



Municipal Light Plants and Energy Efficiency

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Executive Summary

Municipal Light Plants (MLPs) around the country are offering programs that incentivize their customers—via rebates, zero- and low-interest loans, and on-bill financing mechanisms—to adopt: energy efficient equipment and home efficiency upgrades; “behind-the-meter” renewable energy like rooftop solar; efficient hot water systems; electric vehicles; and heat pumps that efficiently heat or cool an indoor space using electricity and natural temperature differences.

On behalf of the Massachusetts Climate Action Network, this Applied Economics Clinic report reviews a sample of 62 MLPs and electric co-operatives across 27 states, and highlights 21 MLPs across 17 states that have demonstrated leadership on energy efficiency, renewable energy and beneficial electrification programs. These MLPs range from urban to rural and from as few as 20,000 customers to as many as 1.5 million. Massachusetts MLPs can look to these examples as they make plans to comply with February 2020, Massachusetts Department of Energy Resources (DOER) guidelines that require MLPs to formally participate in developing and administering energy efficiency programs (and be subject to state oversight parallel to that of Eversource, National Grid and Unitil).

Offering rebates, zero- and low-interest loans, and on-bill financing mechanisms for energy efficiency, renewable energy and beneficial electrification programs helps all customers participate in the cost and energy savings benefits of these measures (see Table ES-1). These kinds of financial incentives either offset costs (as with rebates and zero-interest loans), or spread costs out more evenly over a longer period of time (as with low-interest loans and on-bill financing), and are particularly beneficial for low- and moderate-income customers who are more likely to lack the funds needed to pursue these investments on their own.

Table ES-1. Benefits of energy efficiency, renewable energy and beneficial electrification programs

Measures	Customer Benefits
Energy efficiency equipment and efficiency upgrades	Energy and cost savings
	Emissions reductions and reductions in direct fuel use
Renewable energy	Emissions reductions and reductions in air pollution
	Job creation
	Community ownership
Hot water	Energy and cost savings
	Reduces costly peak energy demand
Electric vehicles	Emissions reductions and reductions in direct fuel use
	Lifetime cost savings
Heat pumps	Energy and cost savings
	Emissions reductions and reductions in direct fuel use



1. Background

In Massachusetts, two types of companies distribute electricity to consumers: investor-owned utilities (IOUs: Eversource, National Grid and Unitil) and Municipal Light Plants (MLPs, for example, Concord MLP and Reading MLP). MLPs are public, independent entities that generally serve a single community (or, sometimes, a small group of communities); MLPs typically have a much smaller number of customers than IOUs.¹ Until recently, Massachusetts MLPs were not legally mandated to comply with the same statewide efficiency programs as IOUs, allowing MLPs more autonomy over their energy choices.² MLPs are still not obligated to comply with the state’s renewable energy requirements³—though some elect to participate in the state’s Renewable Energy Trust Fund.⁴

In 1997, Massachusetts went through a process of “restructuring” its IOUs: today’s utilities may not own power plants or other generation assets; they may only own poles and wires (distribution and transmission assets).⁵ Throughout most of New England, electric generating power plants were sold to multiple, private, non-utility companies that compete against one another to sell their electricity onto the grid.⁶ The goal of restructuring was to allow competition between generators that would lower electric rates for customers.⁷

In 2008, a Massachusetts Department of Public Utilities (DPU) order adopted “revenue decoupling,”⁸ which fundamentally changed the way IOUs earn money for shareholders. Prior to the 2008 order, IOU earnings depended on how much energy they sold; since the 2008 order, IOU revenue is based on their total investments in new poles, wires and other capital expenditures. IOUs are regulated by the DPU, which

¹ Adelman, K. August 3, 2016. “Municipal Light Departments in Massachusetts: What are they and why should you care?”. MAPC. Available at: <https://www.mapc.org/planning101/municipal-light-departments-in-massachusetts-what-are-they-and-why-should-you-care/>

² Ibid.

³ Hibbard, PJ., Darling, PG. July 2019. *Fuel Mix and Greenhouse Gas Emissions of Municipal Electric Light Companies in Massachusetts*. Analysis Group. Available at: [http://www.energysterling.com/pdf/Fuel Mix and Greenhouse Gas Emissions of MLPs in Mass - Final.pdf](http://www.energysterling.com/pdf/Fuel_Mix_and_Greenhouse_Gas_Emissions_of_MLPs_in_Mass_-_Final.pdf)

⁴ Massachusetts Clean Energy Center. No date. “Municipal Lighting Plant Communities”. Available at: <https://www.masscec.com/municipal-lighting-plant-communities>

⁵ The 191st General Court of the Commonwealth of Massachusetts. November 25, 1997. *An Act relative to restructuring the electric utility industry in the Commonwealth*. Chapter 164. Available at: <https://malegislature.gov/laws/sessionlaws/acts/1997/chapter164>

⁶ Conservation Law Foundation. September 2015. *A Guide to Electricity Markets, Systems, and Policy in Massachusetts*. Chapter 1: Deregulation. p.5. Available at: <http://www.clf.org/wp-content/uploads/2015/09/Electricity-Markets-Primer.pdf>

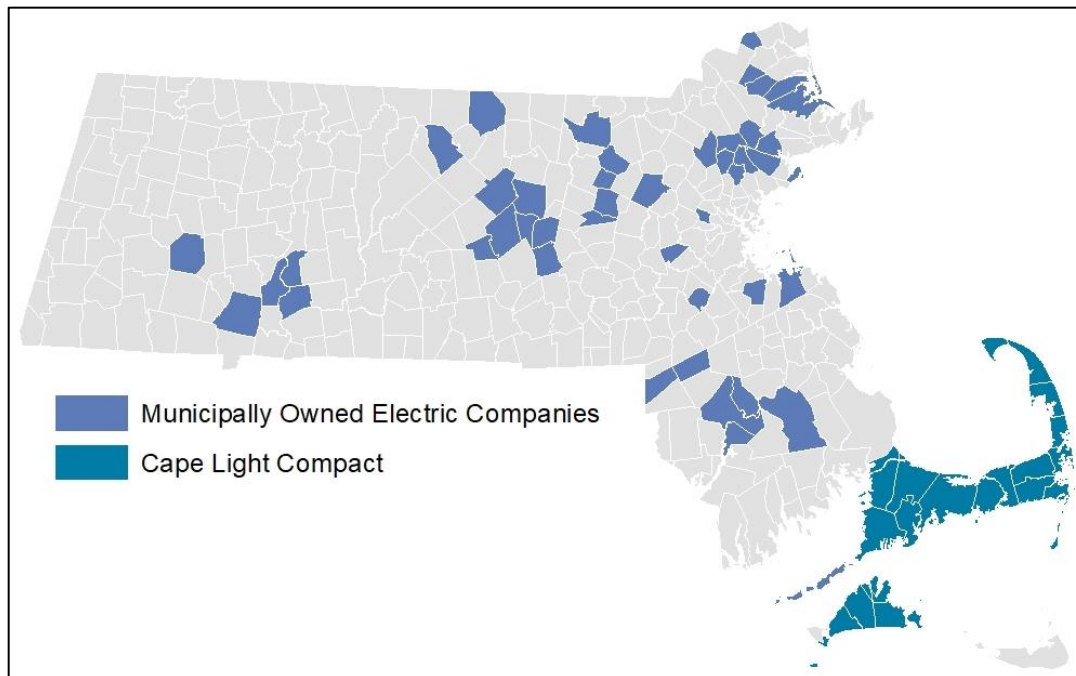
⁷ Ibid.

⁸ Massachusetts Department of Utilities. 2008. *Motion into Updating its Energy Efficiency Guidelines Consistent with An Act Relative to Green Communities*. DPU 07-50-A-2008. Available at: <https://www.mass.gov/files/documents/2016/08/sg/15facghg.pdf>

oversees their new investments in infrastructure and sets “rates” (per kilowatt-hour customer charges).

Massachusetts MLPs (often called “Munis”) are operated as independent, municipal electric distributors, and are permitted to own power plants and set their own rates. MLPs are not subject to the same DPU oversight as IOUs.⁹ As of June 2020, 43 MLPs provide electric service to 71 Massachusetts communities.¹⁰ Twenty-one of these towns have joined together to form the Commonwealth’s largest Muni, the Cape Light Compact (see Figure 1). Cape Light Compact is a limited-purpose Muni that administers its own energy efficiency and renewable energy programs but does not supply energy—Eversource supplies the electricity distributed to the Cape Light Compact towns. In 2019, the 42 other MLPs accounted for 14 percent of the Commonwealth’s electric demand.¹¹

Figure 1. Municipal Light Plants in Massachusetts



Source: Mass.gov. 2020. *Massachusetts municipally-owned electric companies*. Available at: [https://www.mass.gov/info-details/massachusetts-municipally-owned-electric-companies#towns-served-by-mlps-\(a-g\)-](https://www.mass.gov/info-details/massachusetts-municipally-owned-electric-companies#towns-served-by-mlps-(a-g)-).

⁹ Massachusetts Department of Utilities. No date. “Massachusetts municipally-owned electric companies”. Available at: [https://www.mass.gov/info-details/massachusetts-municipally-owned-electric-companies#towns-served-by-mlps-\(a-g\)-](https://www.mass.gov/info-details/massachusetts-municipally-owned-electric-companies#towns-served-by-mlps-(a-g)-)

¹⁰ Ibid.

¹¹ Hibbard, PJ., Darling, PG. July 2019. *Fuel Mix and Greenhouse Gas Emissions of Municipal Electric Light Companies in Massachusetts*. Analysis Group. Available at: <http://www.energysterling.com/pdf/Fuel Mix and Greenhouse Gas Emissions of MLPs in Mass - Final.pdf>



2. Massachusetts MLPs have an opportunity to lead on energy efficiency

In 2008, the Massachusetts legislature passed the Green Communities Act (GCA),¹² which—among other provisions—requires IOUs to develop and administer three-year energy efficiency plans to pursue all cost-effective efficiency measures (that is, any efficiency measure that results in greater benefits than costs must be made available to customers). The IOUs' energy efficiency plans are submitted to and approved by the DPU, which also receives regular reporting on the IOU's efficiency performance. The current energy efficiency plan, spanning the 2019 to 2021 period, targets energy savings averaging 2.7 percent of annual electric sales.¹³ In 2018, Eversource and National Grid achieved 3.1 and 3.7 percent efficiency savings as a percentage of total electric sales¹⁴, respectively, making the Commonwealth the national leader in energy efficiency for nine years running.¹⁵ In addition, IOUs are required to fund publicly available third-party evaluations of their efficiency programs to independently confirm energy savings and identify ways to improve program performance.¹⁶

Prior to 2020, MLPs were not included in Massachusetts' mandate to administer energy efficiency plans. Some individual MLPs offered efficiency measures to their customers, but these programs were not subject to state oversight and their efficiency goals were not enforceable. This changed in February 2020, when the Massachusetts Department of Energy Resources (DOER) released new guidelines for Residential Conservation Services (RCS) programs (including energy efficiency programs) that enacted a "Municipal Action Plan" to require MLPs to formally participate in developing and administering energy efficiency programs and be subject to parallel state oversight as IOUs.¹⁷

¹² 191st General Court of the Commonwealth of Massachusetts. July 2, 2008. *An Act relative to green communities. Chapter 169*. Available at: <https://malegislature.gov/laws/sessionlaws/acts/2008/chapter169>

¹³ ACEEE. July 2019. "Energy Efficiency Resource Standards". Available at: <https://database.aceee.org/state/energy-efficiency-resource-standards>

¹⁴ Relf, G., Cooper, E., Gold, R., Goyal, A. and Waters, C. February 2020. 2020 Utility Energy Efficiency Scorecard. *American Council for an Energy-Efficient Economy*. Available at: https://www.eenews.net/assets/2020/05/19/document_cw_06.pdf.

¹⁵ Mass Save. October 1, 2019. "Massachusetts ranked number one in energy efficiency for ninth consecutive year". Available at: <https://www.masssave.com/about/news-and-events/News/massachusetts-ranked-number-one-in-energy-efficiency-for-ninth-consecutive-year>

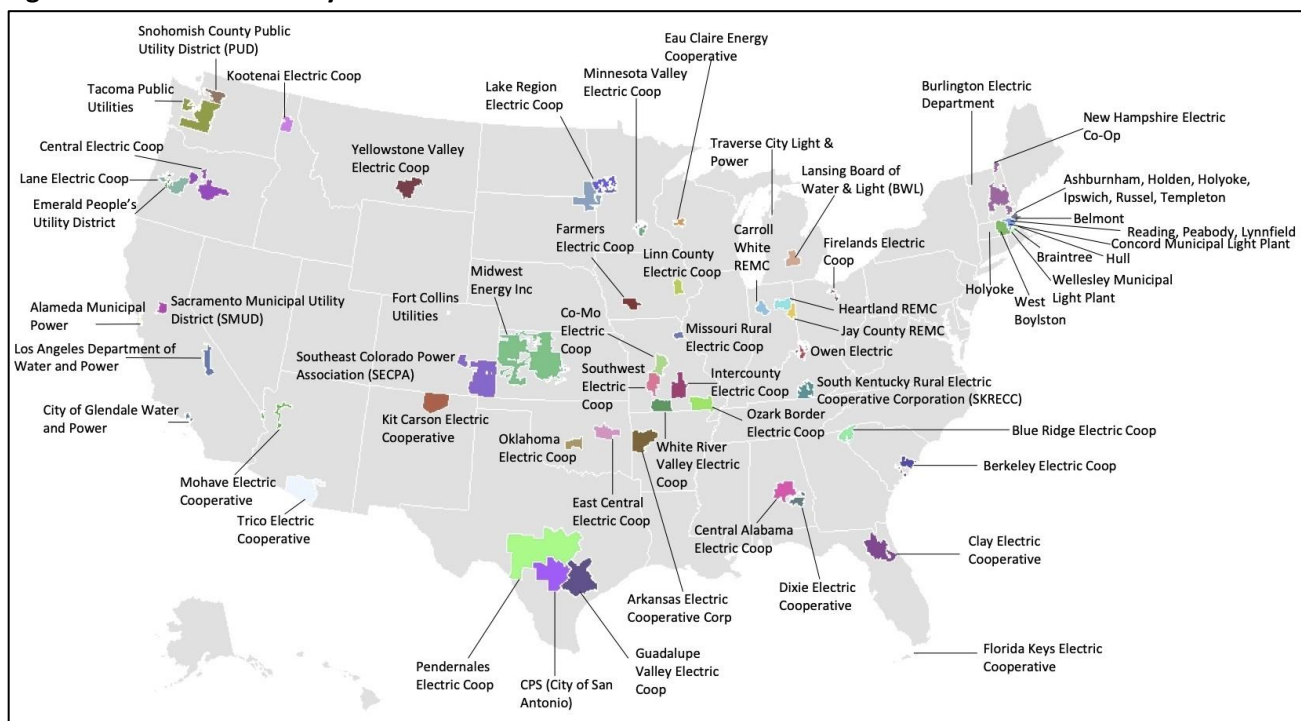
¹⁶ Mass Save. October 30, 2015. *Massachusetts Joint Statewide Three-Year Electric and Gas Energy Efficiency Plan*. DPU 15-160 to 15-169. p.38. Exhibit 1. Available at: <http://ma-eeac.org/wordpress/wp-content/uploads/Exhibit-1-Gas-and-Electric-PAs-Plan-2016-2018-with-App-except-App-U.pdf>

¹⁷ Massachusetts Energy Efficiency Division. February 20, 2020. *Guideline Interpreting 225 CMR 4.00*. Residential Conservation Services. p.6. Available at: <https://www.mass.gov/service-details/residential-conservation-services-rcs>

3. Energy efficiency, renewable energy and beneficial electrification programs are common among MLPs around the country

As of 2017, 2,770 publicly owned utilities—including federal-, state-, and municipally-owned utilities and member-owned electric co-operatives—operated across the United States serving almost 30 percent of all electric customers.¹⁸ AEC reviewed a sample of 62 MLPs and electric co-operatives across 27 states to assess what kinds of energy efficiency, renewable energy and beneficial electrification¹⁹ programs they offer (see Figure 2).

Figure 2. MLPs reviewed by AEC



AEC's review revealed several interesting trends in the types of energy efficiency, renewable energy and electrification measures included in programs, and in the financing options offered. Common measures include: heat pumps, which heat and cool a home using electricity instead of gas or oil; electric vehicles; energy efficient equipment and home efficiency upgrades; renewable energy; and efficient hot water

¹⁸ U.S. Energy Information Administration. August 15, 2019. "Investor-owned utilities served 72% of U.S. electricity customers in 2017". Available at: <https://www.eia.gov/todayinenergy/detail.php?id=40913>

¹⁹ Beneficial electrification refers to switching from direct fuel use to electricity—such as electric vehicles or heat pumps.



systems. Common financing options include rebates, low- or no-interest loans and on-bill financing.

Table 1. Common measures and financing options among MLPs

Measures
Energy efficiency equipment and efficiency upgrades
Renewable energy
Electric vehicles
Hot water
Heat pumps
Financing Options
Rebates
Zero- and low-interest loans
On-bill financing

The remainder of this report provides examples of MLPs that offer programs that include the measures and financing options presented in

Table 1 above and highlights 21 MLPs from 17 states that have demonstrated leadership on energy efficiency, renewable energy and beneficial electrification programs.

4. Common Measures Among MLPs

Energy efficient equipment and efficiency upgrades

Energy efficiency measures provide important benefits for customers, electric distributors and the environment. Given that American homes and commercial entities consume about 40 percent of the energy used in the United States,²⁰ energy efficiency is an important way to achieve reductions in harmful greenhouse gas emissions and pollution from electric generation (63 percent of which was powered by fossil fuels in 2019²¹) and direct fossil fuel use (burning oil, gas or propane for heating).

According to the U.S. Department of Energy, as much as 20 percent of total household energy is wasted via inefficient systems and other losses.²² Energy efficiency reduces overall energy consumption and lowers

²⁰ U.S. Energy Information Administration. No Date. Use of energy explained. Available at: <https://www.eia.gov/energyexplained/use-of-energy/>.

²¹ U.S. Energy Information Administration. March 20, 2020. Electricity explained: Electricity in the United States. Available at: <https://www.eia.gov/energyexplained/electricity/electricity-in-the-us.php>.

²² U.S. Department of Energy. No Date. Why Energy Efficiency Upgrades. Available at:



customers' bills. For MLPs, less energy consumption can mean lower profits—but this effect can be offset by aggressively pursuing beneficial electrification measures (such as heat pumps and electric vehicles) that increases electric sales. There is also recognition in states with net-zero emissions and/or 100 percent clean energy goals that it's necessary to look closely at the way utilities make money and consider alternative business models.²³ Tools under consideration by utilities include net metering policies to facilitate and integrate distributed energy resources, electrification incentives and development of energy storage resources.

For electric customers, enhancing energy efficiency typically begins with an energy audit to determine the energy profile of a building and identify energy saving measures. Based on this audit, customers may choose to invest in measures such as: sealing air leaks and ducts; adding insulation; installing more efficient windows and doors; installing smart thermostats; upgrading home heating and cooling systems; installing more efficient hot water systems; installing more efficient home appliances like dishwashers, refrigerators, washers and dryers; and installing energy efficient lighting.²⁴ In choosing which measures to pursue, capital costs and cost savings are important considerations, but so too are rebates, loans and other incentives offered by energy efficiency program administrators. The following MLPs have demonstrated leadership regarding their energy efficiency programs.

Farmers Electric Cooperative, Iowa: The cooperative serves 54 districts, primarily suburban and rural communities across southwest Iowa.²⁵ Farmers Electric offers free home energy assessments, inspecting buildings for issues related to sealing, insulation, and other potential energy losses and recommended efficiency upgrades, many of which can be partially paid for by utility-offered rebates like \$400 per electric heat pump water heater unit and \$50 per Energy Star-approved refrigerators and freezers.²⁶

Belmont Light, Massachusetts: Belmont is a western suburb of Boston with a population of approximately 26,000.²⁷ As of 2019, Belmont Light served 11,685 customers²⁸ and offered an ENERGY STAR rebate

<https://www.energy.gov/eere/why-energy-efficiency-upgrades>.

²³ MIT Energy Initiative. 2016. Utility of the Future. Available at: <https://energy.mit.edu/wp-content/uploads/2016/12/Utility-of-the-Future-Full-Report.pdf>.

²⁴ U.S. Department of Energy. No Date. Why Energy Efficiency Upgrades. Available at: <https://www.energy.gov/eere/why-energy-efficiency-upgrades>.

²⁵ Farmers Electric Cooperative. No date. "Service Territory". Available at: <http://www.farmersrec.com/content/service-territory>.

²⁶ Available at: Farmers Electric Coop. N.d. "Efficiency Hub Rebates". Available at: <https://farmerselectric.coop/rebates/>

²⁷ U.S. Census. July 1, 2019. "Quick Facts". Belmont, MA. Available at: <https://www.census.gov/quickfacts/fact/table/belmonttownmiddlesexcountymassachusetts,belmontcdpmassachusetts,MA/PST045219>.

²⁸ Belmont Light. 2019. 2019 Annual Report. Available at: <https://www.belmontlight.com/about/financials-policies-terms/>.



program, which allows customers to receive appliance rebates on their electric bills, with values ranging from \$25 to \$500. Qualifying appliances include ENERGY STAR-approved refrigerators, heat pumps, AC units, dehumidifiers, smart water heaters and thermostats.²⁹

Lansing Board of Water and Light, Michigan: Lansing Board of Water and Light serves the greater Lansing area, with over 97,000 electric and 56,000 water customers in urban and suburban settings.³⁰ The Lansing MLP offers the Hometown Energy Savers program, which provides residential customers with free products and services including home energy assessments, energy saving kits (including LED light bulbs), energy efficiency education through online resources and tips on energy saving, and additional efficiency upgrades for households with electric water heaters (which are all free to customers). Rebates are also available for efficient equipment like lighting, heating/cooling, smart thermostats, and other household appliances.³¹

Renewable energy

Renewable energy produces no greenhouse gas emissions which contribute to global climate change or harmful pollution that negatively impacts air quality and public health.³² Gallup polls have found that a majority of Americans are in favor of renewable energy-powered electricity.³³ MLPs benefit from developing renewable energy generating capacity because customers are often willing to pay more money for it.³⁴ The people willing to pay the most for it include those most concerned about climate change and the negative health impacts of fossil fuel pollution, and/or those that think renewable energy development creates jobs and boosts the economy.³⁵ Electric customers can also benefit from “behind-the-meter” renewable energy (renewable energy resources that are owned by customers, such as rooftop solar panels or community solar farms). These resources help customers save money by producing their own energy and—when utilities facilitate it—can generate revenue for customers when they produce more energy

²⁹ Belmont Light. 2018. “Energy Portfolio”. Available at: <https://www.belmontlight.com/energy-portfolio/>.

³⁰ Lansing Board of Water & Light. 2019. “Fast Facts 2019”. Available at: <https://www.lbwl.com/about-bwl>.

³¹ Lansing Board of Water & Light. Available at: <https://www.lbwl.com/customers/save-money-energy/plug-electric-vehicles-pev>.

³² Union of Concerned Scientists. Published July 14, 2008, Updated December 20, 2017. Benefits of Renewable Energy Use. Available at: <https://www.ucsusa.org/resources/benefits-renewable-energy-use>.

³³ McCarthy, J. March 22, 2019. “Most Americans Support Reducing Fossil Fuel Use”. *GALLUP*. Available at: <https://news.gallup.com/poll/248006/americans-support-reducing-fossil-fuel.aspx>.

³⁴ Roberts, D. October 11, 2018. “Utilities have a problem: the public wants 100% renewable energy, and quick”. *Vox*. Available at: <https://www.vox.com/energy-and-environment/2018/9/14/17853884/utilities-renewable-energy-100-percent-public-opinion>.

³⁵ Gustafson, A., Goldberg, M., Rosenthal, S., Kotcher, J., Maibach, E. and Leiserowitz, A. July 16, 2019. “Who is willing to pay more for renewable energy?” *Yale Program on Climate Change Communication*. Available at: <https://climatecommunication.yale.edu/publications/who-is-willing-to-pay-more-for-renewable-energy/>.



than they need and sell that excess back to the grid.³⁶

Community solar and/or solar panel leasing programs also benefit customers by reducing the barriers to access solar panels and are an important way to bring the benefits of renewable energy to low- and moderate-income households.³⁷ Many low- and moderate-income households do not have the credit score needed to obtain financing to install their own solar panels and may not be able to claim important federal clean energy tax incentives. They are also more likely to reside in rental units, reducing the likelihood that they would benefit directly from lower electric bills.³⁸ Owning solar generation helps to protect against electric rate increases and can help reduce and stabilize electric bills. By eliminating and/or reducing the upfront costs of solar, low- and moderate-income households are better able to access the benefits of solar.³⁹ The following MLPs offer leading renewable energy programs.

Owen Electric, Kentucky: Owen Electric is a cooperative with over 62,000 active accounts as of December 2019; it primarily serves suburban customers in northern Kentucky.⁴⁰ The cooperative offers the EnviroWatts program, which allows customers to purchase carbon offsets by supporting: solar, wind, hydro or biomass. For \$2.75 per EnviroWatt, members can offset carbon dioxide while investing in renewable resources for the community. Owen Electric also offers Cooperative Solar, a program that lowers customers' monthly bills by the amount of their ownership share in a solar farm. Customers make a one-time payment of \$460 per panel for a 25-year license.⁴¹

Fort Collins Utilities, Colorado: The City of Fort Collins provides light and power service to over 70,500 homes and businesses across over 55 square miles.⁴² Fort Collins Utilities offers rebates and resources for customers interested in generating on-site renewable energy through solar panels. Residential customers can receive rebates of up to \$1,500 for rooftop solar installation, while commercial customers can receive up to \$50,000.⁴³

³⁶ Meehan, B. May 16, 2018. "New Energy Sources Challenge Utilities to Innovate". *ESRI*. Available at: <https://www.esri.com/about/newsroom/publications/wherenext/utilities-business-model-change/>.

³⁷ Paulos, B. May 2017. Bringing the Benefits of Solar Energy to Low-Income Consumers: A Guide for States & Municipalities. *Clean Energy States Alliance and U.S. Department of Energy SunShot*. Available at: <https://www.cesa.org/wp-content/uploads/Bringing-the-Benefits-of-Solar-to-Low-Income-Consumers.pdf>.

³⁸ Bovarnick, B. August 8, 2017. "Barriers and Solutions to Low and Moderate-Income Solar Adoption". Yale Center for Business and the Environment. Available at: <https://cbey.yale.edu/our-stories/barriers-and-solutions-to-low-and-moderate-income-solar-adoption>.

³⁹ Low-Income Solar Policy Guide. 2020. "Community Solar". Available at: <https://www.lowincomesolar.org/best-practices/community-solar/>.

⁴⁰ OWEN Electric. 2020. "Annual Meeting Recap". Min: 20:00. Available at: <https://owenelectric.com/2020-annual-meeting-recap>.

⁴¹ Owen Electric. N.d. "About". Available at: <https://www.cooperativesolar.com/about>

⁴² City of Fort Collins. N.d. "Light & Power." Available at: <https://www.fcgov.com/utilities/what-we-do/light-power>.

⁴³ City of Fort Collins. N.d. "Go Solar in 2020". Available at:



Hot water

Conventional hot water tanks are fired by gas, propane, oil or electric resistance and operate by heating a water tank (or coil of pipes within a tank) to a pre-set temperature and then holding that temperature constant. Not only do hot water tanks lose heat when sitting idle, most households utilize their hot water at times of “peak” demand (in the times before or after a typical workday), which means that hot water tanks are typically re-filling and re-heating when electricity is in highest demand and at its most costly. Efficient hot water systems—like solar-powered water heating, heat pump water heating, hot water recovery systems and tankless water heaters—use less energy than fossil fuel-powered alternatives by reducing standby heat loss and/or only heating water on-demand, saving customers money.⁴⁴ Compared to conventional water heating tanks, which are typically the second highest source of energy usage in the home, efficient water heaters cut energy use roughly in half due to more efficient conversions of energy to heat. For example, rather than using electricity or fuel to create heat, heat pump water heaters use existing differences in ambient air temperature and concentrate heat using an electric compressor, to heat water.⁴⁵

MLPs benefit from efficient hot water systems because less energy is used at times of peak demand, which is the most expensive demand for MLPs to meet. When energy demand peaks, it requires the MLP to either quickly ramp-up its most expensive (and least-utilized) generating assets or exceed its generating capacity, necessitating the purchase of additional power on the market.⁴⁶ The following MLPs demonstrate leadership in efficient hot water programs.

Clay Electric Cooperative, Florida: Clay Electric is a cooperative with roughly 183,000 customers in a service area stretching across 14 counties in North Florida.⁴⁷ The cooperative offers rebates of up to \$600 for solar water heating, \$175 for heat pump water heating, and \$200 for hot water recovery systems. Clay Electric also offers energy conservation loans to assist in financing other home energy efficiency improvements. Members can borrow up to \$7,500 to upgrade various systems, including solar thermal

<https://www.fcgov.com/utilities/residential/renewables/solar-rebates>.

⁴⁴ Nadel, S. July 2018. *Energy Savings, Consumer Economics, and Greenhouse Gas Emissions Reductions from Replacing Oil and Propane Furnaces, Boilers, and Water Heaters with Air-Source Heat Pumps*. ACEEE. p.iii. Available at: <https://www.aceee.org/research-report/a1803>.

⁴⁵ Ryan, S. November 19, 2015. “Ask the Expert: Hot Savings with ENERGY STAR Certified Water Heaters”. *Energy Star*. Available at: <https://www.energystar.gov/products/ask-the-expert/Ask%20the%20Expert%3A%20Hot%20Savings%20with%20ENERGY%20STAR%20Certified%20Water%20Heaters>.

⁴⁶ Office of Energy Efficiency and Renewable Energy. December 11, 2019. “Heat Pump Water Heaters Achieve Significant Peak Reduction and Energy Savings”. *Department of Energy*. Available at: <https://www.energy.gov/eere/buildings/articles/heat-pump-water-heaters-achieve-significant-peak-reduction-and-energy>.

⁴⁷ Clay Electric Cooperative. N.d. “Quick Facts”. Available at: <https://clayelectric.com/about-clay/quick-facts>.



water heating and solar pool heating.⁴⁸

Emerald People’s Utility District, Oregon: Emerald People’s Utility District serves a primarily suburban customer base of 21,122 accounts in territories scattered around the Eugene-Springfield metropolitan area.⁴⁹ The MLP offers cash rebates of \$800 and a zero-interest loans up to \$1,200 for qualifying residential customers to install a heat pump water heater. In addition to the benefit of reducing energy usage, this incentive also allows customers to gain additional control of the operation of their heat pump water heater through a digital control panel.⁵⁰

Electric vehicles

Electric vehicles help to reduce fuel consumption and associated tailpipe emissions by switching from gasoline to electricity. Customers benefit from incentives to purchase electric vehicles because, while they are more expensive to purchase than gasoline vehicles on average, they are cheaper to operate. Running a car on electricity is less expensive per mile than gasoline⁵¹ and electric vehicles have fewer mechanical parts to maintain and repair.⁵² MLPs benefit from electric vehicles because (all else being equal) they increase electric sales. Though still in its infancy, vehicle-to-grid systems—where an electric utility could “communicate” with plugged-in electric vehicles to charge or discharge their batteries to help balance the grid⁵³—could be adopted by MLPs and their customers in the future. The MLPs that follow provide examples of leadership in electric vehicle programs.

Burlington Electric Department, Vermont: Burlington is the most populous city in Vermont, with over 42,000 residents.⁵⁴ Its electric department serves 17,309 residential customers and approximately 4,000 commercial and industrial customers.⁵⁵ The city offers customers a \$1,800 rebate on the lease or purchase

⁴⁸ Clay Electric Cooperative, Inc. N.d. “Energy Rebates and Loans”. Available at:

<https://www.clayelectric.com/member-information/energy-information/energy-rebates-loans>.

⁴⁹ Emerald People’s Utility District. December 2016. “District Statistics”. Available at:

<https://www.epud.org/about/district-statistics/>.

⁵⁰ Emerald People’s Utility District. N.d. “Residential Energy Efficiency Programs”. Available at:

<https://www.epud.org/conservation-energy-savings/residential-programs/>.

⁵¹ U.S. Office of Energy Efficiency & Renewable Energy. No date. “Saving on Fuel and Vehicle Costs”. Available at:

[https://www.energy.gov/eere/electricvehicles/saving-fuel-and-vehicle-costs#:~:text=Plug%2Din%20electric%20vehicles%20\(also,average%20than%20conventional%20gasoline%20vehicles.&text=On%20a%20national%20average%2C%20it,EV%20than%20a%20conventional%20vehicle](https://www.energy.gov/eere/electricvehicles/saving-fuel-and-vehicle-costs#:~:text=Plug%2Din%20electric%20vehicles%20(also,average%20than%20conventional%20gasoline%20vehicles.&text=On%20a%20national%20average%2C%20it,EV%20than%20a%20conventional%20vehicle).

⁵² Consumer Reports. July 21, 2019. “Electric Cars 101: The Answers to All Your EV Questions”. Available at:

<https://www.consumerreports.org/hybrids-evs/electric-cars-101-the-answers-to-all-your-ev-questions/>

⁵³ Wenzel, E. November 12, 2019. “Vehicle-to-grid technology is revving up”. Green Biz. Available at:

<https://www.greenbiz.com/article/vehicle-grid-technology-revving>.

⁵⁴ U.S. Census. July 1, 2019. “Quick Facts”. Burlington, VT. Available at:

<https://www.census.gov/quickfacts/fact/table/burlingtoncityvermont/PST045219>.

⁵⁵ Burlington Electric Department. March 2020. *Performance Measures Report 2019*. p.10. Available at:



of a new electric vehicle and \$1,500 for a new plug-in hybrid vehicle. In addition, all customers are eligible for an \$800 rebate when purchasing a used or pre-owned electric vehicle or plug-in hybrid. Burlington also offers rebates for electric bicycles of \$200 at time of purchase.⁵⁶

Sacramento Municipal Utility District, California: Sacramento Municipal Utility District (SMUD) provides electric service to over 1.5 million customers across approximately 900 square miles, comprising most of Sacramento county and adjoining portions of Placer and Yolo counties.⁵⁷ The MLP offers customers who purchase or lease a new electric vehicle \$599 to pay for either the average cost of charging a vehicle for two years, or a 240-volt high-powered electric vehicle charger. In addition, SMUD offers a Time-of-Day electric rate: plug-in electric vehicle owners can receive a discount of 1.5 cents per kilowatt-hour when they charge their vehicle between midnight and 6 a.m.⁵⁸

Heat pumps

Heat pumps use electricity to move heat from the outside air or ground to heat or cool an indoor space; because they do not generate heat, they require very little electricity to operate.⁵⁹ Air-source heat pumps transfer heat between the air outside a building and inside a building, while ground-source heat pumps transfer heat between the air inside a building and the ground beneath a building.⁶⁰ According to the U.S. Department of Energy, heat pumps can reduce energy use and bills by 30 to 60 percent, and reduce operating costs compared to conventional gas or oil-fired heating systems and cooling systems like central air and window units.⁶¹

The cost of a heat pump depends on the size of the space it must heat and cool.⁶² Heat pump capacities typically range from 2 tons to 5 tons, with installation costs ranging from \$3,500 to \$8,800, based on a survey of heat pump owners conducted by Home Advisor.⁶³ Though upfront costs are higher than

<https://www.burlingtonelectric.com/performance-measures-report>.

⁵⁶ Burlington Electric Department. N.d. "Electric Vehicles". Available at: <https://burlingtonelectric.com/index.php/ev> and <https://burlingtonelectric.com/ebike>.

⁵⁷ Sacramento Municipal Utility District. 2020. "Serving Sacramento for over 70 years". Available at: <https://www.smud.org/en/Corporate/About-us>.

⁵⁸ Sacramento Municipal Utility District. N.d. "Residential Electric Vehicles". Available at: <https://www.smud.org/en/Going-Green/Electric-Vehicles/Residential>.

⁵⁹ Government of Canada. March 27, 2017. "What Is a Heat Pump and How Does It Work?". Available at: <https://www.nrcan.gc.ca/energy/publications/efficiency/heating-heat-pump/6827>

⁶⁰ Carrier. 2020. "How Does a Heat Pump Work?" Available at: <https://www.carrier.com/residential/en/us/products/heat-pumps/how-does-a-heat-pump-work/>.

⁶¹ U.S. Department of Energy. No date. "Heat Pump Systems". Available at: <https://www.energy.gov/energysaver/heat-and-cool/heat-pump-systems>

⁶² Home Advisor. No date. "How Much Does A Heat Pump Cost?". Available at: <https://www.homeadvisor.com/cost/heating-and-cooling/install-a-heat-pump/>

⁶³ Ibid.



traditional heating systems, heat pumps benefit utility customers by reducing their heating and cooling bills.⁶⁴ This technology also benefits MLPs that own generation, as they electrify systems that previously used fossil fuels, thereby increasing electricity sales.⁶⁵ Greater adoption of heat pumps is also good for the environment because they displace fossil fuels and reduce harmful greenhouse gas emissions and pollution. The following MLPs have leading heat pump programs.

Mohave Electric Cooperative, Arizona: Mohave County is predominantly suburban and rural, with a population of 212,181;⁶⁶ and its electric cooperative serves over 33,700 members.⁶⁷ The cooperative offers a \$150 rebate for installing a heat pump in a new building, or upgrading an older, less efficient cooling system. For high efficiency heat pumps, the rebate increases can be as high as \$500.⁶⁸

Yellowstone Valley Electric Cooperative, Montana: Yellowstone Valley Electric Cooperative covers a service territory of almost 3,500 square miles in Yellowstone, Carbon, Big Horn, Musselshell, Stillwater, and Treasure counties.⁶⁹ This rural cooperative offers a variety of rebate programs for residential and commercial customers, including for two types of heat pumps: add-on heat pumps that are installed in addition to a forced air heating system and ground-source (or geothermal) heat pumps that draw heat via underground pipes. Add-on and geothermal heat pumps receive incentives of \$200 per ton for residences, and \$150 per ton for commercial customers. The maximum rebate available is \$800 for add-on heat pumps, and \$1,000 for residential ground-source heat pumps (\$5,000 for commercial). These rebates can be used in addition to a state tax credit of \$1,500 for both residential and commercial heat pumps.⁷⁰

5. Common Financing Options Among MLPs

Offering rebates, zero- and low-interest loans, and on-bill financing mechanisms for energy efficiency, renewable energy and beneficial electrification programs helps all customers to participate. Rebates and

⁶⁴ U.S. Department of Energy. No date. "Heat Pump Systems". Available at: <https://www.energy.gov/energysaver/heat-and-cool/heat-pump-systems>.

⁶⁵ Nadel, S. September 18, 2018. "How Might Electrification Affect Electric and Gas Systems? Recent Studies Shed Both Light and Heat". ACEEE. Available at: <https://www.aceee.org/blog/2018/09/how-might-electrification-affect>

⁶⁶ U.S. Census. July 1, 2019. "Quick Facts". Mohave County, AZ. Available at: <https://www.census.gov/quickfacts/fact/table/mohavecountyarizona/PST045219>.

⁶⁷ Mohave Electric Cooperative. June 2019. *Annual Report*. p.2. Available at: <https://www.mohaveelectric.com/2019-annual-report>

⁶⁸ Mohave Electric Cooperative. N.d. "Heat Pump Rebate". Available at: <https://www.mohaveelectric.com/heat-pump-rebate-0>.

⁶⁹ YVEC. 2020. "Service Area Map". Available at: <http://www.yvec.com/about-us/service-area-map/>

⁷⁰ Yellowstone Valley Electric Cooperative. N.d. "Member Programs". Available at: <http://www.yvec.com/member-programs/>.



zero-interest loans serve to offset customer costs, while low-interest loans and on-bill financing spread customer costs out more evenly over a longer period of time; all are particularly beneficial for low- and moderate-income customers who are more likely to lack the funds needed to pursue these investments on their own.

Rebates

Rebates incentivize consumers to pursue energy efficiency upgrades, invest in behind-the-meter renewable energy, purchase electric vehicles, or undertake other energy-related projects. While all customers benefit from reduced energy costs, discounted or complimentary efficient products, increased comfort, and access to renewables, low- and moderate-income customers have the most to gain from rebates by reducing the upfront cost of measures that lead to continual energy savings.⁷¹ For MLPs, although rebates come at an initial cost, their long-term benefits include greater adoption of energy efficiency measures, greater penetration of renewable energy and beneficial electrification, and greater customer satisfaction and retention.⁷² The MLPs that follow offer substantial rebates to their customers.

Intercounty Electric Cooperative, Missouri: Intercounty Electric has 24,000 residential, commercial, and agricultural customers in parts of ten counties in rural Missouri.⁷³ The cooperative provides rebates for the purchase of a wide range of energy efficient products and systems, including: a \$50 electric water heater rebate, up to \$500 for heat pump water heaters, \$50 for individual room air conditioners, \$150 per ton for electric-powered air source heat pumps, \$750 per ton for geothermal-powered ground-source heat pumps, up to \$250 for insulation, \$50 per smart thermostat, and rebates not exceeding 50 percent of the total cost for high-efficiency motors (for commercial and industrial customers only). Rebates are available to cooperative members who install Energy Star certified or other approved products in permanent facilities served directly by Intercounty Electric.⁷⁴

Central Alabama Electric Cooperative, Alabama: Central Alabama Electric services over 42,000 meters in a ten-county area of central Alabama, just north of Montgomery.⁷⁵ The rural cooperative offers the Touchstone Energy Home Program which includes rebates for home heat pumps and energy efficient water heaters. Rebates range from \$235 to \$400, depending on system size and type, and if the upgrade is in a new building or is a retrofit. For dual-fuel and mini-split system conversions to be eligible for utility rebates, the system must have a minimum Seasonal Energy Efficiency Rating (SEER) of 15.⁷⁶

⁷¹ U.S. Department of Energy. 2009. *Utility Rebates and Incentive Programs*. Federal Energy Management Program. Available at: <https://www.nrel.gov/docs/fy09osti/46311.pdf>. p. 1.

⁷² Attala, J. January 17, 2018. "Why Utility Companies Provide Energy Efficiency Rebates to Businesses". *Verdant*. Available at: <https://www.verdant.co/blog/why-do-utility-companies-provide-rebates-to-businesses/>.

⁷³ Intercounty Electric Cooperative. 2018. "Service Territory". Available at: http://www.ieca.coop/service-territory_.

⁷⁴ Intercounty Electric Cooperative. N.d. "Rebate Program". Available at: <http://www.ieca.coop/rebate-program>.

⁷⁵ Central Alabama Electric Cooperative. 2020. "About CAEC". Available at: <https://caec.coop/about-caec/>.

⁷⁶ Central Alabama Electric Cooperative. N.d. "Heat Pump Rebates". Available at: <https://caec.coop/member-benefits->



Zero- and low-interest loans

Like rebates, zero- and low-interest loans are a common tool among electric distributors to help customers invest in energy efficiency, renewable, or other similar energy projects that avoid full up-front costs. Zero- and low-interest loans make energy efficiency, renewable energy and beneficial electrification measures more accessible to low- and moderate-income households who are more likely than higher-income households to lack the funds to pursue these investments on their own and/or have a more difficult time obtaining traditional loans due to problems obtaining credit. Zero-interest loans are particularly beneficial for low- and moderate-income households that have difficulties securing credit through traditional loan application processes when paired with on-bill financing. Energy efficiency upgrades immediately lower energy bills, offsetting monthly loan payments. If energy savings are substantial, customers may even see a decrease in monthly expenses while paying off the loan. Loan conditions vary by utility, program, customer type, and are sometime available in conjunction with on-bill financing.⁷⁷ The following MLPs offer zero-interest loans to their customers.

New Hampshire Electric Cooperative, New Hampshire: Serving 84,000 members across 115 communities throughout New Hampshire⁷⁸, the suburban and rural cooperative provides residential energy efficiency loans at low and no interest. For zero-interest loans, on-bill financing is available (see the on-bill financing section below for more information). New Hampshire Electric offers zero-interest loan terms of up to 48 months, depending on the loan amount (minimum of \$500, maximum of \$4,000). The cooperative also works with participating banks and credit unions to lower interest rates to 2 percent to cover costs for home energy efficiency upgrades. Under this option, loans of up to \$15,000 are available, with terms up to 7 years. To qualify for on-bill financing, the customer must be a cooperative member with an excellent payment history.⁷⁹

Tacoma Public Utilities, Washington: The City of Tacoma’s municipal utility serves nearly 179,000 customers across urban, suburban, and rural settings.⁸⁰ Residential customers may qualify for 7-year, zero-interest loans for heat pump installation, window replacement, and insulation-related energy efficiency upgrades. Once approved, loan recipients can combine multiple projects into one monthly payment that is separate from their electric bill. To qualify, the applicant must be the property owner at the installation

[services/heat-pumps/](#).

⁷⁷ Efficiency Vermont. N.d. “Financing for Homeowners”. Available at:

<https://www.encyvermont.com/services/financing/homes>.

⁷⁸ New Hampshire Electric Cooperative. 2020. “Our Story and Values”. Available at: <https://www.nhec.com/our-story-values/>

⁷⁹ New Hampshire Electric Co-op. N.d. “Residential Energy Efficiency Loans”. Available at:

<https://www.nhec.com/home-energy-solutions/energy-efficiency-loans/>.

⁸⁰ Tacoma Public Utilities. 2020. “About Tacoma Power”. Available at: <https://www.mytpu.org/about-tpu/services/power/about-tacoma-power/>.



address and must have good credit history (including no outstanding debt with the City of Tacoma).⁸¹

On-bill financing

On-bill financing eliminates or reduces up-front efficiency costs by allowing customers to pay back the cost of energy efficiency, renewable energy and beneficial electrification measures through a recurring charge on their monthly electric bill. Monthly energy (and bill) savings allow customers to partially or wholly offset the increase in their monthly bill from this charge. By eliminating or significantly reducing upfront costs, on-bill financing helps increase access to energy upgrades, particularly for low-and-moderate-income customers.⁸² Since on-bill financing programs are funded using public, ratepayer money, these programs typically offer very low or zero interest rates—facilitating broader adoption of efficiency measures among MLP customers.⁸³ The MLPs that follow offer on-bill financing options.

Dixie Electric Cooperative, Alabama: Serving over 21,000 rural and suburban members in parts of eight Alabama counties, Dixie Electric offers low-interest loans for energy efficiency upgrades that are financed directly through the cooperative using on-bill financing, where customers pay a fixed monthly charge on their electric bill for the term of the loan. In all loan options, financing terms are dependent upon credit approval.⁸⁴

The Electric Cooperatives of South Carolina, South Carolina: Present in all 46 counties of South Carolina, this network of 19 electric distribution cooperatives serves 1.5 million customers in urban, suburban, and rural areas.⁸⁵ Through the Help My House loan program⁸⁶, customers can obtain low-interest loans with on-bill financing for specific home energy efficiency and weatherization measures, including heat pumps, insulation and sealing. Help My House loans are 10 years or less with a 2.5 percent interest rate and allow consumers to enjoy the immediate benefits of their energy efficiency upgrades with no money down. The program has supported 125 homes with efficiency upgrades, with a default rate lower than 1 percent. In this pilot program, participating cooperatives enabled consumers to borrow money for energy efficiency

⁸¹ Tacoma Public Utilities. N.d. “Loans and Deferred Loans”. Available at: https://www.mytpu.org/ways-to-save/residential-rebates/loans/#pattern_3.

⁸² National Conference of State Legislatures. April 7, 2015. “On-Bill Financing: Cost-free Energy Efficiency Improvements”. Available at: <https://www.ncsl.org/research/energy/on-bill-financing-cost-free-energy-efficiency-improvements.aspx#:~:text=On%2Dbill%20financing%20can%20bring,so%20customers%20see%20immediate%20benefits>.

⁸³ Better Buildings. No date. “On-Bill Financing/Repayment”. U.S. Department of Energy. Available at: <https://betterbuildingsolutioncenter.energy.gov/financing-navigator/option/bill-financingrepayment>.

⁸⁴ Dixie Electric Cooperative. May 2018. “EE Loan Program”. Available at: https://www.dixie.coop/content.cfm?id=2049&download_id=92.

⁸⁵ The Electric Cooperatives of South Carolina. N.d. “Created to Serve”. Available at: <https://www.ecsc.org/content/created-serve>.

⁸⁶ ECSC. July 17, 2012. “Help My House Loan Pilot Program”. Available at: <https://www.ecsc.org/content/help-my-house-loan-pilot-program>.



projects and repay the loan through their monthly bills.⁸⁷ The program had an average reduction in electricity usage of 34 percent and average per household monthly savings have exceeded monthly loan repayment by \$288 per year.⁸⁸

Holland Energy Fund, Michigan: A town of 30,000 people, Holland has created an on-bill financing program for residential energy efficiency upgrades. To qualify, there are no credit checks—the household must simply demonstrate 12 months of on-time bill payment history with the Holland Board of Public Works. The program offers loans between \$5,000 to \$30,000 at fixed interest rates no greater than 7 percent with a maximum term of 15 years.⁸⁹

6. MLP leaders in this space pursue an “all of the above” strategy

MLPs that are leading the way on energy efficiency, renewable energy and beneficial electrification programs have multiple program offerings that create substantial energy and cost-savings for their customers. These MLPs incentivize their customers to make their homes and businesses more energy efficient, adopt renewable energy and switch from direct fossil fuel use to electric-powered technologies by offering rebates, low- and no-interest loans and on-bill financing options. We selected five such examples from around the country to illustrate what offering energy efficiency, renewable energy and beneficial electrification programs look like in practice.

Concord Municipal Light Plant, Concord, Massachusetts

In its current Strategic Plan for 2018-2025, Concord Municipal Light Plant (CMLP) identified its aim to continue and expand its energy efficiency programs—with the goal of achieving energy efficiency savings equal to 1.5 percent of total electric sales by 2025.⁹⁰ CMLP currently incentivizes households and businesses to install efficient products, such as lighting, smart thermostats, HVAC, refrigeration,

⁸⁷ ECOVA. June 2012. “Help My House Pilot Program Summary Report”. Prepared for Central Electric Power and The Electric Cooperatives of South Carolina. Available at:

<https://www.ecsc.org/sites/ecsccecs/files/PDF/Help%20My%20House%20Pilot%20Program%20-%20Initial%20Summary%20Report%20June%202012.pdf>.

⁸⁸ Keegan, P. June 2013. Help My House Pilot Program Final Summary Report. Prepared for Central Electric Power Cooperative and The Electric Cooperatives of South Carolina. Available at:

<https://www.eesi.org/OBF/coops/helpmyhouse>.

⁸⁹ Holland Energy Fund. No date. “Holland On-Bill Loan Program”. Available at: <https://hollandenergyfund.com/on-bill-loan-program/>.

⁹⁰ Concord Municipal Light Plant. November 2017. *Strategic Plan 2018 – 2025*. CMLP Strategic Planning Committee. Available at: <https://concordma.gov/1877/CMLP-Strategic-Plan>. p. 7.



compressed air, and process heat, and to make other energy efficiency-related upgrades⁹¹ by offering free home energy assessments.⁹²

CMLP aims to cut or shift energy consumption at times of peak demand by offering residential time-of-use rates, where energy is 2.5 times more expensive to customers at times of peak demand than in off-peak periods.⁹³ CMLP offers equipment rebate incentives for beneficial electrification—including up to \$4,000 for air-source heat pumps, up to \$7,500 for ground-source heat pumps, up to \$750 for heat pump water heaters,⁹⁴ and \$1,500 for electric vehicle purchases.⁹⁵ The MLP also aims to offset all greenhouse gas emissions from their electricity sales by 2021, by increasing their Renewable Energy Credit (REC) purchases and renewable power purchase agreements.⁹⁶ CMLP provides incentives for renewable energy by offering rebates up to \$3,125 for solar installations and investments in utility-scale battery storage.⁹⁷

Sacramento Municipal Utility District, Sacramento, California

Sacramento Municipal Utility District (SMUD) offers its customers incentives for clean energy, beneficial electrification and energy efficiency measures. For residential customers, SMUD has a \$300 solar installation incentive,⁹⁸ two rebate options for residential electric vehicles, as well as several electric vehicle opportunities for businesses.^{99,100}

SMUD also provides rebates for a variety of energy efficient appliances, heating and cooling, pool equipment, and recycling programs, including rebates ranging from \$50 to \$2,500 for smart thermostats, refrigerators, heat pump water heaters, induction cooktops, and HVAC replacements.¹⁰¹ For costs not covered by rebates, SMUD has financing programs with which customers in good credit standing can pre-

⁹¹ Ibid. p. 17.

⁹² <https://concordma.gov/2584/Home-Energy-Assessments>.

⁹³ Concord Municipal Light Plant. November 2017. *Strategic Plan 2018 – 2025*. CMLP Strategic Planning Committee. Available at: <https://concordma.gov/1877/CMLP-Strategic-Plan>. p. 9.

⁹⁴ <https://concordma.gov/1870/Rebates-for-your-Home>.

⁹⁵ Concord Municipal Light Plant. November 2017. *Strategic Plan 2018 – 2025*. CMLP Strategic Planning Committee. Available at: <https://concordma.gov/1877/CMLP-Strategic-Plan>. p. 7.

⁹⁶ Ibid. p. 9.

⁹⁷ Concord Municipal Light Plant. November 2017. *Strategic Plan 2018 – 2025*. CMLP Strategic Planning Committee. Available at: <https://concordma.gov/1877/CMLP-Strategic-Plan>. p. 7.

⁹⁸ Sacramento Municipal Utility District (SMUD). N.d. *Solar for your home*. Available at: <https://www.smud.org/en/Going-Green/Solar-for-Your-Home>.

⁹⁹ Sacramento Municipal Utility District (SMUD). N.d. *Residential electric vehicles*. Available at: <https://www.smud.org/en/Going-Green/Electric-Vehicles/Residential>.

¹⁰⁰ Sacramento Municipal Utility District (SMUD). N.d. *Business electric vehicles*. Available at: <https://www.smud.org/en/Going-Green/Electric-Vehicles/Business>.

¹⁰¹ Sacramento Municipal Utility District (SMUD). N.d. *Rebates savings and tips*. Available at: <https://www.smud.org/en/Rebates-and-Savings-Tips>.



qualify for loans up to \$30,000 at a fixed rate of 6.99 percent for terms of up to 15 years.¹⁰²

CPS Energy, San Antonio, Texas

CPS Energy's SaveNow program aims to reduce total energy demand by 771 megawatts by 2020, by offering energy-efficient products, audits, and weatherization. This goal was achieved a year ahead of schedule, and 15 percent under budget—with annual costs ranging from \$12 million to \$77 million.¹⁰³

In addition to their energy savings goals, CPS Energy offers rebates for efficiency and for renewable energy. The efficiency rebates include commercial and residential \$85 bill credits for smart thermostats¹⁰⁴, \$90-\$310 per ton for home heat pumps¹⁰⁵, \$0.25-\$0.35 per square foot for residential attic insulation¹⁰⁶, and \$0.08-\$0.20 per square foot for cool roof upgrades. Rebates for renewable energy include maximums of \$25,000 per residential account and \$80,000 for commercial accounts to install solar panels,¹⁰⁷ and a maximum allowable rebate of \$2,000 for solar water heater installations for both residences and businesses.¹⁰⁸ CPS Energy also invites customers to join a community solar program operated collaboratively with solar developer, Big Sun. In this program, customers buy solar panels that are installed offsite in a sunny location in San Antonio, claim the tax credit, and receive solar credits that automatically lower their monthly electric bills.¹⁰⁹

CPS Energy also provides an array of customer assistance programs, including the Casa Verde weatherization program, which assists low-income homeowners and renters with an average of \$5,000 in efficiency upgrades to promote long-term energy savings.¹¹⁰ The Disabled Citizens' Billing and Senior Citizen Billing Programs give disabled customers on Supplemental Security Income (SSI) and seniors living on a fixed income additional time to pay their monthly bills.

Fort Collins Utilities, Fort Collins, Colorado

The City of Fort Collins' municipal utility, Fort Collins Utilities, supports customers to reduce energy costs and cut emissions through a variety of energy efficiency incentives, including several opportunities to

¹⁰² Sacramento Municipal Utility District (SMUD). N.d. *Energy efficiency financing*. Available at: <https://www.smud.org/en/Rebates-and-Savings-Tips/Energy-Upgrade-Project-Financing>.

¹⁰³ CPS Energy. N.d. *Save for Tomorrow Energy Plan*. Available at: <https://www.cpsenergy.com/step>.

¹⁰⁴ CPS Energy. N.d. *Wifi Thermostat Rewards*. Available at: <https://cpsenergy.com/content/corporate/en/my-home/savenow/my-thermostat-rewards.html>.

¹⁰⁵ CPS Energy. N.d. *Home Energy Rebates Program*. Available at: <https://residential.savenow.cpsenergy.com/rebates>.

¹⁰⁶ Ibid.

¹⁰⁷ CPS Energy. June 21, 2019. *CPS Energy Solar Rebate Program Manual*. Available at: <https://cpsenergy.com/content/dam/corporate/en/Documents/CPSE%20Solar%20Program%20Manual.pdf>. p. 2.

¹⁰⁸ CPS Energy. N.d. *Solar Water Heater Rebates*. Available at: <https://cpsenergy.com/en/my-home/savenow/rebates-rebate/solar-water-heater-rebate.html>.

¹⁰⁹ Big Sun Solar. N.d. *A Better Way to Go Solar*. Chosen by CPS Energy. Available at: <https://www.bigsunsolar.com/>.

¹¹⁰ CPS Energy. N.d. *Casa Verde*. Available at: <https://residential.savenow.cpsenergy.com/casaverde>.



integrate solar energy and a residential battery storage pilot program.¹¹¹ Energy efficiency audits are available to all customers, and the utility provides rebates for clothes washers, refrigerators, smart thermostats, efficient lighting, weatherization, and additional services to assist in reducing the upfront cost of upgrades.¹¹² For example, customers can receive a \$10 bill credit for installing water-saving showerheads, a \$35 rebate check for recycling and hauling old refrigerators and freezers at no cost to the customer, and a \$50 rebate for an Energy Star-certified clothes washer.¹¹³ Home efficiency upgrades can be financed using Fort Collins' "Epic Loans". In this program, customers can invest in efficiency and solar projects while repaying the loan on their monthly electric bills. The maximum borrowing amount is \$25,000, and there are several term options.¹¹⁴

Rebates up to \$1,500 are available for solar installations and helps Fort Collins to meet state renewable energy standards by generating Renewable Energy Credits (RECs). Fort Collins applies net metering credits to solar owners' monthly utility bills, offsetting other charges on the bill.¹¹⁵ Net metering occurs when surplus solar power generated by the customer's panels is sold to the electric grid. The MLP deducts the cost of electricity returned to the grid, through a credit on the customer's monthly electric bill. Over 1,600 residential customers have installed solar PV systems, generating more than 9.6 MW of capacity.¹¹⁶

Participants in Fort Collins' residential battery storage pilot program receive an incentive of up to \$1,500 to install a new battery system, calculated at \$100 per kilowatt-hour, as well as practical advice on how to use their battery to minimize their energy bill. Customers can take advantage of time-of-use pricing and net metering rates to maximize cost savings by charging their battery during off-peak hours and discharging the battery during peak hours.¹¹⁷

Los Angeles Department of Water and Power, California

Since 2000, the Los Angeles Department of Water and Power (LADWP) has invested \$424 million on energy efficiency, saving over 1,756 gigawatt-hours. In 2014, the LADWP board established a goal to reduce the city's energy usage by 15 percent of 2010 levels by 2020, surpassing the state-mandated goal for publicly owned utilities of 10 percent. To achieve this goal, a variety of energy efficiency programs are offered, including: refrigerator recycling and exchange, appliance rebates, residential retrofits, commercial lighting, commercial HVAC, commercial custom retrofits, tree planting, and efficient building codes.

¹¹¹ City of Fort Collins. N.d. *Renewables*. Available at: <https://www.fcgov.com/utilities/residential/renewables>.

¹¹² City of Fort Collins. N.d. *Rebates & Programs*. Available at: <https://www.fcgov.com/utilities/residential/conserves/rebates-programs>.

¹¹³ City of Fort Collins. N.d. *Residential Rebates Application*. Available at: <https://www.fcgov.com/utilities/rebates/>.

¹¹⁴ Fort Collins Utilities. N.d. "Epic Homes Loan". Available at: <https://www.fcgov.com/utilities/epicloan>.

¹¹⁵ City of Fort Collins. N.d. *Go Solar in 2020*. Available at: <https://www.fcgov.com/utilities/residential/renewables/solar-rebates>.

¹¹⁶ Ibid.

¹¹⁷ City of Fort Collins. N.d. *Residential Battery Storage Pilot Program*. Available at: <https://www.fcgov.com/utilities/residential-battery-storage-pilot-program>.



LADWP offers a rebate up to \$1,500 for used electric vehicles. Eligible customers can receive rebates up to \$500 for the purchase of a qualified electric vehicle charging station and a \$250 rebate for the installation of an electric vehicle meter. Commercial entities may receive a rebate of up to \$125,000 per charging station, depending on its power output.¹¹⁸ Though currently out of funds, LADWP's Solar Incentive Program previously offered reimbursements assisting with the cost of solar panels in the residential (\$0.25/Watt), commercial (\$0.30/Watt) and government/nonprofit/affordable housing sectors (\$0.95/Watt).¹¹⁹

¹¹⁸ Kushler, M. et al. 2015. "Municipal Utility Energy Efficiency: Successful Examples around the Nation". ACEEE. Available at: <https://www.aceee.org/sites/default/files/publications/researchreports/u1510.pdf>, p. 23-24.

¹¹⁹ DSIRE. June 4, 2019. "LADWP – Solar Incentive Program". Available at: <https://programs.dsireusa.org/system/program/detail/501>.