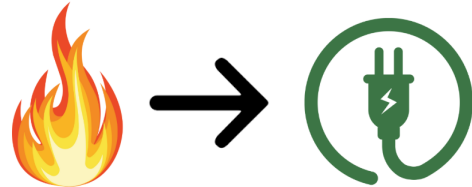




Make a Plan to Electrify Your Home

Roughly 75% percent of greenhouse gas emissions come from burning fossil fuels. To stabilize our climate, therefore, people will need to stop burning fossil fuels and power our lives with clean electricity.



We are not, however, asking everyone to electrify their homes this year. That isn't practically or financially feasible. It would crash the electric grid. And it wouldn't even be best for the climate.

Instead, we encourage you to *make a plan* to electrify your home. Figure out when it makes sense, for you, to replace each item in your home that uses fossil fuels. Write down your plan, put each item in your long-term calendar, and follow through when the time comes.

The goal of this document is to help you make a plan that will work well for you and your home. It has four sections:

1. What's in an All-Electric Home (p. 2)
2. How to Decide When to Install Heat Pumps (p. 4)
3. How to Decide When to Replace Other Appliances (p. 7)
4. Electric Panels and Electric Service (p. 8)

If you have questions about anything in this document, see the additional resources on the [Electrify Arlington website](#) and/or email Arlington's Energy Advocate at ElectrifyArlington@town.Arlington.ma.us.

1. What's in an All-Electric Home

1. Insulation and Air-Sealing. A home that has good weatherization – insulation and air sealing – will cost less to heat and cool, feel more comfortable, and produce fewer greenhouse gas emissions. Weatherizing an uninsulated home can reduce annual energy use/costs/emissions by up to 20%. If you aren't sure whether your home is fully insulated, getting a no-cost, no-commitment Mass Save[®] home energy assessment is the first step.

Arlington has partnered with HomeWorks Energy to provide home energy assessments and weatherization services. You can schedule an appointment at [HWE.Works/Arlington](https://www.hwe-works.com/arlington) or call 781-305-3319.

Mass Save will pay for 100% of the cost of recommended insulation in 2-4 family buildings, rental properties, and for low and moderate income households. Otherwise, it will pay for 75% of the cost of recommended insulation and 100% of recommended air sealing.

If you want to go beyond the Mass Save weatherization recommendations, a HERS (Home Energy Ratings System) rater can do a more in-depth evaluation of your home's energy use, recommend energy-efficiency measures, and estimate pay-off periods. Mass Save will not, however, help pay for these additional measures.

2. Heat Pumps. The biggest single energy user in any New England home is the heating system. An all-electric home is heated with either an air-source heat pump (ASHP) or a ground-source heat pump (GSHP), both of which also provide high-quality AC in the summer. The new cold-climate heat pumps are very efficient and maintain their heating capacity in sub-zero temperatures, so it's perfectly possible to heat a New England home with just a heat pump, if it's properly chosen and sized. (In Norway, 60% of homes are heated by ASHPs.) GSHPs are more efficient and last for 50+ years, but their up-front costs are a lot higher than ASHPs and the installation process is disruptive. Most all-electric homes therefore have ASHPs. Learn more about [GSHPs](#) and [ASHPs](#).

3. Electric or Solar Water Heater. Water heating uses more energy than most people realize – often 15-20% of a home's total energy use. Heat pump water heaters and thermal solar panels are the most energy-efficient ways to heat water, but they aren't the best solutions for every situation and there are other good options. Learn more about [water heater options](#).

4. Induction Stove or Conventional Electric Stove. Public health researchers are increasingly concerned about gas stoves, especially for young children, older people, and anyone with respiratory issues. Most people who like gas stoves also like induction stoves, which heat up quickly and provide fine-tuned control, but are safer than gas stoves

and don't heat up your kitchen in the summer. Conventional electric stoves are only 5-10% less efficient than induction stoves, so if you have a conventional electric stove and like it, that's perfectly fine from the planet's point of view. Learn more about [induction stoves](#).

5. Heat Pump Clothes Dryer or Conventional Electric Clothes Dryer (optional). A heat pump clothes dryer is more than twice as efficient than a conventional electric dryer. Also, it doesn't exhaust air outside the home, so it doesn't pull cold air from outside into your home – an indirect but important energy savings. Of course, drying clothes on a hanger or clothesline takes even less energy, and it helps clothes last longer too. Learn more about [heat pump clothes dryers](#).

6. Electric Vehicle Charger (optional). If you think you might ever want to charge an EV at home, include an EV charger in your planning. A Level 1 EV charger plugs into an ordinary 120V wall outlet and adds about 4 miles per hour to an EV battery, which can be fine for overnight charging if you own a plug-in hybrid EV. Most all-battery EV owners, though, want to install a Level 2 charger, which is powered by a 240V circuit and adds 10-55 miles of charge per hour (depending on several factors, most importantly how quickly your EV's onboard charger can accept the charge). Multiple EVs can share a Level 2 charger, with just a little bit of coordination, so you need only one Level 2 charger even if you have multiple EVs. Also, some EV owners use a Level 1 charger at home for everyday life and use a commercial Level 2 or Level 3 charger (which adds up to 200 miles in 30 minutes) when they are preparing for a longer trip.

7. Solar Panels (optional). Solar panels have been a good financial bargain for Massachusetts residents if they have a good solar exposure and their roof is less than around ten years old when they install the panels. The federal 30% tax credit for residential solar panels will expire on December 31, 2025, so solar panels won't be as good a financial bargain in the future, but they still might be more cost-effective than other ways of paying for electricity. Learn more about [solar panels](#).

8. Residential Battery (optional). One or more residential batteries can increase your home's resilience during power outages, especially if it is connected to solar panels. If you enroll your battery in Eversource's ConnectedSolutions program, Eversource will use it to increase the stability of the grid during times of peak demand (usually, hot summer afternoons) and pay you a small amount of money for each time your battery is drawn on. This program helps avoid turning on the grid's "peaker plants," which are both expensive and highly polluting. Residential batteries are less expensive than they used to be, but many people still find them too costly. Learn more about [residential batteries](#).

2. How to Decide When to Install Heat Pumps

Replacing your fossil-fuel heating system with a heat pump is the most effective thing you can do to reduce your home's greenhouse gas emissions, but it is also the most expensive. So the first thing you should decide, when making a plan, is when to install heat pumps.

Some people think that everyone should install heat pumps as soon as they possibly can. But it's more complicated than that.

Every object in your home has “embodied emissions,” sometimes called “embodied carbon.” These are the greenhouse gasses that were emitted when it was manufactured, transported, and installed in your home, and that will be emitted when it is disposed of. As a general rule, the heavier an object is, the more embodied emissions it has. This is why, for example, it wouldn't be earth-friendly to throw out your one-year-old refrigerator and replace it with a new refrigerator that's a little more energy-efficient. That would waste embodied emissions as well as money.

The more you can decrease your on-going emissions, the less embodied emissions are important. If you have a ten-year-old fridge that is costing \$100 a month to operate, it makes sense to buy a new energy-efficient fridge even if the old one is still working.

You can think about your heating system the same way. If you have a one-year-old high-efficiency gas furnace, replacing it with an ASHP would reduce your annual emissions, but that's a lot of embodied emissions for just one year of service. If, however, you have a twenty-year-old oil furnace, installing an ASHP as soon as you can is a good investment. Your annual emissions would drop a lot, and the furnace is probably near the end of its life anyway.

Most homes are somewhere between these extreme cases, so there is no one-size-fits-all answer about when it's best to replace a heating system with a heat pump.

You may find these suggestions helpful:

1. Install an ASHP as soon as you can, with some urgency, if your heating system or central AC is 18 years or older, needs substantial repairs, or seems to be nearing the end of its lifespan. Don't wait until it dies.
2. If your heating system is 15+ years old, install an ASHP or GSHP as soon as you conveniently can.
3. If you're struggling with summer heat and want/need better AC, install a heat pump system. ASHPs are much quieter and more convenient than window ACs. They're

also better at dehumidifying, so your home will feel more comfortable at a given temperature. GSHPs are even better: they suck heat out of your home, store it in the earth, and return it in the winter.

4. If you're doing a major renovation or addition, that's often a good time to switch your whole home to a heat pump system.
5. Otherwise, plan to install a heat pump system when your oil or propane system is 8-12 years old, your standard gas system is 10-14 years old, or your high-efficiency gas system is 12-16 years old. (Not sure whether your system is high-efficiency? If the exhaust is cool enough to go out the side of your home, it's high-efficiency. If the exhaust is so hot that it goes up a chimney, it isn't.)

The following information may also help you decide what makes most sense for your particular situation:

- ❖ Burning oil or propane produces more emissions than burning gas, so a heat pump will create a bigger drop in annual emissions if you currently heat with oil or propane.
- ❖ The expected lifespan of a furnace or boiler is around 20 years, give or take. Some older furnaces and boilers have lasted for 30 or even 50 years, but that longevity is less likely for equipment installed in the last couple of decades.
- ❖ It takes at least a few weeks to research ASHPs, talk with installers, choose a quote, and get an ASHP installed. It generally takes at least 4-8 months to install a GSHP. So you don't want to try to install a heat pump immediately if your heat goes out in the middle of the winter.
- ❖ A central AC system usually lasts 15-20 years. If you feel like AC is essential for your home, don't wait until yours dies to replace it with a heat pump system.
- ❖ The federal tax credit for ASHPs (\$2,000) and GSHPs (30% of the cost) will expire on December 31, 2025.
- ❖ The maximum Mass Save[®] ASHP rebate (for households who don't qualify for the income-based programs) is currently \$10,000 and will decrease to \$9,000 in 2026 and \$8,000 in 2027. It hasn't been decided what the rebates will be in 2028 and later, but it's probably unwise to assume they will be higher. You can learn about all available financial incentives, including loans, in this booklet on [financial resources for energy-efficient homes](#).

- ❖ Starting in November 2025, Eversource will offer a lower electricity rate to households that heat with heat pumps. If you currently heat with gas, you would probably see a very small (averaging about 4%) decrease in your annual expenses if you switch to an ASHP. If you currently heat with oil or propane, the decrease in your annual heating costs would probably be more substantial. The more efficient your heat pump system, the lower your annual costs will be.
- ❖ If you don't currently have ductwork, don't want to install ductwork, and really don't like ductless ASHPs, you might want to wait a few years to see whether air-to-water (A2W) heat pumps become available locally. A2W systems use baseboards, radiators, and/or radiant floors to distribute heat and cooling. They currently work well in new construction and when retrofitting homes with radiant floors. They are not yet locally available for retrofits of homes with baseboards or radiators, but that may change within a year or two.

A2W systems will never be able to use existing distribution systems to provide AC, since in humid weather water would condense on the cold pipes and drip into your home. Instead, A2W systems use special baseboards with drip protection and small fans. They will not be a low-cost option, especially for early adopters, but some people may find their aesthetics preferable to the other options.

Before you decide to wait until A2W systems are available locally, learn more about current [ASHP options and aesthetics here](#).

If you're ready to install a heat pump system, use the [Electrify Arlington website](#) to find [information from ASHP installers](#) who scored highly on an Electrify Arlington request for information and other resources.

3. How to Decide When to Replace Other Appliances

Knowing when appliances are likely to wear out, and acting before they do, means you can make thoughtful decisions about replacement appliances. The table below therefore suggests the likely lifespan of common appliances. Sometimes, of course, an appliance lasts longer or shorter than expected. Different manufacturers have different reliability records, and good maintenance can extend an appliance's lifetime. No one can know for sure how long any object will last, but this table can help you estimate when each appliance is likely to be reaching the end of its lifespan.

If you have a gas stove, consider replacing it sooner if anyone in your home is a child, getting older, or has respiratory issues. Small methane leaks and combustion byproducts are more likely to cause health problems for people in these categories. The older a stove gets, the more likely it is to develop small leaks.

If you have just one gas appliance in your home, replacing it may save more money than you think, since utilities charge a monthly fee to provide gas service. There's also a real satisfaction in having a fossil-fuel-free home.

Write into the table the year when each of your appliances was installed, and then the year when you plan to replace it. If that time is soon, learn about [water heater options](#) and [kitchen and laundry appliances](#).

Appliance	Estimated Lifespan	Install Year	Replace Year
Tank on water heater	Warranty + 1-2 years		
Tankless hot water	~20 years		
Gas or propane stove	10-15 years		
Clothes washer or dryer	10-15 years		
Refrigerator	10-15 years		

4. Electric Panels and Electric Service

Make a list of all the electrical improvements you plan to make to your home and share it with your electrician. It is often more cost-effective to do all of the electrical work at the same time, rather than some now and some later. At the very least, having a plan will reduce the chances of doing electrical work that you later need to remove and re-do.

When creating your electrical plan, consider your long-term plans for each of the following:

1. Heat pumps
2. Water heater
3. Kitchen stove and other appliances
4. Clothes dryer
5. EV charger
6. Solar panels – if your roof exposure is suitable for them

Most single-family homes in Arlington have 200 Amps of electrical service. This is usually sufficient for fully electrifying a home, but may not be if the home is unusually large or has energy-intensive appliances like a hot tub or a ducted heat pump system with heat strips (backup electrical resistance heaters that can be installed in an air handler).

Many two-family buildings in Arlington, however, have 200 Amps of electrical service to the whole building. Each unit typically has 100 Amps of electrical service, with a 60 Amp or 100 Amp electrical panel. To fully electrify, you may need to upgrade your units to 200 Amps, which requires increasing the service to the building to 400 Amps, which is expensive.

Sometimes, though, it is possible to fully electrify one's home with 100 Amps, especially if it's a smaller apartment, you choose ductless heat pumps and other higher-efficiency appliances, and/or you install a "smart" electrical panel. If you are in this situation, you may find Rewiring America's article on "[How to Electrify on 100 Amps](#)" helpful.

If you are considering increasing the electrical service to your building, you may find that some kind of smart electrical panel is a more cost-effective solution. For example, a "load shedding" device can monitor how much power is going through your electric panel and temporarily turn off an EV charger or water heater if the panel is nearing its peak capacity. It's very rare that all of the electrical appliances in a home draw their peak currents at the same time, but electrical codes have to include buffers for safety, and a load shedding device allows you to take advantage of these buffers without compromising safety. Other types of smart panels take more sophisticated approaches to load management and allow more user control.

You can find a list of electricians who responded to an Electrify Arlington request for information and want to serve small residential customers in Arlington, along with information about the services they provide, at tinyurl.com/ArlingtonElectricians.

- This listing includes which electricians install smart panels and the brand(s) they install.
- This listing also includes which electricians say they know how to upgrade a building to 400 Amps and upgrade one unit to 200 Amps, without upgrading the other unit. Some electricians say it isn't possible to do this, but Arlington's Inspector of Wires says it is, and so do some (not all) of the electricians who responded to the request for information.

There has been a nationwide shortage of 400 Amp equipment because of high demand from high-end developers. Some people, even electricians, think that providing 400 Amps of service to a building requires 400 Amp equipment. It is, however, possible to use two sets of 200 Amp equipment, and Arlington's Inspector of Wires allows this. This approach, however, costs more than using 400 Amp equipment – another reason to stay below 100 Amps if you can.

Thank you for wanting to make your home more climate-friendly!

Questions?

Email Arlington's Energy Advocate at
ElectrifyArlington@town.Arlington.ma.us