



# BENEFICIAL BUILDING ELECTRIFICATION



**PARTNERS IN ENERGY**  
An Xcel Energy Community Collaboration

## **XCEL ENERGY PARTNERS IN ENERGY AND THE ROLE OF TOOLKITS**

Xcel Energy Partners in Energy provides communities in Minnesota, Wisconsin, and Colorado services to develop and implement an energy or electric vehicle action plan. Every community has its own unique energy needs and priorities, and Partners in Energy tailors its services to complement each community's vision. As part of this offering, we have developed several toolkits to help communities reach their energy goals.

You can explore all available toolkits on the [Partners in Energy Portal](#). To customize any of the resources with your community's unique brand identity, contact your Partners in Energy facilitator.

### **Using this Toolkit**

The goal of this toolkit is to provide background, information, and resources for communities seeking to move toward beneficial building electrification. It discusses potential barriers that could be encountered on the road to achieving building electrification goals and the strategies available to communities as they consider beneficial building electrification in their community.

Please note that this toolkit does not address transportation electrification. Visit the [Partners in Energy Electric Vehicle Toolkit](#) to learn more about transportation electrification.

Xcel Energy assumes no liability during project implementation. This toolkit is only intended to provide information and general resources. It is not a substitute for conducting localized research and developing specific plans tailored toward individual communities' needs.

### **Who Should Use This Toolkit?**

This toolkit is intended for local government staff and stakeholders in communities that currently have or are considering building electrification goals, focus areas or strategies.

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# Glossary of Terms

**Beneficial Building Electrification:** Swapping fossil fuel-powered building appliances with electric ones while keeping energy costs affordable for all income groups. Weatherization and building envelope improvements often precede beneficial building electrification because they allow for the efficient heating and cooling of spaces.

**Beneficial Electrification:** Reducing direct fossil fuel use and replacing it with electricity in a way that lowers greenhouse gas emissions and energy costs.

**Carbon-free:** Carbon-free refers to sources of energy that will not emit additional carbon dioxide into the air. Wind, solar, and nuclear energy are all examples of carbon-free sources but only wind and solar are renewable.

**Carbon-neutral:** Carbon-neutral, also described as net zero, could include carbon-free sources but is broader and refers to energy that removes or avoids as much carbon dioxide as is released over a set period of time.

**Decarbonization:** Reduction or elimination of carbon dioxide emissions from a process.

**Demand Side Management (DSM):** Modification of consumer demand for energy through various methods such as demand response or conservation measures. DSM usually is targeted to decrease energy consumption, especially during peak hours, or to shift time-of-energy use to off-peak periods such as nighttime and weekend.

**Electrification:** Replacing equipment or technology that uses fossil fuels with electric-powered alternatives.

**Energy Efficiency:** The use of less energy to perform the same task or produce the same result.

**Greenhouse Gases (GHG):** Gases in the atmosphere that absorb and emit radiation and significantly contribute to climate change. The primary greenhouse gases in the earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone.

**Grid Decarbonization:** The reduction in the carbon intensity of electricity provided by electric utilities through the addition of low- and no-carbon generation resources to the electricity grid.

**Million British Thermal Unit (MMBtu):** Unit to measure heating content and the value of a fuel. Often used to combine both electricity and natural gas consumption to under a common unit.

**Weatherization:** Protecting a building from the outside elements to maximize energy efficiency. Common weatherization investments include insulation, air sealing and windows.

# **BENEFICIAL BUILDING ELECTRIFICATION CONTEXT**



# Beneficial Building Electrification Context

## WHAT IS BENEFICIAL ELECTRIFICATION?

Local governments, states, and the country are increasingly seeking to decarbonize buildings and transportation as they move toward greenhouse gas reduction goals.

**Beneficial Electrification** involves reducing direct fossil fuel use in a way that lowers greenhouse gas emissions and energy costs (Environmental and Energy Study Institute, n.d.).

This toolkit focuses on the beneficial electrification of buildings, which seeks to reduce direct fossil-fueled appliances at the same time the electric grid is decarbonizing with wind, solar, and other cleaner forms of power. Building envelope and weatherization updates often precede beneficial building electrification because they improve building quality. This, in turn, maximizes the efficiency of the building. Greenhouse gas emissions can be lower because less heat and cooling is needed to maintain indoor climate. The next step is finding electric alternatives to shift away from natural gas-burning furnaces and boilers, hot water heaters, clothing dryers, and stoves.

## Why Beneficial Building Electrification, and Why Now?

Fossil fuel-burning appliances in buildings account for one-tenth of greenhouse gas emissions in the United States (RMI, 2019). Swapping fossil fuels like natural gas and propane with electricity from an increasingly cleaner electric grid will result in significant climate benefits. At the same time, the Inflation Reduction Act of 2022 unleashed \$369 billion in clean energy investments. In addition to federal dollars, local and state governments, and energy utilities like Xcel Energy offer additional ways for consumers to defray the upfront costs that have deterred building electrification.



## BENEFICIAL BUILDING ELECTRIFICATION BUILDING BLOCKS

The foundation of electrification is to prepare a building through energy efficiency, weatherization, and service panel upgrades, along with replacing fossil fueled equipment with electric equipment.

### Energy Efficiency and Weatherization

Key components include insulation, air sealing, and improved windows. While these improvements can involve a large investment on the front end, particularly if there was deferred maintenance on the home or building, they provide long-term benefits like improved thermal comfort, improved indoor air quality, and lower energy bills. Building envelope investments are important to beneficial building electrification, particularly when transitioning to electricity for space heating. By creating an airtight tight building envelope through weatherization, occupants can choose the rightsized equipment, avoiding larger and more expensive equipment components, and ensure their equipment will operate at its highest efficiency, avoiding wasted energy and costs. As tighter building envelopes are established, occupants should be aware that carbon monoxide could pose a greater risk because it may not escape the building as readily as it did before weatherization.

### Wiring and Service Panel Upgrades to Prepare for Electrification

Electrifying different end uses will add electricity demand in buildings, which can require modernizing electric wiring and upgrading the electric service panel. Outdated service panels (e.g., a home with 30-amp to 100-amp service) are most common in older residential homes built between 1950 and 1975. If your community has an older housing stock, service panel upgrades (e.g., upgrade to 200-amp service) are important as a first step to electrification.

### Electrification and Space Heating

The powerhouse of beneficial building electrification is the heat pump for space heating. Two types of heat pumps are most common for electrifying space heating: air source heat pumps (ASHP) and ground source heat pumps (GSHP). Both provide heating and cooling to buildings, using highly efficient heating technology that can effectively reduce greenhouse gas emissions. Both ASHPs and GSHPs use the same technology that can be found in a refrigerator.

#### Air Source Heat Pumps (ASHP)

In the winter, an ASHP extracts heat from outside cold air using a colder refrigerant and then compresses the refrigerant to heat it up. In the summer, the process is reversed, the compressed hot refrigerant rejects its heat to the outside air.

For homes and buildings that do not have air ducts, property owners often install ductless ASHPs (also known as a mini-split heat pump), which can supply hot and cold air directly to rooms via refrigerant lines that run outside the home.

Cold climate ASHPs can heat homes as low as  $-13^{\circ}\text{F}$ , in addition to cooling homes during the summer. They can also be used in non-ducted and ducted formats. A back-up system fueled by either electricity or natural gas is recommended to supplement systems when the temperature drops below  $-13^{\circ}\text{F}$  (Center for Energy and Environment, Cold-Climate Heat Pumps, 2023). Altitude can also potentially impact heat pump performance. Air Conditioning Contractors of America (ACCA) recommends allowing up to 10% reduction in performance for homes at higher elevations.

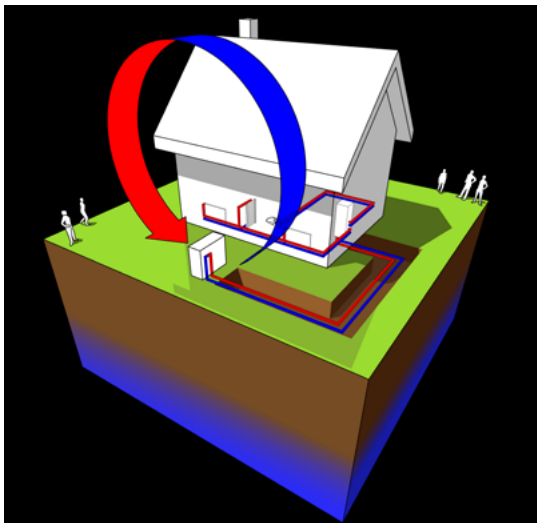


Figure 1: Using a similar technology to what your refrigerator has, an ASHP circulates through indoor and outdoor air to achieve space conditioning.

### Ground Source Heat Pumps (GSHP)

A GSHP takes advantage of the relatively cool underground temperatures in the summer and the warm temperatures in the winter to manage a home's internal temperature. The ground acts as a natural insulator, keeping ground temperatures at a relatively constant temperature. GSHPs take advantage of this constant temperature to regulate and enhance indoor temperatures.

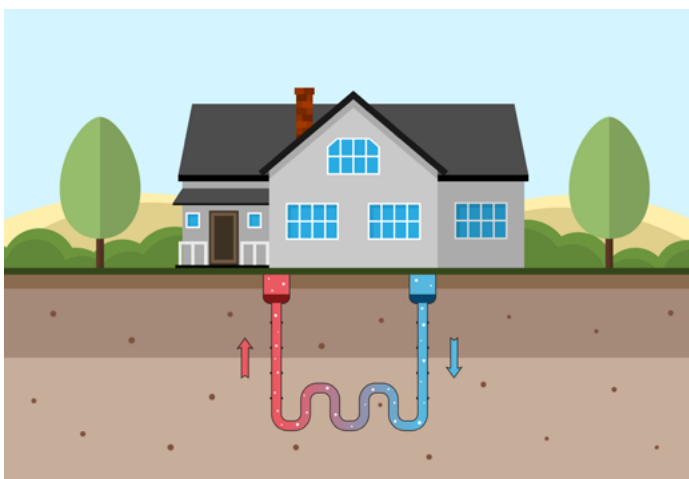


Figure 2: A GSHP uses the ground's cool temperatures in the summer and warm temperatures in the winter to regulate a home's climate



## What does an electrified home look like?

It's hard to envision all the elements of electrification together. A fully electrified home means a weatherized, energy efficient home with electric heat, a smooth top or induction stove, and an electric-powered water heater and dryer.

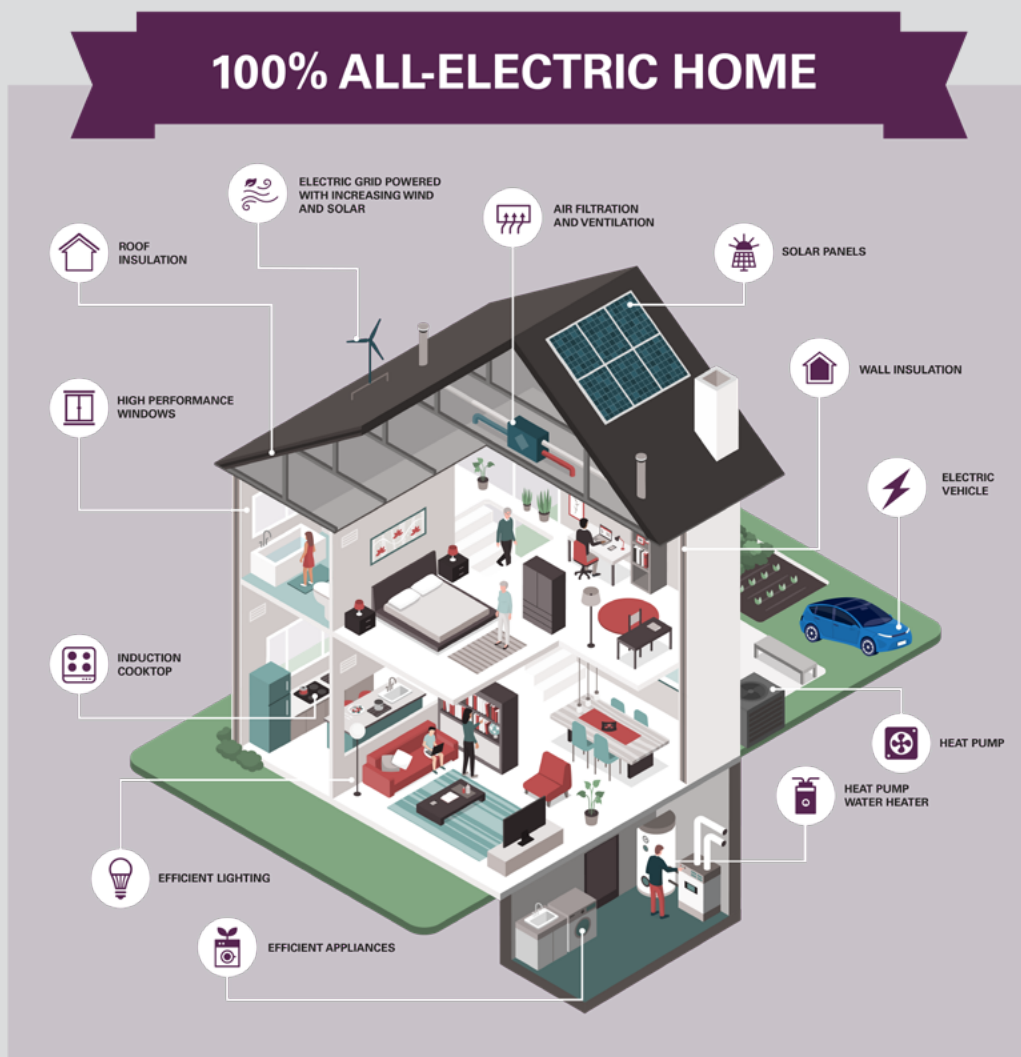


Figure 3: A fully electrified home.

The following table provides examples of residential natural gas-powered appliances, their corresponding electrification opportunity, and sample upfront costs. These costs can vary greatly depending on the unique circumstances in each application.

Natural Gas-Powered Appliance/Equipment	Electrification Opportunity	Upfront Installation Costs
<b>Furnace (Natural Gas)</b>	Electrified Heat Pump (air source)	\$12,000-\$24,000
	Electrified Heat Pump (air source) with natural gas backup or electric resistance backup	\$12,000-\$24,000
	Electrified Heat Pump (ground source)	\$30,000-\$60,000
<b>Hot Water Heater (Natural Gas)</b>	Electrified Heat Pump Water Heater	\$4,000-\$5,000
<b>Clothes Dryer (Natural Gas)</b>	Heat Pump or Electric Resistance Dryer	\$1,000-\$1,700/ \$600-\$1,400
<b>Stove (Natural Gas)</b>	Induction Stove or Smooth Top Electric Stove	\$1,000-\$4,000/ \$500-\$3,000

(Center for Energy and Environment, Electrify Everything Minnesota, 2023)



## XCEL ENERGY AND BENEFICIAL BUILDING ELECTRIFICATION

For more than a decade, Xcel Energy has demonstrated leadership on clean energy, proactively reducing carbon emissions at levels that currently surpass state and federal goals.

- In 2005, Xcel Energy was one of the first power suppliers to register with the Climate Registry to track and verify emissions.
- In 2018, Xcel Energy was the first major U.S. electricity provider to set a vision to serve customers with 100% carbon-free electricity by 2050, and to reduce carbon emissions 80% by 2030 from 2005 levels.
- In 2020, Xcel Energy saw its largest one-year decline in carbon emissions, reducing carbon emissions 51% since 2005, more than halfway to reaching the 2030 goal.

### Net-Zero Energy Provider by 2050

Read more about Xcel Energy's carbon reduction plans for delivery of clean energy on their [website](#). Xcel Energy's [Colorado Energy Plan](#) and [Upper Midwest Energy Plan](#) detail how Xcel Energy will transition to cleaner energy resources in each region.

The pathway to achieving this bold vision involves adding thousands of megawatts of wind and solar power, incorporating natural gas and storage resources, retiring coal units, supporting electrification, and investing in critical infrastructure. Key to the grid infrastructure investments are efforts to allow Xcel Energy to increase electricity generation capacity, paving the way for electrification efforts. In addition to efficiency rebates and programs, Xcel Energy has developed several renewable energy options that support on-site and off-site generation for both wind and solar, creating additional opportunities for its customers to power their home and buildings with renewable electricity. See the [Resources](#) section for information about Xcel Energy's renewable energy and efficiency programs.

### Minnesota's 100% Clean Electricity by 2040 Goal

In 2023, the Minnesota state legislators passed a new law that requires 100% of the electricity that Minnesota utilities produce or buy to be generated with carbon-free energy resources by 2040. The law considers the importance of reliability and affordability, the effects of new, beneficial electric loads, and job impacts. Xcel Energy is working with the Minnesota Public Utilities Commission to meet this and other interim goals as it continues to provide clean, reliable electricity in Minnesota. [Read more about the legislation here](#).

## Preparing for Electrification

Xcel Energy’s [Clean Heat Plan](#) and 2023 [Demand-Side Management and Beneficial Electrification Plan](#) (filed, but not yet approved as of November 2023) in Colorado and [Energy Conservation Optimization \(ECO\) Triennial Plan](#) in Minnesota will help lay the groundwork for customers seeking to electrify their homes through new utility programs and initiatives launching in 2024. These programs include robust insulation and air sealing rebates, which help improve the building envelope before electrification. These plans also include programs and rebates for electrification equipment, including additional rebates for projects that pair insulation, air sealing, and heat pumps. The goal in both plans is to reduce greenhouse gas emissions and increase energy efficiency across a multiple sectors, from residential to business to industrial, while maintaining reliability and affordability.

In addition to offering equipment rebates for electrification, Xcel Energy is preparing for electrification and increased electricity demand in a variety of ways, including advanced grid investments and demand side management programs. Xcel Energy’s Advanced Grid Initiative is bringing digital technology to electric service with a smarter, more resilient electric distribution grid. Compared to traditional distribution systems, the advanced grid enhances visibility and control of the grid via modern system technology. Demand side management strategies, like time-of-use rates (also known as time-of-day rates) in Colorado, will allow Xcel Energy customers to use electricity in off-peak hours and give customers more control over bills.



### Partners in Energy Network Resource: Advanced Grid Community Playbook

The [Partners in Energy Advanced Grid Community Playbook](#) identifies steps to educate and engage communities on the Advanced Grid Initiative. This playbook is designed to help you know how and when to educate your local leaders, raise community awareness around what is happening, and respond to questions and concerns.



## GREENHOUSE GAS EMISSION REDUCTION GOALS AND BENEFICIAL ELECTRIFICATION

States and communities are setting ambitious greenhouse gas reduction goals with beneficial building electrification as a key strategy to reducing emissions in the building sector.

### Statewide Goals

The Partners in Energy network includes Colorado, Minnesota, and Wisconsin, all of which have set statewide greenhouse gas emissions reduction goals.

- Colorado legislation requires the reduction of greenhouse gas pollution 50% by 2030 and 90% by 2050. Carbon-free buildings and a cleaner grid are not the only means by which the near-term and final goals will be met. The state's [GHG Pollution Reduction Roadmap](#) anticipates important gains from the oil and gas extraction industry, agriculture, transportation electrification, and others. Action is required from all identified players to achieve greenhouse gas reduction gains.
- The [Minnesota Climate Action Framework](#) identifies clean energy and efficiency goals, including expanding the use of carbon-free energy to create healthy, comfortable buildings. The solutions identified include 100% carbon-free electricity and 55% renewable electricity by 2040, adapting Minnesota's grid through transmission upgrades to enable greater reliability and renewable energy access, and improving building codes and standards so that all new commercial and large multi-family buildings produce net-zero greenhouse gas emissions by 2036.
- Wisconsin's [Clean Energy Plan](#) (CEP) sets a 100% carbon-free electricity goal by 2050 and ensures the state of Wisconsin is fulfilling the carbon reduction goals of the 2015 Paris Agreement. The CEP includes four key pathways to create momentum: accelerate clean energy technology deployment, maximize energy efficiency, modernize buildings and industry, and innovate transportation.



## Community Goals

There are many ways local governments can combine electrification goals and strategies with greenhouse gas reduction efforts. The following examples demonstrate how communities are combining their goals and strategies so others can model similar efforts.

For communities creating new energy action and climate action goals or adding new beneficial building electrification strategies, the [Setting Goals and Tracking Progress](#) section further explains how electrification can affect your community-wide goals.

Location	Goal	Highlights
Boulder, CO	Seeking to transition 80% of residential buildings to heat pumps by 2050	<ul style="list-style-type: none"> <li>• 100% renewable electricity by 2030</li> <li>• Joined <a href="#">consortium of cities seeking to collaborate with heat pump manufacturers</a></li> </ul>
Colorado Front Range Beneficial Electrification Network	Achieve state and local climate action goals with a focus on equity	<ul style="list-style-type: none"> <li>• Participation from more than 20 Colorado communities, representing more than 40% of the state's population</li> <li>• Drive demand for retrofits through standardized information, funding, scaling solutions, and shared goals and targets</li> <li>• Support workforce development</li> </ul>
Denver, CO	Net zero energy in new buildings and homes by 2030	<ul style="list-style-type: none"> <li>• Denver itemized strategies to reduce carbon emissions from buildings in <a href="#">a plan</a> that highlights specific strategies, including dates by which future building code updates need to be made to reach its 2030 goal</li> </ul>
Edina, MN	Net-zero emissions by 2050	<ul style="list-style-type: none"> <li>• Several strategies including:             <ul style="list-style-type: none"> <li>- Improve building energy efficiency</li> <li>- Adopt high-performance building construction technology and net-zero construction</li> <li>- Reduce energy burden for residents</li> <li>- Fuel switch from on-site fossil fuel combustion to less carbon-intense sources</li> <li>- Increase renewable energy generation</li> </ul> </li> </ul>
Minneapolis, MN	Carbon neutrality by 2050	<ul style="list-style-type: none"> <li>• Created the Climate Legacy initiative to fund supporting work</li> <li>• Adopted interim goal to reduce carbon emissions 75% by 2030</li> <li>• Whole home weatherization and electrification retrofits</li> <li>• Expanded workforce training</li> </ul>

Northfield, MN	Carbon-free community by 2040	<ul style="list-style-type: none"> <li>• Adopted interim goal of carbon-free electricity by 2030</li> <li>• Strategies to reduce emissions through fuel switching from natural gas to electricity and increasing building efficiency, net-zero construction, and retrofits</li> <li>• Adopted interim goal of 100% renewable electricity by 2030</li> <li>• Support for energy code enforcement for existing buildings</li> <li>• Sustainable building policy encouraging increased building efficiency and renewable energy</li> <li>• Fuel switching strategies including moving natural gas end-uses, like water heaters and furnaces, to electrified equipment</li> </ul>
St. Louis Park, MN	Carbon neutrality by 2040	<ul style="list-style-type: none"> <li>• Adopted interim goal of 100% renewable electricity by 2030</li> <li>• Support for energy code enforcement for existing buildings</li> <li>• Sustainable building policy encouraging increased building efficiency and renewable energy</li> <li>• Fuel switching strategies including moving natural gas end-uses, like water heaters and furnaces, to electrified equipment</li> </ul>
Eau Claire, WI	100% renewable electricity and carbon neutrality by 2050	<ul style="list-style-type: none"> <li>• Created a Net-Zero Energy Building Guide</li> <li>• Promoting energy audit, efficiency rebates and financial incentives</li> <li>• Recognize sustainable investments through Sustainable Eau Claire Award</li> </ul>
La Crosse, WI	Carbon neutrality by 2050	<ul style="list-style-type: none"> <li>• Adopted interim goal of 40–50% reduction in greenhouse gas emissions</li> <li>• Strategies to increase net-zero construction community-wide and facilitate electrification for municipal buildings</li> </ul>

## HOW DOES EQUITY FIT INTO BENEFICIAL BUILDING ELECTRIFICATION?

As communities transition to increasing electricity use in place of carbon-intensive fossil fuels, the cost impact may be unequally distributed across society. The potential of stranded gas assets and general transition costs could result in higher utility bills, which will burden those already struggling to pay heat and cooling bills. Those individuals who are slower to switch to electricity from natural gas will see continued fluctuations in their monthly bill. Inequitable workforce development may result in a clean energy job industry that does not foster diverse backgrounds. An equitable transition strives for a future in which all groups across geography, class, gender, ethnicity, and race can fully embrace the economic and health benefits of a system that favors equitable electrification access.

### Federal Funding and Equity

The federal High-Efficiency Electric Home Rebate (HEEHRA) Act (included in the Inflation Reduction Act) includes discounts for the purchase of new, efficient all-electric appliances by low- and moderate-income households. The total cost of appliances can't exceed \$14,000 per household. Low-income households can be eligible for support covering 100 percent of project costs. Moderate-income households can recoup 50 percent of project costs. Rebates cover heat pumps, electric appliances, and enabling measures such as circuit panel and insulation upgrades.

The following considerations are important for communities and stakeholders as they plan for equitable building electrification.

- Short-term higher utility bills for the economically disadvantaged:** Research shows that low-income individuals, older adults, and communities of color are the most strained when paying their utility bills (Economy, 2020). Higher-income individuals will see the early financial cost savings from beneficial electrification due to their ability to pay upfront for home improvements as early adopters. As communities consider outreach strategies, it's important to promote existing rebates, financing, and other programs that reduce the cost for a variety of household incomes and types to make energy improvements. If these programs aren't sufficient, explore opportunities to create new programs to fill the need. Community regulations that specify which type of appliances can be used (i.e., gas vs. electric) should be considered carefully from an equity and cost lens to ensure lower income customers are not unduly burdened by higher energy costs.
- Look beyond a household's ability to pay utility bills. Consider behavior, too.** Low-income households can sometimes be driven to limit energy consumption due to high energy costs (Shuchen Cong, 2022). When considering electrification efforts, estimated benefits could potentially be limited if households run heat pumps and other electric appliances less in an effort to lower utility bills. This makes it important for communities to understand baseline energy needs and behaviors when sketching out programs.
- New housing and electrification opportunities:** As new development occurs in a community, builders and developers can prioritize electrification measures in the design process. Through regulation or incentive programs, communities can work with housing authorities to prioritize all-electric efficient affordable housing, ensuring that low-income families are the first to benefit from electrification and lower utility bills.



A hand is shown placing a puzzle piece into a larger assembly. The puzzle pieces are a warm, golden-brown color. The background is a soft, out-of-focus image of a person's face, suggesting a human element in the strategy. The overall lighting is warm and bright, creating a positive and forward-looking atmosphere.

# **CREATING ELECTRIFICATION STRATEGIES**

# Creating Electrification Strategies

As your community implements beneficial building electrification, there are a few components that need to be addressed during strategy development to be effective and successful in meeting your community goals.



## DEFINING YOUR TARGET AUDIENCE

The first step to beneficial building electrification implementation is to identify the target audience(s) and their energy needs because the barriers and strategies to beneficial building electrification differ based on the target audience.

The [Strategies for Local Governments and Stakeholder Groups](#) section details different strategies for reaching these audiences. Although there may not be a direct solution to a barrier faced by your target audience, being aware of the limitations to electrification will inform your strategy development.

### Existing Residential Buildings

Existing residential buildings are a common target audience for building electrification strategies. The residential sector often represents the largest in terms of energy users and the market is primed to deliver electrification technologies to residential buildings, particularly in one-to-four-unit homes, compared to other sectors.

Common barriers to residential electrification include high project costs, poor weatherization, space constraints, access to qualified and willing contractors, supply chain delays, lack of contractor training, misinformation about equipment effectiveness, and deferred maintenance. For renter-occupied residential buildings, the split incentive between the building owner and tenant can also be a barrier (i.e., building owner incurs the expense to upgrade but tenant pays utility costs).

### Existing Commercial Buildings

Compared to the residential sector, there are often fewer commercial sector energy users in a community, but this sector often represents higher energy use per building. However, due to the market availability of electrification equipment for small- and medium-sized commercial spaces and the opportunity to move carbon-intense end uses to cleaner end uses, communities are targeting these spaces.

Common barriers to commercial building electrification include high project costs, deferred maintenance on equipment and building envelopes, fewer technology solutions, complexity in installation, workforce gaps on the contractor and building maintenance fronts, supply chain delays, and lack of equipment to meet the same needs. Similar to residential buildings, tenant-occupied commercial buildings also need to address the barrier of the split incentive between the building owner and tenant.

### Industrial Sector Electrification

The industrial sector presents a unique set of challenges when it comes to building electrification. Often these are energy-intensive processes that may have difficulty transitioning to new electrified equipment that still operates cost-effectively (Jeff Deason, March 2018). In addition, there may not be equipment readily available on the market to consider as part of an electrification strategy.

### New Development (Residential and Commercial Buildings)

New development is a good target audience for electrification strategies because it can be cost-effective to electrify on the front-end and ensure new construction is designed to be as efficient as possible and ready for electrification. By integrating effective insulation, air sealing and electrification on the front-end, these buildings can also avoid costly future retrofits.

Barriers to electrification in new development are very similar to those in existing buildings, including high project costs, lack of familiarity with energy efficient building electrification design and specs, space constraints, and workforce gaps and supply chain delays. In addition, building code compliance is also a barrier. Lack of education and understanding of updated building codes, or even compliance with existing building codes, can complicate new development.

### Contractors and Trades

Contractors who are trained and qualified to install energy efficient electric equipment can be an important target audience for communities as the demand for these workers increases. These contractors might include those specialized in HVAC, insulation and air sealing, and energy audits, in addition to more common trades like electricians and pipe fitters. Challenges with workforce development are broad, ranging from an overall lack of workers in the region to a lack of specialized training and expertise in new electrification equipment to skepticism about new technology and misinformation about equipment effectiveness. See [Collaborating on Workforce Development](#) for more context.



## INTEGRATING EFFICIENCY AND WEATHERIZATION

As you develop a beneficial building electrification strategy, consider how efficiency and weatherization are incorporated as an early first step to any electrification project. This can be as simple as including it in the messaging of an outreach campaign to including it as an eligible requirement for an incentive or financing. Revisit the [Beneficial Electrification Building Blocks](#) section for ideas on how efficiency can be communicated as a first step to your target audience.

## COLLABORATING ON WORKFORCE DEVELOPMENT

A trained workforce is needed throughout the electrification journey from efficiency and weatherization to equipment installation and electric panel upgrades to ensure project completion. There may be gaps in your local or regional workforce when it comes to qualified contractors and trades. This could include an overall lack of workers (e.g., no Building Performance Institute (BPI) certified contractors in the area), misinformation about the technologies, and gaps in expertise about equipment and installation (e.g., lack of training on how to install air source heat pumps).

Although this toolkit focuses on implementing electrification strategies, workforce availability is an important component to track. The [Strategies for Local Governments and Stakeholder Groups](#) section highlights workforce strategies, plus the [Partners in Energy Workforce Development Collaboration Toolkit](#) goes into more detail on how a community can collaborate with existing workforce initiatives to prioritize clean energy jobs and meet your community's climate goals.

## TRACKING PROGRESS

As you implement your beneficial electrification strategies, you will want to measure success and track progress.

### How Electrification Affects Energy Action and Climate Action Goals

As noted in the [Greenhouse Gas Emission Reduction Goals and Beneficial Electrification](#) section, states and communities are including electrification in their community-wide greenhouse gas reduction and climate goals. Electrification strategies affect community goals in different ways, so it's important to consider how your electrification strategies will help you meet your community-wide goals.

#### **Grid Decarbonization and Increased Electricity Consumption**

As Xcel Energy continues to invest in carbon-free power generation, the mix of renewable electricity will increase; so even if electricity consumption rises in a community due to building electrification, associated greenhouse gas emissions should decline because the grid supplying this power is cleaner. Additionally, the emissions from the electricity grid are less carbon intense than the natural gas emissions reduced during electrification.

- **Greenhouse gas emissions reduction goals:** Electrification strategies reduce greenhouse gas emissions related to natural gas consumption by shifting natural gas consumption to electricity; however, as you increase electricity consumption, your community's electricity consumption and related emissions will increase. If your community-wide goal is to reduce community-wide greenhouse gas emissions, you'll want to account for both a decrease in natural gas emissions and an increase in electricity emissions, even if overall emissions will reduce.
- **Energy consumption reduction goals:** Electrification strategies move fossil fuel end uses to electric, so electricity consumption will increase in communities focused on building electrification. This could be a large increase with widespread adoption across the residential and commercial sectors. Like greenhouse gas emissions goals, your consumption goals will need to account for an increase in electricity consumption and a decrease in natural gas consumption.
- **Program participation and energy savings goals:** Xcel Energy offers different rebates for efficiency, weatherization, and equipment electrification. As you encourage your community to increase efficiency and electrify buildings, you'll likely see an increase in rebate participation due to residents and businesses taking advantage of utility rebates to help manage project costs. Electrification strategies will likely result in increased program participation and energy savings, helping you meet your participation and savings goals.
- **Energy cost savings goals:** Depending on the end use, electrification can result in an increase in energy costs. For example, if natural gas rates are lower than electric rates (on a MMBtu basis), a homeowner who electrifies their home's space and water heating may see an increase in utility electricity costs because of higher electric demand and rates. Energy cost goals can be difficult to track and manage in respect to electrification, so we recommend reducing energy costs for those with a high energy burden.



## Tracking your Goals

Measuring progress toward your goals is an important step, whether you have qualitative or quantitative data to share. Sharing that progress with your stakeholders generates community support. There are a few sources to help you track progress toward your community goals.

- **Utility data:** Xcel Energy's community energy reports and Partners in Energy dashboards will allow you to compare trends in consumption, greenhouse gas emissions, program participation, and energy and cost savings. When tracking progress at the program level, ask your Partners in Energy community facilitator which programs are tied to weatherization and equipment electrification, including what granular data is available to understand what type of equipment is being installed (e.g., air source heat pumps). If you are served by more than one energy utility, check-in with both your electric and natural gas service providers to see what type of data they can provide on consumption, greenhouse gas emissions, and program participation.
- **Municipal data:** Your city or county may track permits related to building electrification projects, such as insulation, service panel upgrades, and heat pump installations. Check with your permit and building officials to understand what type of data is tracked and if a regular report of permitted installations can be provided.
- **Census data:** The American Community Survey estimates how homes are heated in a geographic area from the state to census block level. Although this data represents an estimate of home heating fuels, it can provide communities with useful insight into the market penetration of electrically heated homes in their community. This data could be compared year-over-year to see if there is a growing number of units as a community implements its electrification strategies.



### Partners in Energy Network Resource: Data Tracking and Reporting

As part of the planning process, Partners in Energy supports community-driven SMART goal setting. If you are a community active in planning, consider how electrification might contribute to your community goal and strategy development. For implementation and graduate communities, work with your Partners in Energy community facilitator to identify the metrics that will help you track the success of your electrification strategies.

An aerial photograph of a city at sunset. The sun is low on the horizon, casting a warm, golden glow over the scene. The sky is filled with soft, white clouds. In the background, a range of mountains is visible. The foreground shows a residential area with houses, trees, and a road. The overall mood is peaceful and hopeful.

# **STRATEGIES FOR LOCAL GOVERNMENTS AND STAKEHOLDER GROUPS**

# Strategies for Local Governments and Stakeholder Groups

The following section identifies outreach and education strategies, process and policy updates, financing and incentives, and workforce development considerations. Each section is organized to include “first steps and quick wins” and “larger efforts.” Larger efforts are strategies that require additional staff capacity, funding, or other resources to implement.

## OUTREACH AND EDUCATION

Outreach and education strategies can reach many target audiences. As you develop your outreach and education strategies, consider which target audience(s) you want to reach and cater your messaging to resonate with each (see [Defining Your Target Audience](#) section). This message may be different depending on who you are trying to reach.

### Toolkit Resource

Check out the [Resources](#) section in this toolkit to learn more about the types of utility, state, and federal resources available to your community.

## First Steps and Quick Wins

### Create and Maintain an Up-to-Date Website

Develop and maintain a comprehensive website that allows residents and businesses to easily access your building electrification information. The website should provide information about energy efficiency, electrification opportunities, and other considerations or call to actions. This website can be a central point to connect your community with Xcel Energy rebates and programs, and federal and state incentives. When implementing a strategy related to maintaining your website, don't forget to create a maintenance schedule to ensure the content is current.

### Leverage Existing Channels to Promote Resources

Your community likely has access to various outreach channels, including social media, newsletters, utility bill inserts, and public buildings. Take advantage of these existing channels to promote utility, state, and federal resources. Cross-promotion and multiple messages can motivate action. Consider creating an outreach plan that identifies the outreach channel and desired messaging to help stay on track with outreach.

### Table at Local Events

Promote, facilitate, and attend local events to educate the community about the benefits of electrification and available programs and resources. Tabling events may include community festivals, farmers markets, and energy workshops. Distribute materials such as utility program details, as well as available state and national tax incentives.

### Front Range Beneficial Electrification Network

The Front Range Beneficial Electrification Network (FRBEN) is supported by several state and utility partners and meets on a recurring basis with support from Xcel Energy's Partners in Energy program. In 2023, FRBEN received Partners in Energy support to develop a residential heat pump retrofits goal for 2030 prioritizing outreach to low- and moderate-income families.





### **Partners in Energy Network Resource: Community Facilitator Support**

Don't forget to ask your Partners in Energy community facilitator for support in campaign planning and creating customized materials for your community. This can include flyers, postcards, social media, and website content. Not sure who your facilitator is? Email [partnersinenergy@xcelenergy.com](mailto:partnersinenergy@xcelenergy.com).

### **Partner with Local Organizations**

Local partners likely have different audiences when it comes to communication. By partnering with other organizations to share messaging, you can broaden your reach with your call to action. These partners could include other community departments, public libraries, social service organizations, neighborhood associations, civic and business groups, faith-based organizations, and education institutions. Provide partners with plug-and-play content to make sharing easy. This could be a social media post they re-share or newsletter text to include in their next email blast. When establishing a partnership, offer support for sharing their messaging and priorities. You'll want to make sure the ask isn't one-sided and that you're also offering support and collaboration.

### **Larger Efforts**

#### **Targeted Engagement to Specific Groups**

A targeted engagement campaign identifies a specific group for outreach and likely involves more one-on-one or small-group conversations compared to a broad message shared via social media or a newsletter. Partnerships are an important part of a targeted campaign to ensure you reach your audience. Some examples of targeted engagement include door-to-door outreach, focus group meetings, and presentations. Identify and conduct outreach to homes that are already using inefficient electric resistance heating or fuel oil and help them identify rebates and other programs to switch to heat pump technologies. Specific groups that may be harder to reach through broad outreach but are important stakeholders for electrification strategies include homeowners associations (HOAs), neighborhood associations, rental property owners and managers, commercial property owners, and developers and builders.

#### **Electrify Everything MN**

**Electrify Everything** is a program supported by the Minnesota cities of Eden Prairie, Edina, St. Louis Park, and Minneapolis and administered by Center for Energy and Environment. The program includes a website detailing weatherization and the electrification of heating, appliances, and water heating in residential homes. In addition, the supporting cities hosted education workshops in their community, breaking down barriers to electrification for residents, and hosted additional contractor training to educate contractors on electrification equipment.

#### **Host an Electrification Event**

Go above and beyond existing events in your community and create your own electrification-focused event. This could be an open house format where attendees meet with vendors or a workshop that offers specific education or training. This is a larger lift than working with existing events because of the logistics involved with planning an event from scratch. In addition to staffing the event, you will need to plan the location, time of day, length of event, and material needs. Start this planning early to give yourself enough time to finalize details.

### Offer One-on-One Support

In addition to a lack of knowledge, a common barrier can be navigating the variety of programs and incentives available for building electrification. Through one-on-one support (e.g., a navigator program), communities can offer tailored support to guide community members through the complicated landscape of building electrification and advise on next steps based on available resources. As you offer one-on-one support, consider the scope of the support and target audience(s) you want to reach. This is often a larger effort because of the staffing needed to provide one-on-one support, whether virtually or in-person.

#### Electrically Heated Multi-family Home Analysis (Saint Paul, MN)

Saint Paul wanted to identify multi-family homes (two or more units) that were heated with electricity so that they could target outreach with a tailored approach about energy efficiency and heat pump upgrades. Partners in Energy facilitators leveraged data available through the Partners in Energy program to identify homes in buildings with two or more units that were electrically heated. Working closely with Xcel Energy and the data from Partners in Energy, the City of Saint Paul developed a pilot outreach program to target homes with weatherization and other efficiency improvements.



## PROCESS AND POLICY UPDATES

Process and policy updates are implemented by the local unit of government and can be applicable to different target audiences depending on who the policy change or process update impacts. Consider who the policy or process affects (e.g., contractors are often those who apply for permits) to tailor your message and information materials to your target audience.

### First Steps and Quick Wins

#### Leverage Permitting Process and Development Review

Collaborate with other city or county departments to integrate electrification information into the permitting process and development review. An easy first step is to include an educational flyer with each permit or development application, and train frontline staff on how to answer questions about electrification equipment and code requirements. When designing informational materials, think of the audience for permit applications (e.g., contractors, developers) and what information will be most valuable to that audience. You may have more than one flyer depending on the audience or resource.

#### Energy Code Enforcement (St. Louis Park, MN)

The City of St. Louis Park is working with Xcel Energy to review design documents for large development projects and identify commonly missed energy measures that often have large energy savings. The goal is to ensure projects are built to current energy code and do not miss energy-savings opportunities.

### Larger Efforts

#### Reduce or Remove Permit Fees

Your city or county likely charges fees for permit applications and inspections. To incentivize electrification equipment and efficiency improvements, consider reducing or removing permit fees for certain permit applications. This will likely require a study into permit fee revenue and your community's capacity to forgo that revenue. Because removing or reducing permit fees results in lower department revenue, speak with permit and building officials, finance division, administration, and other city or county leadership to understand if this is an option for you.

#### Create a Sustainable Building Policy

A sustainable building policy incentivizes sustainable development by offering builders and developers financial and land-use incentives in exchange for meeting the community's sustainability requirements. These requirements exceed building codes and can be tied to a standard like LEED, Green Communities, or specific community goals (e.g., EV charging). Existing sustainability standards may have electrification requirements but may not be as advanced as you want to include in your policy (e.g., all-electric heating, predicted and actual energy use). Review the sustainability standards you are considering requiring to determine whether it makes sense to align your sustainable building policy with existing sustainability certification programs or to identify specific requirements to help you meet your goals.



### **Partners in Energy Network Resource: New Construction & Redevelopment Toolkit**

The [New Construction & Redevelopment Toolkit](#) can help your community accelerate the adoption of efficient design. It includes more in-depth information on how to create strategies to encourage or require more sustainable development. This includes strategies for permitting, development review, and policy development.

### **Update Building and Energy Codes (Colorado Only)**

*Note: This strategy is only applicable to communities in Colorado. Minnesota and Wisconsin communities cannot require buildings to exceed statewide building codes without a sustainable building policy or other incentive structure.*

Building and energy codes establish a minimum standard for construction across all sectors, creating an opportunity to integrate electrification requirements in new construction or major retrofits. Review your community's existing building code for opportunities to incorporate electrification equipment standards and specifications, such as air source heat pumps for residential construction. Review the energy-related aspects of construction, such as mechanical systems, service panel requirements, insulation materials and R-values, air sealing details, and system controls.

### **Building Code Updates (Superior, CO)**

After the 2021 Marshall Fire, Superior adopted a [new building code with electric-preferred requirements](#) but it also grants exceptions. Next, Superior received beneficial electrification planning and implementation support via Partners in Energy. Superior identified the specific strategies to electrify existing properties, support all-electric new development and explore electrifying the Town's fleet. Its plan established a baseline from which it can measure progress.

### **Education on Electrification (Boulder, CO)**

During its 2023 energy code update (ongoing as of November 2023), the City of Boulder sought strategies to promote renewables and incentivize electrification. A citizen [Climate Action Guide](#) promotes air source heat pumps and offers helpful tips on weatherization and reducing utility bills.



## FINANCING AND INCENTIVES

In addition to promoting existing financing and incentives, communities can create their own programs to reduce the upfront costs of beneficial electrification. Similar to previous strategies, a variety of audiences can be reached by these programs as the cost to electrify is a common barrier for existing and new homes and buildings.

### First Steps and Quick Wins

#### Promote Existing Rebates and Programs

Utilities, state energy offices and federal agencies offer programs and equipment rebates to offset upfront costs of beneficial building electrification. Leverage these existing resources and promote their availability on your website and other communication channels. As you develop other electrification strategies, highlight these rebates and programs in informational materials and written content (e.g., highlighted on website, included in permit flyer attachment).

#### Toolkit Resource

Check out the [Resources](#) section in this toolkit to learn more about the types of utility, state and federal resources available to your community, including the [Partners in Energy's Inflation Reduction Act Resource \(IRA\) Guide](#) for ways to maximize IRA dollars in your community.

#### Update Existing Financing Programs to Include Electrification

If your city or county offers financing for home or building improvements, review eligible activities to ensure that efficiency and electrification improvements are included as an eligible expense (e.g., weatherization, air source heat pumps). Work with your city or county department that manages this funding to review funding eligibility and identify opportunities to add efficiency and electrification. Once these funding sources are updated, include this as a resource in your informational materials.

### Larger Efforts

#### Create an Incentive Program

Build on existing programs and rebates by creating your own incentive program. These are often in the form of bonus rebates that match utility or state rebates up to a certain amount. These additional dollars further reduce the upfront project cost, making electrification more affordable. When designing your incentive program, consider which target audience(s) will be included, rebate eligibility and verification, and how much each incentive will be (e.g., percentage of rebate received from utility, capped amount). You may want to prioritize a specific target audience or certain equipment based on your electrification goals and priorities.

#### Prioritizing Healthy Homes and Incentives (Denver, CO)

To work toward its net zero energy in new buildings and homes by 2030 goal, Denver established a [Healthy Homes Program](#) to help low- to moderate-income multi-family and single-family homes reduce greenhouse gases. The program tests air quality and offers free advice on electric appliance and heating upgrades. Additionally, Denver offers [bonus rebates](#) funded via a climate action tax, which all homeowners can stack with Xcel Energy and IRA rebates.

### Create a Financing Program

Create additional opportunities to help residents and businesses manage project costs and make electrification more affordable by creating a new financing program focused on efficiency and electrification projects. Like creating a new incentive program, consider which target audience(s) will be included, financing eligibility and management, and loan amounts and interest rates. This type of strategy is a larger lift because of the logistics and administrative costs involved in managing loans. You'll want to work with administration, financing and other city and county divisions to design a manageable program that will help you meet your goals.

### Coordinate Group Buys

Buying large quantities of equipment leverages the collective buying power of a group of community members to save on the total cost. Group buys are most common for solar panels, where a group of neighbors or businesses team up to purchase solar panels in bulk to scale the costs. You can replicate the solar group-buy model with electrification equipment, as well. These arrangements are made directly between the building owner and contractors. As a community, you can help develop the strategy for promoting the program and initiate the idea within your community across different neighborhoods.

#### **Bonus Rebates for Electrification (Edina, MN)**

The [City of Edina's Community Climate Action Fund](#) is a cost-share program in which the City reimburses residents and businesses for some of the costs to complete high-impact energy efficiency projects. As the City of Edina considers equity, higher cost-share amounts are available to residents who live in census tracts identified by the Department of Energy as experiencing energy justice challenges. Cost sharing is available for insulating and air sealing, high-efficiency electric appliances, equipment tune-ups, and electrification.



## WORKFORCE DEVELOPMENT

Contractors and trades are the common target audience for workforce development strategies. In some cases, builders and developers may be reached and are valuable stakeholders as you collaborate on workforce initiatives.

### First Steps and Quick Wins

#### Share Materials with Contractors

Contractors are a key piece of the puzzle when it comes to meeting climate goals. They are often the first person a resident or business may interact with when they start thinking about beneficial building electrification. Ensuring contractors understand the type of equipment available, your community's goals, and available rebates and incentives can motivate beneficial building electrification. Equip these trusted messengers with key informational materials and talking points related to building electrification, offering your community team as a resource for questions.

### Larger Efforts

#### Contractor Training

Contractors in your community may be less familiar with emerging technologies or have preconceived notions about the efficiency of air source heat pumps or other equipment. Overcome these barriers through education workshops that include contractors, manufacturers, and other stakeholders. In addition to outreach, Denver created a workforce portal with easy-to-understand materials on permitting a heat pump, navigating rebates, and other Frequently Asked Questions. Considerations for a training include topics that resonate, presenters, attendee invitations, meeting location and timing, and material needs.

#### Collaborate with Existing Workforce Efforts

Local governments are important collaborators and connectors for existing workforce development programs. Connect with energy utilities, trade unions, education institutions and K-12 schools, and social service organizations to understand what workforce development may already be underway in your region, particularly those around clean energy.

#### Partners in Energy Network Resource: Workforce Development Collaboration Toolkit

The [Workforce Development Collaboration Toolkit](#) identifies strategies for communities to promote and retain a qualified workforce. Understand national trends, workforce challenges, and how to address workforce gaps through collaboration.

#### Minnesota Air Source Heat Pump Collaborative

The [Minnesota Air Source Heat Pump \(ASHP\) Collaborative](#) is a joint effort to promote ASHP adoption across Minnesota through collaborative partnerships with utilities, installers, manufacturers, and distributors. The Collaborative's website includes resources for homeowners and contractors, including a landing page with information on incentives and financing for ASHPs. The Collaborative also hosts a Preferred Contractor Network list that identifies contractors committed to quality heat pump installations and maintenance.



# RESOURCES

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# Resources

## PARTNERS IN ENERGY NETWORK

- [Advanced Grid Community Playbook](#): Identifies steps to educate and engage communities on the Advanced Grid Initiative, Xcel Energy's effort to build a smarter and more resilient energy grid to better serve customers.
- [IRA Resource Guide](#): Partners in Energy compiled IRA resources, including target audience, state-specific resources, and how to stack rebates.
- [New Construction and Redevelopment Toolkit](#): This includes more in-depth information on how communities can strategize to encourage or require more sustainable development. Toolkit includes strategies for permitting, development review, and policy development.
- [Workforce Development Toolkit](#): Offers ideas on how communities can provide underrepresented and disadvantaged groups with job training and resources in the energy industry, while also providing local businesses and residents with energy savings

## FEDERAL

- [Department of Energy Heat Pump Systems Energy Saver](#): This Energy Saver reviews the types of heat pumps available, how they work, how to select a heat pump, and common performance issues.
- [Department of Energy State and Community Energy Programs \(SCEP\)](#): The federal government offers grant funding and technical assistance to support states and local governments in advancing local clean energy, weatherization, and economic development work.
- [Department of Energy Weatherization Energy Saver](#): This Energy Saver page reviews the basics of home weatherization, including home assessments, air sealing, insulation, moisture control, and ventilation.
- [Energy Efficiency and Renewable Energy \(EERE\) Electrification Planning and Funding](#): This table summarizes major Bipartisan Infrastructure Law programs that assist states in their electrification efforts.
- [ENERGY STAR Federal Tax Credits](#): This page summarizes federal tax credits and incentives for energy efficiency because of the Inflation Reduction Act, including savings for homeowners, home builders, and commercial building owners.
- [IRS Inflation Reduction Act Credits and Deductions](#): The Inflation Reduction Act updated a wide variety of tax laws, including changes that will be implemented over the next 10 years. This webpage includes recent news, tax law changes, and ready-to-use articles.
  - [2022 Credits and Deductions](#)

## COLORADO

- [Beneficial Electrification in Colorado Market Potential 2021-2030](#): The Colorado Energy Office estimates the potential for beneficial electrification in Colorado during this timeframe in addition to the estimated GHG reductions anticipated.
- [C-PACE](#): Facilitates financing via a public-private partnership for energy efficiency retrofits for new construction.
- [Love Electric](#): The rebates page has specific offerings listed by local electric utilities in Colorado for heat pumps. The website is managed by the Beneficial Electrification League of Colorado.
- [Xcel Energy Business Rebates](#): Xcel Energy offers rebates for efficient building and equipment upgrades. This ranges from whole building energy audits to rebates for HVAC+R upgrades.
- [Xcel Energy Residential Rebates](#): Xcel Energy offers rebates for efficient building and equipment upgrades. This ranges from home energy audits and rebates for insulation and air sealing to rebates for air source heat pumps.

## MINNESOTA

- [Electrify Everything MN](#): Electrify Everything offers technical and outreach support to the supporting cities for residential building electrification. The program is supported by the Minnesota cities of Eden Prairie, Edina, St. Louis Park, and Minneapolis and administered by Center for Energy and Environment.
- [Grid Resilience State and Tribal Formula Grants in Minnesota](#): Describes the competitive selection process held by the State of Minnesota to identify projects for \$12 million in federal funding.
- [Minnesota Air Source Heat Pump \(ASHP\) Collaborative](#): The ASHP Collaborative's website includes resources for homeowners and contractors, including a landing page with information on incentives and financing for ASHPs. The Collaborative also hosts a Preferred Contractor Network list identifying contractors committed to quality heat pump installations and maintenance.
- [Minnesota Department of Commerce, Energy Office](#): The Department of Commerce administers programs to help Minnesotans save money and energy, get assistance to pay their utility bills and transition to renewable energy.
  - The rollout process for new energy programs passed by the 2023 Minnesota Legislature will take some time and not all programs will be launched at once. Information and guidance for these programs will be posted on the [New Energy Programs](#) webpage.
- [Minnesota PACE](#): Managed by the Saint Paul Port Authority, Minnesota PACE financing allows commercial property owners to invest in energy-saving projects to make their buildings more efficient and resilient.
- [Xcel Energy Business Rebates](#): Xcel Energy offers rebates for efficient building and equipment upgrades. This ranges from whole building energy audits to rebates for HVAC+R upgrades.

- [Beneficial Electrification League](#): This nonprofit has resources and events across the country focused on electrification.
- [EESI Beneficial Electrification Access Clean Energy Savings Program](#): EESI offers beneficial electrification “mini assessments” to municipal utilities and other stakeholders.



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