BETTER HEAT

Steps to a Cheaper, Cleaner Way to Heat Our Homes in Chicago

Produced by the
Citizens Utility Board (CUB)
of Illinois

Contents

An Unacceptable Status Quo

Building electrification—replacing fossil-fueled equipment like furnaces and natural gas stoves with their electric counterparts—is a topic that's been gaining traction around the country, but here in Chicago a perfect storm of factors has made the quest for affordable alternatives to gas particularly urgent. We must not only dramatically reduce carbon emissions, but we face out of control gas utility bills and rising gas commodity costs. Switching to electricity to run your home means that your energy can come from clean and more affordable sources like solar or wind, instead of fossil fuels. It can also improve indoor air quality and help protect you from high gas costs.

Recurring spikes in gas prices combined with years of aggressive spending by the local gas utility, Peoples Gas, have created a heating affordability crisis in Chicago. "The bill gets bigger and bigger," one Peoples Gas customer wrote CUB. "I can't afford to pay at the rate they are raising it and can't stay in my house with no heat...This is outrageous and unacceptable."

Gas service is unaffordable when nearly one in five Chicago gas customers are consistently more than a month behind on their bills—and the energy burden is likely to get worse. A pipeline replacement program funded on the backs of Peoples Gas customers is billions of dollars over-budget and years behind schedule. In fact, years from now, when this massively expensive project is scheduled to be finally completed, gas is likely to be an obsolete heating source because of its cost and harmful climate effects. High gas bills present a crisis for many low-income families, but it also raises all customers' bills when the gas utility recovers "uncollectibles" by raising rates. In short, gas is unsustainable from both an affordability and environmental perspective.

The City of Chicago has already released a plan for transitioning buildings from gas to electricity. As a consumer advocate, CUB will do everything it can to help Chicagoans and local leaders plan for this significant transition to cheaper, cleaner electrified forms of heating.

With this guide, we hope to demystify the steps to building electrification and offer a handy resource for Chicago residents seeking to stop using fossil gas in their homes to save money, be more healthy and cut their carbon emissions.

Why Kick Fossil Fuels Out of Your Home?

About 80% of Chicago homes heat with gas, and we pay a steep price for that dependence. As your gas-fired appliances near the end of their lives, electrification is a great opportunity to reduce your energy bills, protect your health and do your part to fight climate change. Here in Chicago, there is a good argument for switching out fossil-fueled appliances for electric ones, even if there is still life in those old appliances—but the upfront costs can be daunting. Thankfully, recently passed state and federal laws are helping consumers overcome those cost hurdles. We'll talk more about that below. Now, however, let's dive into some of the reasons why building electrification makes sense.

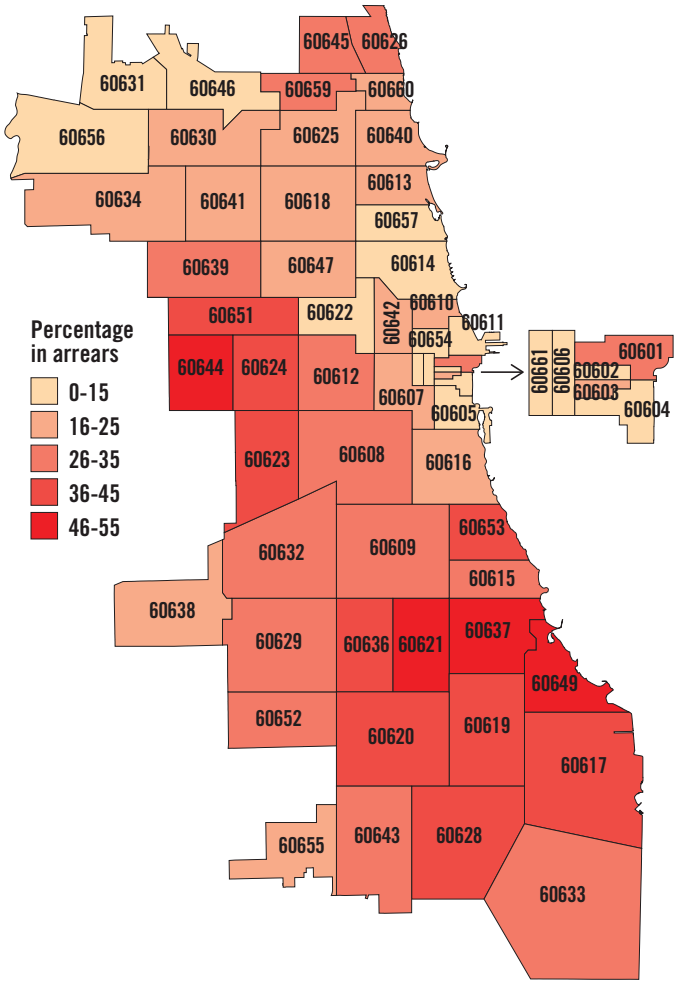
Gas is bad for our bottom lines

In Chicago, spiraling fossil gas costs have already created an unaffordable situation for a large segment of the city's population. Plagued by ongoing mismanagement, the pipeline-replacement program being conducted by Peoples Gas (Chicago's gas distribution utility) is a failure from both a political and economic point of view. One review showed projected pipe-replacement costs have risen alarmingly, from about $2 billion to $11 billion, and an analysis by the Illinois Attorney General's office estimated that gas bills could double over the next 15 years, raising the already high fixed charge of about $40 a month to an astonishing $80 a month, before any gas is actually used. Adding to this burden, the price of gas has soared in recent years (see Figure 2).

The impact is devastating for Chicago residents. In September 2022, nearly one in five (18.5%) of the city's gas customers were more than 30 days past due on their gas bills, and nearly one in three (28.4%) had been assessed late fees. Lower-income and Environmental Justice neighborhoods are the hardest hit. In the South Side neighborhood of Englewood, for example, the numbers indicate that about half of the customers are on the brink of disconnection. The average amount owed by Peoples Gas customers behind in their bills is disturbing—$621 on average—across the city, but it's even worse in Englewood: $900. These numbers are likely to get worse in colder months when gas use significantly increases.

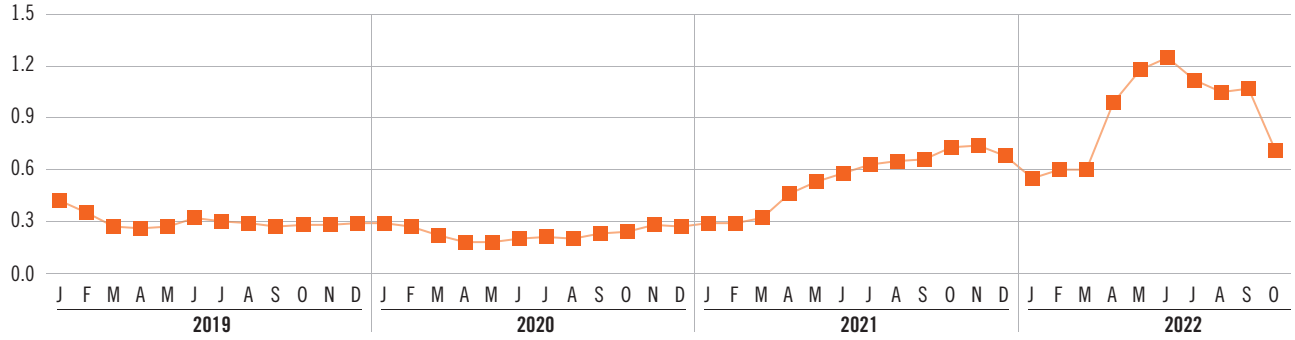
Allowing this situation to continue raises the very real possibility of a utility "death spiral," where customers

Figure 1: Percentage of residential Peoples Gas customers assessed late fees in October 2022, by ZIP code.



Source: PGL Credit, Collections, and Arrearage Report filed with the Illinois Commerce Commission

Figure 2: Peoples Gas supply prices per therm over time.



Source: Illinois Commerce Commission (ICC) tariffs

who can afford to electrify their homes leave Peoples Gas, forcing lower-income customers to shoulder the growing costs of maintaining the system. Eventually there's nobody left to pay the ever-increasing bills except those who can least afford it.

Gas is bad for our health

There is mounting evidence that cooking with gas produces high levels of pollutants that threaten our health. Sustainability think tank RMI found that burning a gas stove for one hour can produce nitrogen dioxide levels that exceed indoor guidelines as well as national standards for outdoor air quality.

Also, RMI linked the typical use of gas stoves to a 42% increase in rates of childhood asthma and a wide variety of additional health problems, including learning deficits, changed lung function and cardiovascular effects. All of this means that electrifying our homes can better protect the health of occupants, especially those most susceptible to pollution-related harm.

Gas is bad for our planet

The United Nations' Intergovernmental Panel on Climate Change warns that we have to act now to prevent the most catastrophic and expensive consequences of climate change. It's impossible to effectively fight climate change if most homes burn fossil fuels—especially in Chicago, where the City estimates that nearly 70% of its carbon emissions come from the burning of gas in buildings. And unburned gas, which can leak from the gas system, consists primarily of methane, a greenhouse gas 20 times more powerful than carbon dioxide.

Pollutants associated with gas stoves

Particulate Matter (PM2.5): Although cooking food emits PM2.5 regardless of whether your stove is electric or gas, gas flames emit particulate matter even when not cooking, and tests show PM2.5 emissions from gas stoves can be two times higher than from electric stoves.

Nitrogen Oxides (NOx): When nitrogen and oxygen react to each other, especially at high temperatures, they produce several toxic gases. NO2 and NO are the principal gases associated with combustion sources (collectively known as NOx). Exposure to elevated levels of NOx can cause severe respiratory illness in humans, especially children.

Carbon Monoxide (CO): An odorless, colorless gas responsible for hundreds of deaths per year. A 2011-2013 study found that gas stoves can substantially increase the risk of elevated CO in the home.

Formaldehyde (CH2O or HCHO): A known human carcinogen. Exposures at levels that occur in homes have been associated with human health impacts such as lower respiratory infections. A new test of one gas stove shows that simmering on low heat for multiple hours can produce significant exposure if ventilation is not used.

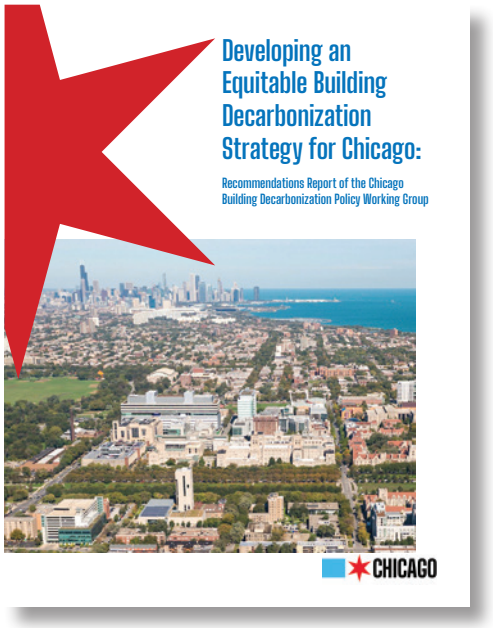
Methane (CH4): The gas we use to cook our food and heat our homes consists primarily of methane, itself a potent greenhouse gas. Methane is also the primary contributor to ground-level ozone, a hazardous air pollutant.

Source: RMI

How Do We Assure a Fair, Equitable Transition?

The Climate and Equitable Jobs Act (CEJA) establishes a path for Illinois to reach a 100% carbon-free power sector by 2045. As the state incorporates more renewables to meet this goal, building electrification becomes a way to utilize those renewable resources connected to the electric grid. But we have a lot of work to do. RMI found that 10 states account for nearly 60% of greenhouse gas emissions from buildings—and **Illinois ranks third**.

Nearly 70% of Chicago's total greenhouse gas emissions comes from buildings, but the **City** has taken a big step in the right direction. In October 2022, it released a report by the Chicago Building Decarbonization Working Group (CBDWG), which included 53 technical experts, civic leaders and members of the community. Their report on how to solve the problem of carbon pollution caused by buildings followed months of research on best practices in a dozen North American cities.



The group focused on 1) existing buildings; 2) new construction; and 3) financial and technical assistance. It identified policies and actions to:

- Equitably advance decarbonization for all residents and businesses, particularly people in lower-income communities.
- Drastically cut fossil fuel use and establish high efficiency standards for new construction.
- Improve building energy use with energy retrofits, increased renewable energy and electrification.
- Identify financial and technical support and resources to ensure the successful decarbonization of Chicago's building stock.

Following the lead of the working group, CUB outlined certain considerations that need to be at the forefront in order to protect customers and allow for an equitable transition, as heat pump technology and building electrification expand.

No new gas investments

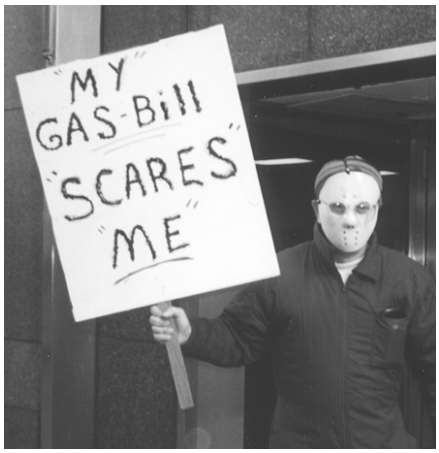
Spending should support carbon-free alternatives to gas such as weatherization and electric heat pumps. Any further spending on gas infrastructure should focus on safety and leak-reduction needs rather than replacing or building out the unaffordable and increasingly obsolete gas system. Utility customers should not be made to shoulder the cost of new infrastructure that is incompatible with climate change goals.

Stop building new gas-fueled homes and businesses

RMI found that constructing new, all-electric homes in four U.S. cities, including Chicago, reduces the homeowner's space- and water-heating costs over the lifetime of the appliances, compared with the same functions for fossil fuels. Constructing new all-electric homes avoids the costs of building out gas mains, services, and meters that are ultimately foisted on consumers.

Stronger building efficiency standards for municipalities

Illinois law calls for the development of a "stretch energy code," which will allow for individual municipalities to require a higher level of energy efficiency in buildings than the standard energy code, and the process of implementing this is currently underway. Advocating for more stringent efficiency codes at the local level can help make our buildings more efficient and affordable to operate.



Protect the most vulnerable customers in this transition

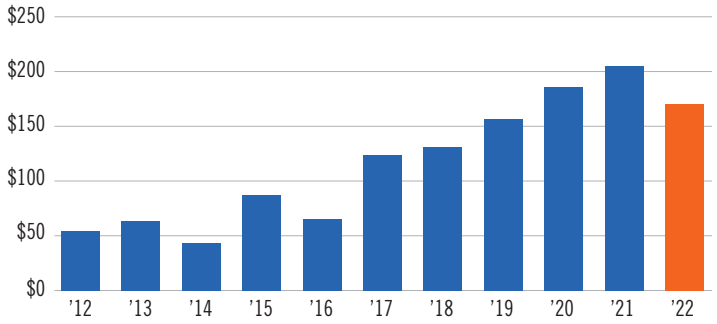
As more people "cut the pipe" and disconnect from gas completely, energy policy must protect the rights and well-being of remaining gas utility customers who don't yet have the means to transition to cleaner, more affordable heating options. Under conventional utility regulation, the cost to operate and maintain the gas system is split among customers via the charges on their gas bills. As electrification advances, these gas costs will be spread over fewer customers, forcing the most vulnerable consumers–lower-to-moderate-income households who can't afford to electrify and renters whose landlords control the heat system–to pay higher gas bills.

Gas customers who face a financial barrier to electrification will need assistance in order to shield them from the rising cost of gas. Also, it's important that we do everything possible to break down those barriers with programs that help offset the upfront costs of electrifying a home, especially for lower and moderate income customers. Beyond that, we must develop programs to benefit households once they electrify. This could include special electric space heat rates—a benefit electric customers used to enjoy in Illinois—and new smart rate designs. Nobody should get left behind in the clean energy future.

Energy policy must prioritize equity

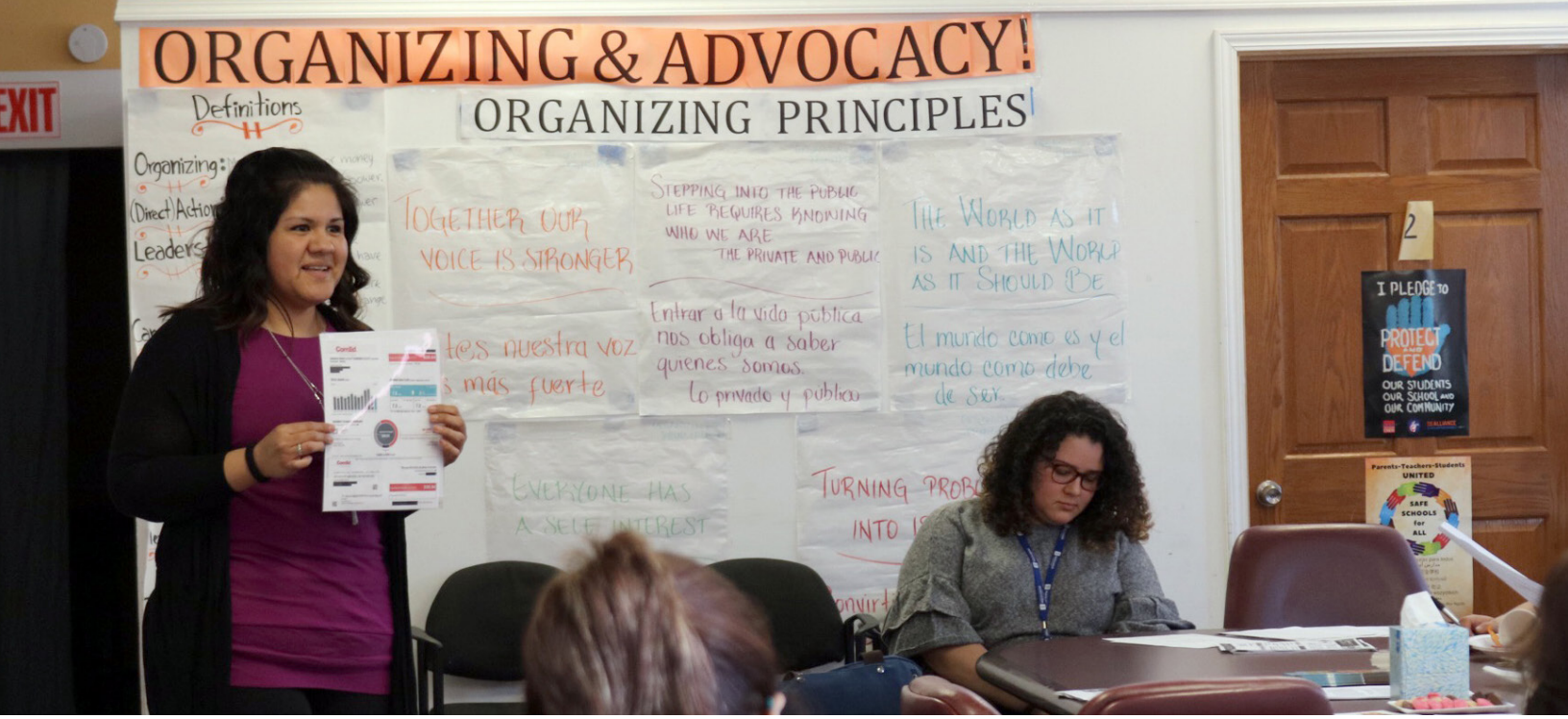
Beyond reducing carbon emissions, building electrification can also benefit communities that have suffered from a lack of good jobs and historically borne more than their fair share of pollution and energy burdens. An equitable transition must include support for necessary home investments and upfront costs of lower-to-moderate-income households.

Figure 3: Peoples Gas annual profits (in millions, through September 2022).



Source: PIRG, Crain's Chicago Business

CEJA allows utilities to include building electrification measures in their energy efficiency programs for income-qualified customers. This means that Illinois' electric utilities may start to offer and promote electrification programs, provided that they reduce the total energy consumption at the premises and provide bill savings. Under CEJA, 25% of energy savings claimed by electric investor-owned utilities must come from lower-income customers, but we can't stop there. Policies that prioritize underserved communities are vital to equitable electrification.



Community engagement is a must

Community engagement—neighborhood meetings, canvassing, and other outreach strategies in partnership with communities—helps to educate consumers about building electrification and funding opportunities, but it can also educate advocates and policymakers on the barriers preventing people from electrifying their homes. Engagement can identify a community's needs and priorities, and thus strengthen the design and delivery of programs where they are most needed.

Eliminating gas from our buildings requires proper policy and planning

This will ensure the transition doesn't leave anyone with higher bills—especially people with lower and fixed incomes who are already battered by high heating costs and don't have the means to immediately go all electric. This complexity, coupled with the urgency of climate change, is why we need to begin planning now on the federal, state and local levels. Fortunately, we've already made progress.

Federal and state: Building electrification becomes more effective as our sources of electricity get cleaner, and Illinois is already taking steps to achieve this: The historic Climate and Equitable Jobs Act (CEJA) of 2021 aims for Illinois to reach 100% clean energy by 2045. More recently, the federal government's Inflation Reduction Act (IRA) increased incentives for energy efficiency and electrification. Both of these clean energy policy breakthroughs open the door for decisive local action.

Local: The **City's Building Decarbonization Working Group recently released a report** that listed 26 strategies to help Chicago reach its goal to reduce carbon emissions by 62% by 2040. The next step is for the Chicago City Council to pass a clean buildings plan that protects customers who are suffering the most from high heating bills while beginning the process of transitioning the entire heating sector from gas to high-efficiency electricity over the next few decades. (**Urge your alder to take action**.)

Beyond advocating for better policy, individuals can do a lot in their own homes. We'll discuss those steps in the next section.

Electrification: Getting Started

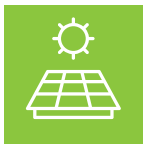
For the average consumer, electrification means replacing your gas stove with an electric or induction model; buying an electric water heater; replacing your gas clothes dryer; and switching out your gas furnace or boiler with a highly efficient electric heat pump. These measures can take different forms for different households—for example, some may opt for a heat pump water heater while others choose a solar water heater. Some households may want to "cut the pipe" from gas service altogether while others decide to keep it, at least temporarily, as a backup. However you slice it, these are significant household changes that require thoughtful planning— electrification doesn't happen overnight. Let's take it step by step.

1. COMPLETE YOUR CHECKLIST OF ENERGY EFFICIENCY UPGRADES

The most thorough method of creating a personalized checklist of energy efficiency upgrades for your home is through a home energy audit, which is offered by local contractors. The cost of an audit may be partially covered by federal or utility company incentives. Making your home as energy efficient as possible will maximize savings before you switch from gas. Plus, it'll help when the time comes to purchase a heat pump: An energy efficient home may require a smaller, less expensive pump. (The formula that helps determine the appropriate size of a heat pump includes how much insulation your home has, for example.) See Appendix I for a checklist of energy efficiency upgrades.

2. MANAGE YOUR ENERGY USE

A key part to saving money while promoting a cleaner energy system is not just paying attention to how much energy you use, but also *when* you use it. Thanks to smart upgrades to the power grid, Illinoisans can now access programs that save you money if you can put off the bulk of your electricity usage to times when electricity demand is lower. By reducing peak electricity demand, these "demand response" programs, including ComEd's Hourly Pricing and Peak Time Savings **programs**, help make the grid cleaner and more reliable, and they can help you save money.



3. USE MORE RENEWABLE ENERGY

The electricity flowing into our homes comes from a number of sources—from the cleanest (wind and solar) to the dirtiest (coal and gas)—at any given moment. Thanks to strong Illinois policy, such as the Future Energy Jobs Act and the Climate and Equitable Jobs Act, renewable energy has become much more accessible. For example, there are now strong incentives available to install solar panels on your property. If you can't install panels—maybe you don't have enough sun, or you don't own your roof—then consider Illinois' community solar program, which allows all customers to benefit from solar energy. Learn more at CUB's **Clean Energy page**. Note also that many alternative electricity suppliers sell plans which they claim allow you to support wind and solar power. But often those plans are overpriced and associated with out-of-state renewable energy projects that were already built long ago. Buyer beware!

4. CONSIDER SWITCHING FROM GAS TO ELECTRIC APPLIANCES

Once you've worked on steps 1-3, you can begin to consider making the switch from gas to cleaner, cheaper ways to serve your home. The next section discusses a number of appliances, including a new generation of electric heat pumps to cool and heat your household.

Alternatives to Fossil-Fueled Appliances: Heat Pumps

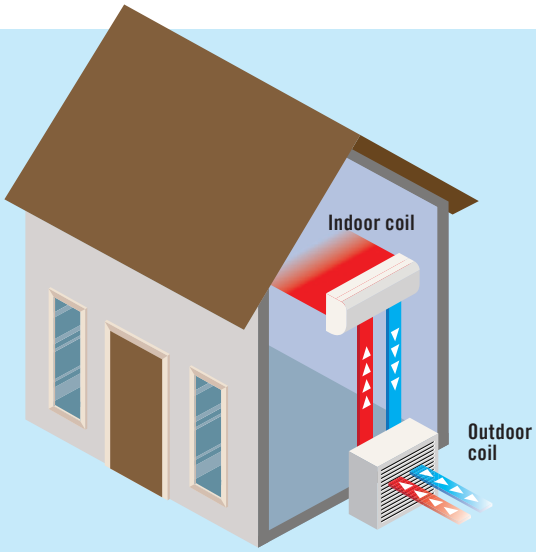
Heat pumps can be 50% to 60% more efficient than a traditional furnace or boiler, and can dramatically reduce energy use. When paired with energy efficiency upgrades like insulation and air sealing, switching to a heat pump may help lower your overall energy bills. In 2021, **CUB's research team released a study** showing Chicago homeowners could enjoy lifetime savings of about $25,000 to $50,000 by switching their homes from gas to electric heat pumps. More recently, an analysis by the **Natural Resources Defense Council (NRDC)** found that Chicagoans could save roughly $11,000 to $13,000 over 20 years by switching from gas to efficient electric heat and appliances. Lower-income and moderate-income households could see thousands more in additional cost-savings, thanks to the availability of incentives and rebates for electrification and efficiency.

For households that don't already have central air conditioning, installing heat pumps can be more economic than purchasing and installing an air conditioner in addition to a furnace or boiler, since heat pumps take care of heating and cooling in one system. RMI found that all-electric homes with heat pumps are overall cheaper investments compared to households that rely upon a mix of electricity and gas for heating and cooling. Analyzing all-electric options in Minneapolis, which is even colder than Chicago, RMI found that all-electric households are less expensive to construct, and have consistently lower maintenance costs than those with gas furnaces and appliances.

As long as our sources of electricity are getting cleaner, electric heat pumps are also better for the environment than their fossil-fueled counterparts. Illinois law puts our state on track to achieve 100% clean, carbon-free electricity by 2045. The nonprofits **RMI and Elevate** identified heat pumps as a key part of our statewide efficiency and carbon-reduction goals. In fact, they show that by electrifying 500,000 households (including the use of heat pumps), Illinois can avoid up to 28 million metric tons of carbon emissions by 2050. That is the equivalent of taking 225,000 gas-guzzling cars off the road.

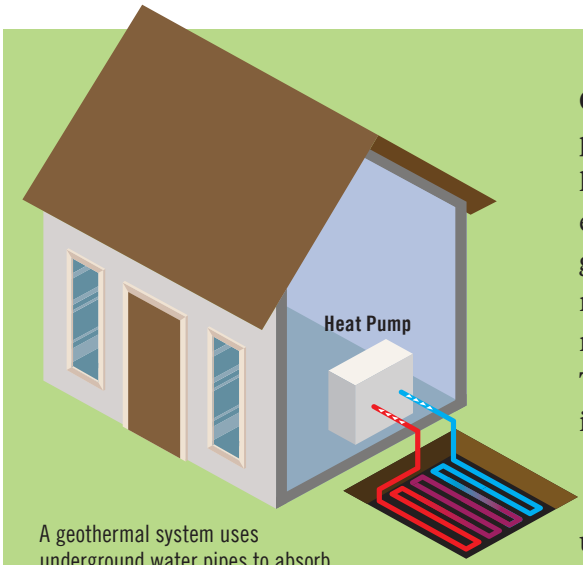
How do heat pumps work?

Heat pump systems are gaining popularity as a money-saving and environmentally friendly alternative to fossil fuel-based heating and cooling systems. A traditional gas furnace heats a home by burning fossil fuels (gas or propane). An electric furnace blows air over a hot element (similar to a hairdryer). But a heat pump is different. Acting like an air conditioner that can also operate in reverse, a heat pump uses electricity to transfer heat, and by doing so can both heat your home in the winter and cool you in the summer. These devices are more economical than their traditional counterparts because they simply move heat, rather than producing their own warm air. Heat pump systems come in two principal types:



An air source heat pump uses an outdoor coil, compressor and an indoor coil to transfer heat from the outside air to the inside. (In the summer, the process is reversed.)

Air source heat pumps: These devices transfer heat between the outside air and the air inside your home. Compared to a traditional electric furnace or radiator heating, air source heat pumps can save you a significant amount of money, especially when combined with other efficiency measures (insulation and air sealing), and many are capable of dehumidifying homes better than standard air conditioning systems. While traditional heat pumps use the ductwork already installed in many homes, mini-split heat pumps can operate in homes without ducts. A question we often get is: "But how can a heat pump transfer heat from outside into your home when it's cold outside?" Actually, the air outside still contains heat, even when the temperature feels very cold. The refrigerant in a heat pump will still be able to absorb that heat and bring it inside.



A geothermal system uses underground water pipes to absorb the earth's heat—the temperature is consistent year-round—and transfer that warmth into a home. (In the summer, the process is reversed.)

Geothermal (ground-source) heat pumps: These pumps can achieve even better efficiency by transferring heat between your home and the ground. Though more expensive upfront than their air-source counterparts, geothermal heat pumps are more efficient and have low maintenance costs since they take advantage of the relatively stable temperature several feet underground. They also are tied into your water heating, further increasing energy efficiency and saving homeowners from having to maintain and replace a separate water heating system. Overall, Geothermal pumps can reduce energy use for heating and cooling by 30% to 60% and save homeowners more money long-term than any other method of cooling and heating homes.

Can heat pumps work in cold climates?

One of the most common misconceptions about heat pumps is the idea that they do not adequately work in cold-weather conditions, and therefore are not a viable option in regions like the Midwest.

Due to technology upgrades, many leading models are now capable of operating at temperatures of -10 degrees F or colder. (The average winter temperature in Chicago is about 28 degrees.) Since the development of **variable speed inverter-driven Indoor coil** and other improvements, heat pumps have passed field tests in northern Minnesota and the Arctic Circle. In Norway, which has an average winter temperature of about 20 degrees F, one in four people use heat pumps.

What are the financial incentives for installing a heat pump?

Now is a good time to install a heat pump. The Inflation Reduction Act has created incentives for heat pumps that can be combined with existing utility company rebates.

Geothermal (Ground-source) Heat Pump: There is a 30% federal renewable energy tax credit for the total cost of installation. This tax credit is uncapped and it can be spread over multiple tax years. There is an additional $2,000 efficiency tax credit for heat pumps.

Some electric utilities also offer incentives for consumers who install geothermal systems. For instance, **ComEd offers a rebate of up to $6,000**, depending on the size of the system, for eligible customers.

With the federal tax credits and utility rebates, the final cost of a geothermal system isn't that much greater than a conventional heating and cooling system. Studies show that geothermal installations will pay for themselves in energy savings in about four to six years. Such systems also typically last much longer than other heating and cooling systems, since they contain no outdoor parts. The heat pump portion of the installation is indoors, while the loop field heat exchanger is buried in the ground. Geothermal systems typically last 25 years and loop field heat exchangers are guaranteed for 50 years.

Air Source Heat Pump: In addition to the $2,000 home efficiency tax credit for heat pumps, there also is an $8,000 electrification rebate for income eligible homeowners (details on eligibility below). There also are utility company discounts and rebates available.

A consumer purchasing a $15,000 heat pump can make deep cuts in the price tag—after the $8,000 rebate, $2,000 credit, and $2,000 discount from ComEd.

Inflation Reduction Act Rebate Eligibility: Beginning in 2023, consumers with income below 80% of the Area Median Income (AMI) can claim an electrification rebate covering the full cost of electrical appliances, up to a $14,000 cap. Consumers with income below 150% of the AMI can get 50% off the cost of appliances, up to $14,000. (**Learn how to find your AMI**.)

WARNING: Please verify that the system you are considering qualifies for these rebates. Also, carefully read utility company offers and check with your tax consultant prior to purchasing any heat pump to verify that you are eligible for the rebates and tax credits.

SELECTING A TYPE

AIR-SOURCE

✓ The most popular and affordable option. Does not have the same space requirements as a geothermal heat pump.

✗ Not as efficient as geothermal.

SPLIT-DUCTLESS

✓ Requires minimal construction. Great option for single-room additions or homes without ductwork.

✗ Oversized or incorrectly located air handlers can cause "short cycling," which wastes energy and poorly maintains temperature and/or humidity control.

GEOTHERMAL (GROUND-SOURCE)

✓ Long lasting, requiring little maintenance, and effective in extreme climates. Also replaces and serves as your water heater.

✗ This is the most expensive upfront option and not practical for small lots, certain subsoils or landscaping conditions.

FINDING A CONTRACTOR

✓ **ComEd** offers rebates on Air Source Heat Pumps and maintains a **list** of contractors participating in their program offerings. This can be a good place to start, although it's still a good idea to confirm if contractors have experience installing cold climate air source heat pumps.

✓ Compare as many contractor options as possible (at least three). Before choosing an installer, check the **Better Business Bureau** website to find complaints regarding contractor service and installation. (CUB does not endorse any contractor or manufacturer.)

✓ If you have a heat pump manufacturer in mind, check their website. Many manufacturers (**Mitsubishi**, **Carrier**, **Daikin**, **LG**, **Trane**, etc) maintain lists of qualified contractors on their websites.

PAY ATTENTION TO THE DETAILS

✓ Base your heat pump size on a recommendation from a heating and cooling professional. Proper installation by a professional will help reduce problems and increase savings.

✓ If your heat pump is the wrong size, it won't heat or cool effectively and may increase your energy bills.

✓ A heating and cooling professional should use an **Air Conditioning Contractors of America Manual J** to calculate the right size, considering your home's foundation, wall thicknesses, insulation values, windows and air filtration.

✓ Research special features that may be important to your needs. For example, check for compatibility with a smart or programmable thermostat to adjust the temperature as needed.

✓ Variable speed fans keep the air moving at a comfortable velocity, minimizing cool drafts and maximizing savings.

✓ Zone control systems, often found in larger homes, use automatic dampers to allow the heat pump to keep different rooms at different temperatures.

✓ Look for the Energy Star label for a heat pump you're considering, and read the energy efficiency rating.

✓ Cooling efficiency is measured by SEER (Seasonal Energy Efficiency Ratio).

✓ Heating efficiency is measured by HSPF (Heating Seasonal Performance Factor).

✓ You should consider buying a heat pump that is at least 15 SEER and 8.5 HSPF. The most efficient heat pumps are 18 to 27.5 SEER and 8.5 to 12.5 HSPF.

Alternatives to Fossil-Fueled Appliances: Heat Pump Water Heaters

Energy Star estimates that heat pump water heaters use 70% less energy and can save a family of four an average of more than $300 a year. **Note:** If you are planning on installing a geothermal heat pump, you will not need to purchase a separate system to heat your water.

Cost

An Internet review found Energy Star models ranging from about $1,800 to $3,700.

Incentives

Heat pump water heaters qualify for a $2,000 home efficiency tax credit and a $1,750 electrification rebate for income-eligible homeowners. There also are incentives from utility companies.

Helpful resources

- Energy Star's Rebate Finder
- Database of State Incentives for Renewables and Efficiency
- ComEd's Energy Efficiency Programs
- ComEd's Marketplace
- Rewiring America's Inflation Reduction Act calculator.

What you should know

- Find out what capacity you will need for your new water heater. For starters, check out the nameplate or the yellow Energy Guide sticker on your current water heater to determine the capacity or volume. Then discuss the sizing of the new unit with your contractor or retail salesperson.
- This Energy Star tool can help you find retailers and installers in your ZIP code. Get cost estimates in writing. Find a contractor who understands building codes/regulations and if you will need any permits to do the installation.
- Look for an Energy Star-certified unit, and those that meet the Northern Climate Efficiency Specification developed by the Northwest Energy Efficiency Alliance (NEEA).
- These water heaters work best if installed in an interior space that remains 40-90 degrees Fahrenheit year-round, and provides 1,000 cubic feet of air space around the heater. A basement furnace room may be ideal.

Alternatives to Fossil-Fueled Appliances: Induction Stovetops

You can replace your traditional electric or gas stove with an induction stovetop, which uses magnetic coils below a surface of ceramic glass. **Energy Star** estimates these are about 5-10% more efficient than conventional electric cooktops and three times more efficient than gas models. "There's this big misconception that electric ranges don't cook as well as gas," says Shanika Whitehurst, of **Consumer Reports**. "But the technology has improved to the point where electric and especially induction ranges and cooktops cook every bit as well, if not better than gas." (While the induction cooktops offer a new way of cooking, the ovens connected to these models operate the same as traditional electric models.) Induction ranges require compatible pots and pans—stainless steel over aluminum works best, and you can't use copper.

There are also environmental and health benefits. The Natural Resources Defense Council (NRDC) estimates that gas-burning appliances, including stoves, produce enough annual emissions in the United States to roughly equal the impact of emissions from a half-million cars.

Cost

An Internet review found models ranging from about $1,090 to $4,400.

Incentives

The Inflation Reduction Act (IRA) offers:

- A rebate of up to $840 on a new electric cooking appliance, depending on your income.
- Up to $500 more if you are converting to electric from gas or propane.
- Up to $2,500 rebate for electric wiring (depending on your income) if installing the stove requires some electric wiring. Also available is a federal tax credit of up to $4,000 for the expense of upgrading your electrical box to accommodate an electric range (or other efficient appliances too, such as electric heat pumps).

Helpful resources

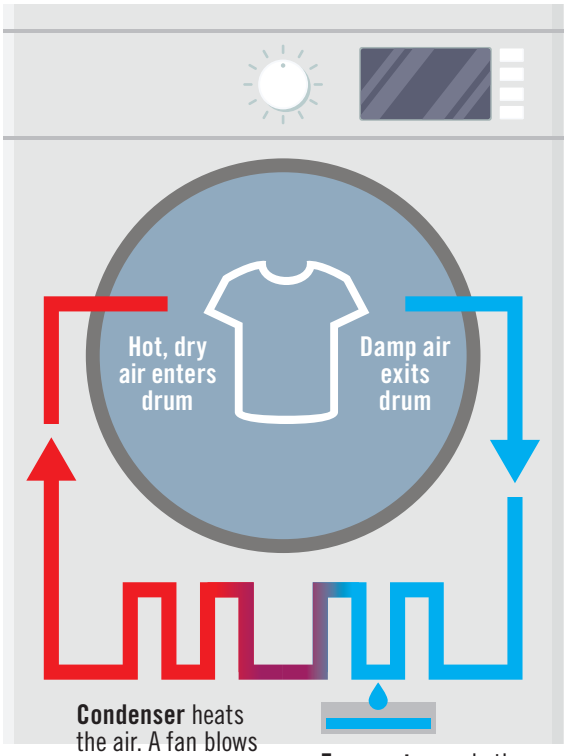
- **Energy Star's Rebate Finder**
- **Database of State Incentives for Renewables and Efficiency**
- **ComEd's Energy Efficiency Programs**
- **ComEd's Marketplace**
- **Rewiring America's Inflation Reduction Act calculator.**

What you should know

- Induction models heat up and cool down faster than more traditional electric and gas units. **Induction stovetops** keep your kitchen cooler and the ceramic top is easier to clean. The stovetops are safer—it's harder to burn yourself on the surface, and you avoid toxic and smelly gas in the air.
- Because they are so efficient, it may take awhile to get to know your induction stovetop and the correct settings for cooking.
- Induction stovetops only work with "magnetic" cookware. Most stainless steel, cast iron and other cookware are magnetic. Simple test: Any pot or pan that sticks to a fridge magnet will work.
- If the induction top doesn't sense magnetic cookware, the burner will shut down automatically to save energy. It's helpful to be familiar with this auto-shutoff feature in case you need to lift the pan off the heating element before you're done cooking.
- The base of the cookware should be at least as wide as the diameter of the magnetic coils, or the burner won't work. The stovetop should give you a warning (a beep and a flashing light, for example) if there's a mismatched burner.
- Switching from a traditional electric stove to an induction model most likely will not require an electrical upgrade, but the transition from a gas stove will. You may need a new outlet, and your electric panel may need more amperages.

Alternatives to Fossil-Fueled Appliances:
Heat Pump Dryers

If you decide to cut the gas pipe, you could go with a standard electric dryer or an even more efficient electric heat pump clothes dryer. Heat pump dryers, which use 30% less energy than conventional units, are closed-loop systems that recycle air and do not require a vent to the outside. They heat air by pulling it through a condenser and then sending it to the drum where it takes the moisture out of the clothes. The water is collected or drained as the damp air is pulled through an evaporator, and the loop starts over again.



Condenser heats the air. A fan blows hot, dry air into the drum.

Evaporator cools the air and removes moisture. The water is collected or drained.

Cost

An Internet review found conventional electric and heat pump models ranging from about $650 to $1,800.

Incentives

- The Inflation Reduction Act (IRA) offers a rebate of up to $840, depending on your income, off the purchase of an electric heat pump clothes dryer—if you're switching from a gas dryer.
- ComEd offers a $40 rebate for purchasing an electric clothes dryer.

Helpful resources

- **Energy Star's Rebate Finder**
- **Database of State Incentives for Renewables and Efficiency**
- **ComEd's Energy Efficiency Programs**
- **ComEd's Marketplace**
- **Rewiring America's Inflation Reduction Act calculator.**

What you should know

- Dryers typically last about a decade. Look for the Energy Star label for the most efficient electric models.
- Consider how much laundry you need to dry each week and the size of your laundry space when determining the size of your dryer.
- Look for models that have auto-settings that can save you time and energy, as well as sensors to detect when clothes are dry and automatically shut off the machine. Models that allow you to schedule the start of your dryer can be helpful if you're on **ComEd's Hourly Pricing** program and you want to schedule your drying for a time when electricity prices are low.
- A heat pump dryer may take longer to dry your clothes and collects moisture that then must be drained. Ideally, you would find a model with a hose extension that allows you to discharge water automatically through your home's drainage system. Otherwise, the water tank will have to be emptied after each load.

Electric Vehicles

While this guide focuses on actions you take inside your home, electrification also extends to the driveway, with the vehicle you choose. According to the Environmental Protection Agency (EPA), transportation is the largest contributor of greenhouse gas emissions in the United States. In Chicago, transportation accounts for about **24% of emissions**. Electric vehicles (EVs) are one more piece to the electrification puzzle, and, thanks to state and federal incentives, they are more affordable than ever.

- With passage of the Climate and Equitable Jobs Act (CEJA), Illinois has been offering a **$4,000 rebate** off the purchase of an electric vehicle.
- The federal Inflation Reduction Act (IRA) offers a tax credit of up to $4,000 for buying a used EV and up to $7,500 for a new one. **Environmental Defense Fund** says the credit will be offered directly through dealerships beginning in 2024 "and since some models already sell for less than $30,000 — it makes EVs cheaper than ever, especially when you consider that the average household spends hundreds of dollars per month on gasoline." For an in-depth overview of EVs, order **CUB's free Electric Vehicle Buyer's Handbook**.

Considerations

Like any significant home upgrade, electrification presents some challenges. It requires careful consideration of both the short-term costs and the long-term savings. Some things to keep in mind:

Electrical upgrades

Some homes will require a new electric panel or breaker box in order to go all-electric, and depending on the circumstances, this could cost hundreds, even thousands, of dollars. Over time, this is a worthwhile investment. Remember that a new **Inflation Reduction Act (IRA)** incentive means that homes transitioning to electricity could be eligible for a $4,000 rebate.

Finding a contractor

With a newer technology like heat pumps, it can be a challenge to find contractors with expertise in the devices. Look at our "Finding a contractor" section, and remember: It's a good idea to confirm if contractors have experience installing cold climate air source heat pumps.

The gas industry's PR campaign against electrification

The gas industry has reacted defensively to the electrification movement, because, obviously, this impacts their bottom line, and it has **even launched disinformation campaigns** that promote gas stoves. Many people are accustomed to cooking over a gas flame, but as this guide outlines, gas is expensive and dangerous to your health, and induction stovetops are great for cooking.

Multi-unit buildings and renters

This guide focuses on homeowners, who have the most to gain immediately from building electrification. In Chicago, however, it is estimated that over half of dwelling units are renter-occupied. Finding electrification solutions that incentivize landlords to make the switch will be a challenge requiring thoughtful public policy.

Call to Action: An urgent need for policy and planning

The gas status quo is harmful to the environment and unsustainable for Chicago, but this challenge also poses an opportunity. Electrification of buildings will fight climate change, improve the air we breathe and eventually help stop skyrocketing energy costs. It also could give a boost to our local economy by creating jobs connected to electrification. These could include electricians, heating and air conditioning experts and other workers skilled at installing systems to replace gas heating.

Appendix I: Energy Efficiency Checklist

The first step in electrification is making your home as efficient as possible. Visit CUB's **Clean Energy page** for tips.

- ❑ Sign up for ComEd's free **Home Energy Assessment** program. The program installs LED bulbs, a programmable thermostat and other energy-saving products for free. Income-qualified customers can also get a free smart power strip and a smart thermostat.
- ❑ Use LED bulbs. Thanks to Illinois' strong energy efficiency policy, LEDs are offered with in-store discounts and many customers can get them for free through a Home Energy Assessment.
- ❑ Adjust your thermostat. In the winter, set it to 68 degrees when you're home and awake. In the summer, set it to 78 degrees. When you're asleep or away, bump it down or up, according to the season. The Energy Department says setting your thermostat back 7 to 10 degrees from its normal setting for 8 hours a day can save you up to 10% a year on heating and cooling costs.
- ❑ Clean/replace your furnace filters regularly.
- ❑ Phantom load is the energy burned on appliances that are plugged in but not in use. The Energy Department says 10% of your bill can be chalked up to devices not in use, such as a cellphone charger plugged into the wall but not charging a phone and a coffee pot that's not brewing but has indicator lights still burning. Regularly turn off and unplug appliances, and use a power strip for your entertainment center and/or computer system.
- ❑ Wash your clothes in cold water. Cut down on dryer use with a clothesline or drying rack. (If you use the dryer, make sure to clean the lint trap between loads.)
- ❑ Insulate your hot water pipes and hot water heater, and put the heater on the warm setting (120 degrees).
- ❑ Seal leaks by adding caulk around windows and weatherstripping around door frames. And seal the ductwork throughout your house.
- ❑ Buy a programmable or smart thermostat—making sure to get a model that can be compatible with a heat pump if you want to electrify. Such thermostats can save you 10% on your energy bills. Smart thermostats, which are free or discounted based on income eligibility from ComEd's Home Energy Assessment, are easily programmed to support energy saving.
- ❑ Check your wall and attic insulation. The U.S. Department of Energy warns that you could suffer significant heat loss through your home's attic if the insulation levels are less than the recommended minimum. If the insulation is even with or below the attic floor joists, it's time to add more.
- ❑ Get a home energy audit. Unlike the Home Energy Assessment mentioned above, a home energy audit is much more comprehensive. While they're not free, the federal Inflation Reduction Act (IRA) offers a $150 federal tax credit on such audits. This can be a worthwhile investment, because it pinpoints what parts of your home's heating and cooling system and building structure are inefficient. They also enable the auditor to determine what upgrades to your home will help you save the most energy and have the fastest payback period. You can find auditors through the Internet (the **Department of Energy** has solid information)—and through the recommendations of like-minded friends.
- ❑ Visit **ComEd's website** and check out what incentives or rebates are available for appliances, home improvements and other purchases. Purchasing a new, Energy Star-approved appliance is a big decision, but you should see substantial savings on your bill.

Appendix II: Key Resources

Elevate's blog on decarbonization: Serves as a primer on what building decarbonization is, the benefits, challenges, and the different components involved in Illinois.

Wirecutter, **A Heat Pump Might be Right for Your Home. Here's Everything to Know**: This article has tips for shopping for heat pumps.

Climate

Elevate's blog on heat pumps and Illinois climate goals: Goes over how heat pumps are a key component in reducing greenhouse gas emissions and actions the state should take toward electrification.

Affordability

Article and **report** by NRDC: The analysis found that Chicagoans participating in home electrification who switch to all-electric appliances by 2023 could save up to $1,445 on their energy bills in their first year of electrification. Single family homes can see long-term cost-savings of $13,300 and multi-family homes cost-savings of $11,000 over a 20-year period. Lower-income and moderate-income households could see thousands more in additional cost-savings, thanks to the availability of incentives and rebates for heat pumps and other electrification and efficiency measures provided through the Inflation Reduction Act.

CUB Study, Better Heat: The Economics of Residential Building Electrification in the City of Chicago: CUB's research team found that homeowners who switch from natural gas to a heat pump would enjoy lifetime savings ranging from $24,716 to $47,104.

RMI Report, **The Economics of Electrifying Buildings**: This study compares electric space and water heating to fossil fuels for both new construction and home retrofits under different electric rate structures in four cities (one being Chicago).

Health

RMI's Health Professional's Guide: A toolkit for health professionals and advocates to learn about the health impacts of fossil fuel combustion and the benefits of electrifying buildings. Includes four different fact sheets (**building electrification 101**, **a guide to clean cooking**, **high-risk groups and equity** and **education and advocacy**) and FAQs on air pollutants found in building emissions.

RMI's blog on indoor air pollution: Goes into the linkage between building emissions and indoor air quality.

Citizens Utility Board of Illinois
309 W. Washington, Suite 800
Chicago, IL 60606
www.CitizensUtilityBoard.org

Photo credits: (cover) iStockPhoto/Grzegorz Kieca; (page 1) CUB; (page 5) CUB; (page 6) CUB;
(page 8) iStockPhoto/Tatiana Dvoretskaya; (page 12) iStockPhoto/Matteo Girelli; (page 13) iStockPhoto/simpson33;
(page 16) Shutterstock/Hryshchyshen Serhii