program options.

Table 1. OBF Program Options

OBF Program Elements	Options
Source of capital	UDSA Rural Energy Savings Program (RESP) loans[26] (most common)
	Local banks (including Community Development Financial Institutions (CDFIs), credit unions, etc.)
	Self-financed by the co-op
Re-payment mechanism	On-bill loan installment
	On-bill tariff
Payment obligation	Tied to meter
	Tied to individual

[21] With on-bill loans, a debt amount is associated with the member or meter, depending on the program's structure. With on-bill tariffs, there is no debt or loan payment. Instead, a monthly tariff is associated with the meter. See: https://www.eesi.org/obf/coops/faq

[22] Beneficial electrification refers to replacing direct fossil fuel end uses (e.g., water heaters, furnaces, cars) with electric versions to reduce emissions and lower costs. For more information, see: https://be-league.com/

Program example: Orcas Power and Light Cooperative's Switch It Up! program

[23] Program example: Mountain Parks Electric, Inc. Electrify Everything program

[24] https://www.eesi.org/obf/coops

[25] https://www.cooperative.com/remagazine/articles/Pages/essential-services-help-low-moderate-income-members.aspx

[26] Other USDA programs have been available for OBF programs in the past. It is unknown at this time if they will be available in the future. More information on USDA's Rural Energy Savings Program (RESP) is included in the Help My House case study.

OBF loan installments are calculated the same as typical loans – principal, interest, and term. Tariffs are calculated similarly, but co-ops may cap the monthly tariff (and therefore total amount financed) to ensure the new bill is less than the old bill would have been. Tariff programs, including Ouachita Electric Cooperative's HELP PAYS and Roanoke Electric Cooperative's Upgrade to $ave, are often Pay As You Save® (PAYS®) programs, a system created by the Energy Efficiency Institute, Inc. (EEI).[27]

If a loan or tariff obligation is tied to a member, that individual is responsible for payment even if they move to another home, unless they arrange for a future occupant to assume their loan. If the loan or tariff is tied to the meter, a future renter or homeowner takes over the monthly installment or tariff. This approach has the benefit of allowing larger energy-efficient investments that take more time to pay off but will save more money and energy over time.

The Environmental and Energy Study Institute (EESI) provides free technical assistance to co-ops on OBF program design. To date, they've helped more than 35 electric cooperatives and municipal utilities with OBF programs, including securing more than $50 million in 0% interest loans from the USDA Rural Energy Savings Program (RESP).[28] For more details about OBF program design, see the very informative "How-to Guide: Launching an On-Bill Financing Program" on EESI's website.[29]

Miguel Yanez, project associate at EESI, noted that there is not one single approach that is always best. Much depends on co-op goals, state laws, and the regulatory environment for co-ops. Fourteen states currently have statutes related to OBF, which is helpful for programs but not necessarily required.[30] However, Yanez emphasized a key element that underpins many successful OBF programs: "We've found it takes leadership. There has to be a champion there that wants to create a program that helps their members save money on their energy bills through retrofits or through solar panels or by replacing propane furnaces."

[27] For more information, see: https://www.eeivt.com/
[28] https://www.eesi.org/Rural-Energy-Savings-Program
[29] https://www.eesi.org/obf/main
[30] Personal communication, M. Yanez, November 13, 2020.

On-Bill Financing Case Studies

➢ Case Study: Help My House – 10 Years of Savings for Members and Co-ops

The Help My House on-bill financing program was not the first OBF program run by an electric cooperative, but many programs that followed used it as model. [31] The program was initially developed by the South Carolina statewide organization, Electric Cooperatives of South Carolina (ECSC), and the state's G&T, Central Electric Power Cooperative (CEPC), with support from the Environmental and Energy Study Institute (EESI). A pilot study of 125 homes in 2011 - 2012 documented impressive savings for members – bills were reduced by more than 30%, nearly $290 per year, even after the monthly loan repayments. Average payback was just over six years, which means that over the 15-year expected lifetime of installed measures, participants will save an average of more than $8,500 (Keegan 2013).

Nearly 10 years later, the program has weatherized and improved the energy efficiency of more than 800 homes in eight distribution co-op territories in South Carolina. And, according to Mike Smith, ECSC's Vice President of Business and Technology Strategy, the savings documented in the pilot study have persisted.

Participants start with a home energy audit that the co-op uses for modeling expected savings from various upgrades with the goal of future bills being cash-flow positive or at least neutral – participants' bills, including monthly loan payments, should be the same as or lower than their bills before the program. Core program measures are air sealing, duct repair, energy efficient HVAC upgrades, and insulation improvements. Because the program serves manufactured homes, it includes measures specific to them such as sealing air and insulation gaps between doublewide units. Participants may choose any approved contractor to perform the upgrades, but the co-op does the final inspection. As Smith said, "We are part of the checks and balances to make sure the work is done well, and the right work is done."

The program initially borrowed capital from the USDA Rural Economic Development Loan and Grant (REDLG)[32] program. Now, with help from EESI, Help My House has secured more than $15.5 million at 0% interest through the USDA's Rural Energy Savings Program (RESP),[33] a program that has ties with the state because South Carolina Congressman James (Jim) Clyburn was instrumental in establishing it.[34] "The pace of the projects each year is a function of members' needs, the resources at the cooperative, and

[31] https://www.eesi.org/obf/case-study/helpmyhouse
[32] https://www.rd.usda.gov/programs-services/rural-economic-development-loan-grant-program
[33] Personal communication, Miguel Yanez, EESI, October 15, 2020
[34] https://www.electric.coop/help-my-house-for-rural-energy-savings-program-south-carolina/

the availability of lending capital from REDLG and RESP. With the recent infusion of 0% interest USDA RESP funds, we expect the pace of the program to accelerate," explained Smith.

Help My House loans, which currently are made at about 4% interest, are tied to the meter, not the individual. A 2010 South Carolina state statute allows for power shut off if loan payments are not made, although this rarely happens. If a participant moves to another home before the loan is paid off, the loan obligation and associated savings transfer to the next occupant (renter or new homeowner) when they take over the electric service account.

Instead of running a standard credit check, the program confirms the applicant is not in active foreclosure or unresolved bankruptcy, then simply uses bill payment history for qualification. Even members who do not pay every bill in full may still qualify. Smith explained that if someone gets behind for a few months, but is still paying something towards their utility bills, that member might be an excellent program candidate. The Help My House program "empowers our members; it can make them better payers," he explained.

As with many OBF programs, Help My House is not an LMI-specific program. The program serves many LMI members because eligible measures are particularly effective in smaller, older homes and manufactured homes. Some co-ops also reach out to members with unusually high bills to see if the program would be a good fit, but otherwise, marketing is not a heavy lift. With many years' worth of satisfied participants, word-of-mouth is very effective.

Figure 3. "Help My House" Program Participant

Image courtesy of Tri-County Electric Cooperative (https://tri-countyelectric.net/help-my-house)

Linda Butler participated in the Help My House Makeover Contest in 2008, a pre-curser to the 2011 pilot program. Her monthly power bills dropped from $800 to around $200 as a result of the program.

In addition to improving homes and budgets, Help My House generates quantifiable benefits for co-ops. First, member satisfaction is high. When surveyed as part of the pilot evaluation, both participants and non-participants were highly satisfied with their co-op as a result of the program.[35]

Second, the significant energy savings — 11,000 kWh per home per year — helps co-ops control wholesale power purchase costs. "Coincidentally and not surprisingly, when you reduce your energy use, you also reduce your peak demand because your house is more efficient," said Smith. An analysis of demand savings from the pilot showed coincident peak savings of a typical pilot home to be 27% during summer peak and 46% during winter peak, [36] as shown in Figure 4.

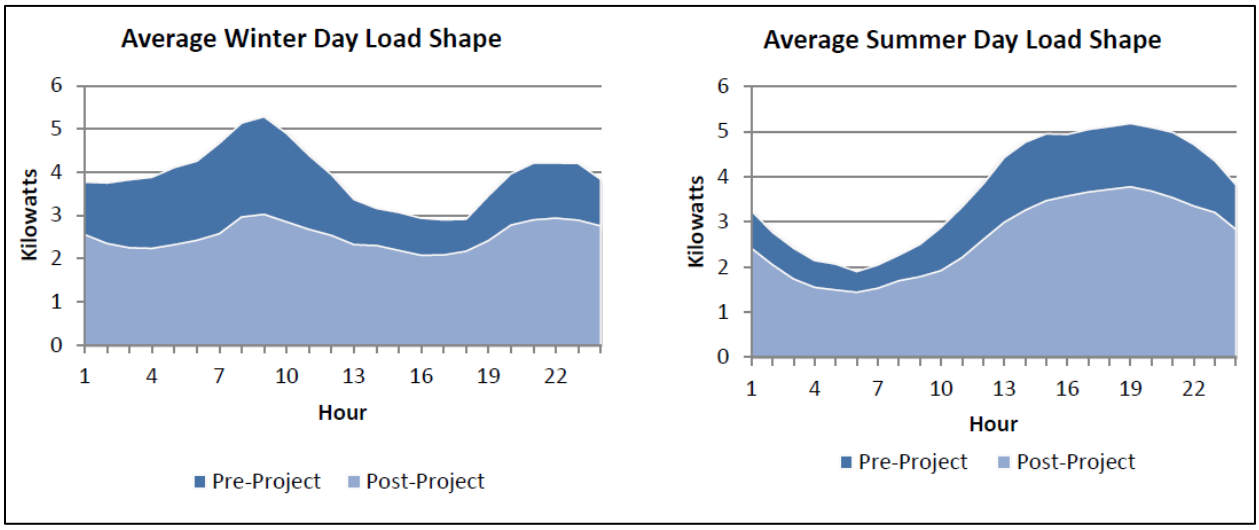

Figure 4. Average Winter and Summer Demand Savings per Home[37]

The pilot did not include any load control devices to flatten peaks, but when weatherization and efficiency measures are combined with load control devices, co-ops can further reduce demand and improve load factor. This holds down costs for all members through lower wholesale power, transmission, and distribution expenses.[38]

With 10 years of history, the Help My House program will continue to benefit program participants and co-ops alike. Regarding its support of LMI members specifically, Smith feels that because the program largely recovers its costs through interest paid on the loans, it eliminates a concern that some members may be unfairly subsidizing others. "If you don't participate, you "don't pay" for someone else," he said.

[35] Keegan 2013
[36] Keegan 2013
[37] Kegan 2013, pg. 28
[38] Keegan 2013

➢ Case Study: Midwest Energy, Inc.'s How$mart ® Program – Self-Financed Tariff Program

Midwest Energy, headquartered in Hays, Kansas, offers OBF programs to its members. How$mart®, the co-op's third OBF program, uses on-bill tariffs tied to the meter to finance weatherization and energy efficiency measures. It is available to both owners and renters, if the landlord signs an agreement with the co-op committing to disclose the tariffed invesment to future tenants. How$mart requires an energy audit to begin. The program accurately projects savings using previous billing data from each site, then caps the allowable monthly bill tariff to 90% of the expected savings. Essentially, the savings cover the tariff. The program uses a 15-year term and 3% cost of capital for the utility to determine the monthly tariff cost recovery charge amount. If the tariffed charge for the proposed measures will exceed 90% of the savings, the total investment amount is reduced until the tariffed cost recovery charge fits within program parameters. In these cases, participants cover the portion of the upfront cost that exceeds the total amount capitalized by the utility.

From January to September 2020, the program financed nearly $120,000 — 106 projects at an average of $5,700 each. This works out to a tariff of approximately a $30 - $40 per month. The co-op self-finances How$mart now, but in the past, they have used state and USDA funding. Because of the tariff caps that ensure bill savings, the program covers an average of about 75% of total project costs.

Brian Dreiling, manager of energy services, explained that the first two OBF programs the co-op offered were loan programs, not tariffed on-bill programs. "There are advantages to both approaches," he said. With the loans, which had 5-year terms, Midwest Energy was able to finance 100% of the upfront costs because the monthly installment was not capped by the energy savings. "People were paying back very large amounts a lot quicker." But loans were tied to the individual, making it harder to involve renters. For this reason, while the cash flow may not be as favorable for the co-op, Dreiling thinks the How$mart tariff program is better for their LMI members, many of whom are renters. "Since we're a rural co-op," he said, "those are many of our customers. We want to do what's right for them."

➢ Case Study: La Plata Electric Cooperative's On-Bill Financing Program – Partnering with a Local Bank

La Plata Electric Association (LPEA), headquartered in Durango, CO, has a mutually beneficial partnership for its OBF program with 1st Southwest Bank, a local community development financial institution (CDFI). CDFIs are well-aligned with co-ops; they also serve economically distressed communities.[39]

LPEA's OBF program is straightforward. According to Nancy Andrews, LPEA's energy management advisor, after the co-op ensures a loan request for a standard energy-efficiency measure or solar panels, a

[39] https://ofn.org/what-cdfi

renewable energy measure recently added to the program, the co-op sends the applicant's payment history to the bank. If the member is in good standing with the co-op, the bank offers a loan (tied to the member) at a low interest rate – currently around 3.75%. Monthly payments are collected on the electricity bill and passed through to the bank.

The low rate is made possible by the bank's loan loss reserve and the simplified process. Having no credit checks or loan paperwork minimizes staff time, and a program of the Colorado Energy Office (CEO) provides funding to reduce risks of defaults. The Green Colorado Credit Reserve (GCCR)[40] contributes a percentage of each loan to the bank's loan loss reserves. This means, with every OBF loan issued, the loan loss reserves increase and the risk to the bank from the unsecured loans decreases.

Kent Curtis, 1st Southwest Bank's CEO, is enthusiastic about the program. He highlights four key benefits. First, with loan loss reserve support from GCCR, the bank has extra protection if a member defaults on the loan. Second, by using bill payment history instead of credit checks and loan applications, OBF loans are "simpler and easier, and don't take a lot of staff resources," he explained. Third, the program generates new customers for the bank. Said Curtis, "For almost all of the loans that we've done through the program, very few of those were actually existing customers. The [OBF participants] came to us because of the program." And finally, "it's good for the environment, and that fits with our mission."

Demand/Response Programs

Demand/response (DR) programs are offered by many co-ops as ways for members to save money by helping the co-op flatten its coincident peak, when supplied electricity is most expensive. Co-ops usually offer these programs on an opt-in basis, so that members explicitly consent to participate. Early residential DR programs involved one-way radio switches on water heaters that co-ops could control remotely to shave peaks. These programs were useful, but co-ops had no way to know if signals were received, if the radio controller had been dismantled, or how much load had been shed. Legacy radio switches are still in members' homes, and some co-ops continue to use them when needed.

More recent DR programs, often branded as "Beat the Peak,"[41] may simply ask members to voluntarily turn off non-essential loads for short periods of time in response to texts, emails, social media posts, and other signals from the co-op. These programs include messaging to help members understand how to curb electricity use during peak events. This ultimately helps save co-ops, and therefore members, money. Some programs include monthly bill credits for participation. Other DR programs include:

- Free or discounted energy-efficient electric water heaters with timers[42]
- Free or discounted wi-fi enabled thermostats that the co-op can control during peak events[43]

[40] https://energyoffice.colorado.gov/green-colorado-credit-reserve
[41] https://www.delaware.coop/btp
[42] http://www.aikenco-op.org/water-heater/
[43] https://energysmartsc.org/smartthermostat/

- Grid-enabled thermal storage (GETS) heaters that store and shed load as needed[44]
- Programable electric vehicle chargers to prevent or incentivize off-peak charging[45]

DR programs can also help LMI members save money directly. For example, Ecobee, a smart thermostat manufacturer and program partner with several co-ops, estimates that households can save more than 20% on their heating and cooling bills with properly programmed smart thermostats.[46, 47]

Rates

Residential and commercial rates rarely require income qualification, but several rates can help members to lower their bills by controlling when they use electricity.

Time-of-Use Rates

Time-of-use (TOU) energy rates, a time-based rate option, price energy consumption according to time periods, including on-peak, off-peak, and sometimes critical peak, shoulder peak, or others as relevant. According to the NRECA/CFC Retail Rate Guide – Volume 1:

> The primary goal of a time-based rate design is to provide a pricing signal to member-consumers that reflects the relative cost of power from one time period as compared to another. Since the majority of the distribution cooperative's delivery costs are fixed, the focus of time-based rate designs is the time related cost differences in the wholesale purchased power cost. Time-based rates provide the member-consumer the ability to control their own billing by reducing usage during peak periods or by shifting usage from peak periods to non-peak periods (p. 40).

TOU rates provide an incentive to members to reduce electricity usage during times when distribution co-ops pay the most to buy it. In turn, members can lower bills by shifting usage to lower-priced times. When cooperatives offer TOU rates, they are typically optional for members. In an early trial of Bandera Electric Cooperative's Time-Based Usage rate, members saved 5% to 10% on their monthly bills.[48]

Demand Rates

Some co-ops are exploring residential demand charges or three-part rates. With these rates, members have a standard monthly fixed service fee, a per kWh usage charge that may vary on- and off-peak, and a monthly charge for their highest demand (kW) during set time periods. While commercial and industrial (C&I) demand charges have been in place for decades, residential demand rates have been somewhat controversial since the average consumer rarely understands the difference between energy (kWh) and demand (kW). However, these rates are gaining interest because they more accurately reflect how distribution co-ops are

[44] https://www.cooperative.com/remagazine/articles/Pages/Community-Storage-Gives-Co-ops-Flexibility.aspx
[45] https://www.delaware.coop/btp
[46] https://www.ecobee.com/savings/
[47] Note that other smart thermostat manufacturers also participate in co-op and other utility programs.
[48] NRECA 2016

charged for wholesale electricity by their suppliers. With carefully designed demand rates coupled with education, co-ops can help members save money even if they don't reduce overall electricity consumption.

After extensive research and outreach, South Carolina's Mid-Carolina Electric Cooperative rolled out a mandatory residential demand rate in 2016 that passes along their costs to members fairly. The co-op found high-demand members were costing the co-op more to serve than lower demand members, regardless of energy use. The demand rate allows high-demand users the opportunity to save while keeping costs down for all members.

The new residential rate has a $12/kW on-peak demand charge, a flat energy rate of just $0.0515/kWh, and a $0.95/day fixed account charge.[49] To help members avoid demand charges, Mid-Carolina does outreach and education on bill reduction strategies like preventing a water heater from turning on during peak or staggering the use of appliances. "Members are engaged and have real options and choices to save money."[50]

Net-Metering Rates

Net-metering rates pay members for electricity they supply to the grid with distributed generation, most commonly rooftop solar systems. For members who can't or don't have rooftop solar systems, some co-ops use virtual net-metering to compensate members for their share of production from a community solar garden. Early net metering programs, designed to encourage a nascent technology, compensated participants at the full retail rate for energy they exported to the grid. However, many states and utilities have reviewed these programs and now offer net billing based on avoided costs or wholesale value to the grid.

Electric Vehicle Charging Rates

Electric vehicle (EV) charging rates are sometimes paired with free or discounted charging equipment, with the goal of encouraging members to charge during off-peak hours when there is excess electricity on the grid. With more and more used EVs for sale and new state incentives, EVs and discounted off-peak rates can be quite beneficial to LMI members as well as co-ops. Off-peak EV charging builds load when the co-op needs it and potentially increases sales. And EVs are far cheaper to drive per mile[51] than gasoline and diesel vehicles, even when modeled with low gas prices and extremely high electricity prices.[52]

Payment Plans

Prepayment Plans

Prepay plans are not new to co-ops, but they are increasingly recognized as an option for members who want to control their energy budgets. With advanced metering, members can monitor their energy usage in near-real-time and add funds on whatever schedule they choose. Smart phone apps, payment kiosks, and websites

[49] http://www.mcecoop.com/content/rate-structure
[50] Porth, M. (n.d.)
[51] Not a proxy for total cost of ownership
[52] https://avt.inl.gov/sites/default/files/pdf/fsev/costs.pdf

offer many options for energy use monitoring and payment. Power may be shut off when an account is out of money, but some co-ops waive reconnect fees.

NRECA estimates that about a quarter or more of NRECA-member distribution co-ops offer prepay. Because cell phone providers now offer pay-as-you-go for voice and data, customers are likely familiar with this kind of plan.

A 2014 NRECA study of prepay programs at four co-ops was not able to document energy savings as a result of these programs, but it notes other studies have shown savings of up to 15%. In addition, 9 out of 10 members felt prepay was easier than paying standard monthly bills.[53]

Levelized Billing

Several co-ops also offer levelized billing to prevent seasonal bill swings and help members plan their energy budgets. A member's previous year's bills are totaled, then divided by 12 to create equal payments every month. Oregon's Central Electric Cooperative's Balanced Payment Plan is one of many examples.

Broadband

The Federal Trade Commission's 2020 Broadband Deployment Report[54] estimates that about 18 million Americans, more than 5% of the American population, lack access to broadband, but nearly 22% of rural Americans and 28% of those living on Tribal lands do not have access. Some suggest these numbers are low. BroadbandNow Research's analysis suggests that more than 42 million Americans lack the ability to purchase broadband in 2020 – more than double FTC estimates.[55]

Today, nearly 150 co-ops are working to fill this gap by providing broadband in their service territories. According to a 2020 NRECA report on COVID-19 and broadband, "Broadband is an essential infrastructure for commercial and residential success in all communities, urban and rural. It is not only a platform to receive communications services (voice, video and data), but to also connect us to government, health, educational, and financial services and to provide professional services."[56] The COVID-19 pandemic has cemented the fact that high-speed internet is a necessity for all Americans—urban, sub-urban, and rural.

NRECA offers numerous resources on broadband to its members, including case studies and white papers on business models, economic studies, assistance on financial and regulatory issues, and legal resources.[57]

Missouri's Co-Mo Electric leverages the broadband service provided by its subsidiary, Co-Mo Connect, to offer the Take Control & Save energy efficiency program. This broadband-enabled energy efficiency program offers members a comprehensive website on energy efficient lighting, appliances, vehicles, and

[53] NRECA 2014
[54] https://docs.fcc.gov/public/attachments/FCC-20-50A1.pdf
[55] https://broadbandnow.com/research/fcc-underestimates-unserved-by-50-percent
[56] https://www.cooperative.com/topics/telecommunications-broadband/Documents/Advisory-Broadband-Essential-To-Rural-America-April-2020.pdf
[57] https://www.cooperative.com/topics/telecommunications-broadband/Pages/Broadband-Overview-and-Key-Contacts.aspx

home comfort, along with interactive savings calculators and information on rebates and other co-op programs (Shoemaker et al. 2018).

Community Solar

Community solar is a way for members to overcome the physical and/or financial barriers of privately-owned rooftop solar, and co-ops have been leaders in this area. A 2016 Deloitte report estimated that electric cooperatives administered more than two-thirds of community solar programs nationwide,[58] which shows how co-ops are meeting members' needs through innovation.

Now, more than 200 distribution cooperatives offer more than 140 MW total of community solar. The median co-op project size is 126 kW, but co-op community solar array sizes range from a 10 kW rooftop installation to Valley Electric Association's 15 MW Community Solar Project in Nevada. Georgia's Walton Electric Membership Cooperative has detailed program information on their Solar Made Easy webpage.

Community solar has historically been a premium product that co-ops offered to members who were willing to pay more for what used to be a more expensive resource. But that is changing. Some co-ops are working to make these programs accessible to more members by leveraging state or philanthropic subsidies. And as solar costs continue to drop, others are exploring unsubsidized LMI community solar options.

Poudre Valley Rural Electric Association (PRVEA) now offers a PV for All program in partnership with the non-profit GRID Alternatives and the Colorado Energy Office. Participants qualify based on income, and there are no subscription costs. And with a grant from the DOE's Clean Energy for Low Income Communities Accelerator, Michigan's Cherryland Electric Cooperative offers an LMI program that combines solar with weatherization and energy efficiency.

Community solar was included as part of NRECA's Solar Utility Network Deployment Acceleration (SUNDA) project (2013 – 2018). There are many resources on the program website, including the Community Solar Playbook.

[58] Deloitte 2016

The Power of Partnerships

In addition to running their own programs, co-ops are ingrained in broader community networks and are instrumental in connecting members in need with non-co-op services.

LIHEAP is a prime example. The Low Income Home Energy Assistance Program, a federal program administered by state offices, provides grants to help people experiencing hardships manage costs associated with home energy bills, energy crises and energy-related home repairs. Co-ops do not administer LIHEAP funds directly, but many provide this critical information about the program on their websites. They may also suggest the program to those struggling to pay bills.

Through energy audits, co-ops may identify homes with significant health and safety issues that are out of the scope of co-op programs. Co-ops can refer these members to regional Community Assistance Programs (CAPs), Weatherization Assistance Programs (WAPs), or similar, that address these needs in LMI households. Homes in need of major health and safety repairs—e.g., closing holes in roofs, floors, or exterior walls; stopping water leaks; removing mold—would not be good candidates for OBF or other energy efficiency programs until these repairs are completed. Therefore, co-ops and community assistance organizations can support each other's missions while helping members.

Some partnerships are ongoing arrangements while others address communities in crisis. Roanoke Electric's Sustainable Forestry and Land Retention Project – a partnership between the co-op, the U.S. Endowment for Forestry and Communities, the Natural Resources Conservation Service, the U.S. Forest Service, and the American Forest Foundation – works to restore and conserve threatened forest land in Roanoke Electric's service area by increasing forest-owner income and land asset values.

The North Dakota Association of Rural Electric Cooperatives (NDAREC) supports a broad range of economic development programs, including a childcare facility and a food cooperative that provides a market for local growers and ranchers in a sparsely populated area. Colorado's Holy Cross Energy, which serves several ski resorts around Aspen and Vail, partnered with Habitat for Humanity, the local school district, county government, and National Renewable Energy Laboratory (NREL) to build affordable, net-zero-energy housing for the resort community's essential workers like teachers, first responders, nurses, and hospitality and service industry workers.[59]

More than 130 distribution co-ops serve Native American tribal lands, and several collaborate with tribal governments on programs and projects. For example, Anza and Kit Carson Electric Cooperatives partner with tribes on local solar developments.[60] In addition to supporting members themselves, hundreds of co-ops help members to support each other through Operation RoundUp, which enables members to round their monthly energy bill up to the nearest dollar. Volunteers decide how those funds will be used in their communities, which can include bill-pay assistance, home weatherization, and scholarships. Ohio's Consolidated Cooperative is one of many examples of a co-op with an active Operation RoundUp program.[61]

[59] https://habitatroaringfork.org/pages/basalt-vista
[60] For more information, see: https://www.cooperative.com/conferences-education/web-based-learning/the-power-of-partnership-solar-energy-series/Pages/default.aspx and https://www.cooperative.com/programs-services/bts/access/Documents/Advisory-ACCESS-Case-Study-Anza-Oct-2020.pdf
[61] https://www.cooperative.com/programs-services/bts/Documents/Secure/Advisories/Advisory-Advancing-Energy-Access-for-All-Case-Study-Consolidated-Cooperative-August-2019.pdf

➢ Case Study: Kit Carson Electric Cooperative – Community Collaboration

Kit Carson Electric Cooperative, which serves about 30,000 members in the high-elevation northern New Mexico counties of Taos, Colfax, and Rio Arriba, provides electricity, propane and broadband to its members. New Mexico is known as the Land of Enchantment for its beautiful landscapes and rich cultural diversity. It is also a global tourist destination. But despite the wealth associated with the Santa Fe and Taos Ski Valley, and the state's high concentration of PhDs at Los Alamos and Sandia National Laboratories, New Mexicans consistently rank as some of the nation's poorest. Kit Carson's territory, which includes two Native American pueblos, is no exception, with poverty rates at or above 20%, nearly double the national average.[62]

The co-op has received a lot of attention for its aggressive goal to supply 100% daytime solar energy by 2022[63] in response to members' requests. Much of this is acquired through a power purchase agreement (PPA) for a 1 MW solar array located at Picuris Pueblo, a 90-home Native American pueblo within the co-op's territory. More than one-fifth of the tribe's members live in poverty, and many more are only slightly above poverty level. Through the PPA, members' bills are reduced through net metering, and the pueblo government uses proceeds to pay for propane at community buildings. In addition to providing clean energy and lower bills, the project benefits the local economy with jobs. During construction, the workforce was largely from Picuris or other nearby pueblos. In many cases, workers received on-the-job training, and can continue to participate in New Mexico's growing renewable energy industry.

The Picuris array, which came online in 2018, illustrates the power of local and national partnerships. Along with Kit Carson and the pueblo, the Department of Energy (DOE), Bureau of Indian Affairs (BIA), Taos County government, National Renewable Energy Laboratory (NREL), and Osceola Energy (project developer) all played important roles.[64]

Beyond this successful, high-profile project, the co-op is quietly working on other efforts to support its community by improving the lives of its neediest members. Luis Reyes, Kit Carson's CEO, said, "You just continue to see this growing divide between those who have and those who have not. Electricity is part of that." He sees a role for the co-op to help address that broader social issue of access.

A simple service the co-op provides is to help members fill out forms for programs such as LIHEAP, weatherization assistance, and emergency relief. Reyes explained that many people in need know there is help out there, but they face real barriers to accessing it. "I think there's this perception that everyone has a computer and high-speed internet and, you know, it's easy to get on and fill out a form. You really don't think about how difficult that can be. When I go talk to [LMI members] at their houses, they're single parents with two or three kids who just don't have a lot of time to sit down and fill out applications or run over to the unemployment office."

[62] https://www.indexmundi.com/facts/united-states/quick-facts/new-mexico/percent-of-people-of-all-ages-in-poverty#map
[63] https://kitcarson.com/electric/100-daytime-solar-energy-by-2022
[64] https://www.energy.gov/sites/prod/files/2019/01/f58/2.1-Picuris.pdf

To bridge this gap, Kit Carson helps members apply for assistance at no charge. “If you bring us the paperwork or come in and sit down with us, we'll help you fill out the application,” said Reyes, who feels that support services can be very helpful to LMI members once they get inside the system.

The co-op also offers free financial literacy classes led by local banks that cover creating budgets, managing bills, and making payment arrangements. “I don't just want members to manage their finances so they can pay me. I want them to be able to manage their finances so that they can pay their bills, but also have enough left over for their family,” said Reyes.

While Kit Carson does not offer an OBF program, the co-op finances appliances. Loans are not part of the electric bill so that borrowers do not fear their power being shut off if they fall behind. Many of the co-op’s members live in rented manufactured homes. For this reason, water heaters are the most commonly financed appliance since they can be moved from home to home.

Credit checks are not required for financing. Instead, explained Reyes, “We sit down and talk with them. We ask, ‘Are you working?’ and some other basic questions to make sure that they can at least, if nothing else, pay their electric bill if they put in an electric heater. It's more interactive in that sense. We don't want to be like a bank, we want to be like a co-op that helps its members.”

In response to the economic downturn and at-home schooling due to COVID-19, the co-op is leveraging its broadband service to support its community. Kit Carson is in the process of connecting all school kids in its territory to the internet with fiber optics. Families need to cover the monthly recurring costs, but the co-op waives all hookup fees and provides a router for free.

And by helping to found, and now actively participating in the Enchanted Circle Community Organizations Active in Disaster (EC COAD),[65] Kit Carson is an integral part of a broader alliance to respond to crises. Along with the co-op, 14 local businesses, non-profits, governments, healthcare providers, and academic institutions make up the EC COAD.

To help families weather the pandemic, the EC COAD coordinated with local churches to deliver food to the elderly and low-income families. Then, they realized they could amplify that impact by helping families grow their own vegetables. To that end, the EC COAD built more than 400 4’ x 8’ raised-bed gardens at community members’ homes. Once people saw how much they could grow in a small bed, families started building larger ones on their own. “It's really interesting,” said Reyes, “once you empower people to make decisions on what they think is important, they take it and run with it.”

Reyes points out that because Kit Carson is a regulated utility, it cannot do everything it would like in terms of LMI rates and programs, but within these limitations, the co-op seeks to build trust and let members know that they truly want to help, and not just with propane and electricity. “All these other relationships actually help [members] get engaged, get empowered, and that helps their quality of life. And at the end, the stress of not paying their electric bill is not so high now that they know there are resources where they can get help.”

[65] https://eccoad.org/

The co-op's efforts, from a solar PPA with a tribe to sitting down with a member to fill out a form, all come down to building a stronger, resilient community through relationships. Luis Reyes summed it up – in both large and small ways, "Kit Carson doesn't just talk about helping LMI members. We really do it."

Conclusion

There are different state and federal metrics for classifying people experiencing financial hardships as poor or low income or LMI, but no matter which metric is used, the fact remains that many people in rural America are struggling financially. The COVID-19 pandemic has only made things worse. Co-ops across the country step up in large and small ways to support LMI members with energy efficiency, weatherization, renewable energy, rate and payment plan options, and community connections. These efforts benefit communities as well, through job creation, economic development, improved housing stock, better internet coverage, and clean energy. Many of these services can be even more powerful when bundled together, leveraging technologies and relationships, and simplifying participation for busy families.

The next report in this series will investigate which of these approaches support NRECA's ACCESS Program's mission to "to help increase solar affordability, with particular focus on assisting low and moderate income (LMI) consumers."

References

Deloitte. (2016). *Unlocking the value of community solar: Utilities find opportunity in the inevitable growth of distributed energy resources.*

Drehobl, A., Ross, L., & Ayala, R. (2020). *How high are household energy burdens? An assessment of national and metropolitan energy burden across the United States.* American Council for an Energy-Efficient Economy (ACEEE).

Keegan, P. (July 2013). *Help My House Program final summary report.* Prepared for Central Electric Power Cooperative, Columbia, South Carolina, and The Electric Cooperatives of South Carolina, Cayce, South Carolina.

National Rural Electric Cooperative Association (NRECA). (2014). *Conservation impact of prepaid metering.*

National Rural Electric Cooperative Association (NRECA). (July 2016). *Rate case studies.*

National Rural Electric Cooperative Association (NRECA) and National Rural Utilities Cooperative Finance Corporation (CFC) (2017). *Retail rate guide: Volume 1.*

Porth, M. (n.d.) *Liberty, justice & demand rates for all.* PowerPoint presentation.

Ross, L., Drehobl, A., & Stickles, B. (July 2018). *The high cost of rural energy in America: household energy burdens and opportunities for energy efficiency.* American Council for an Energy-Efficient Economy (ACEEE).

Shoemaker, M., Gilleo, A., and Ferguson, J. (September 2018*). Reaching rural communities with energy efficiency programs*. American Council for an Energy-Efficient Economy (ACEEE).