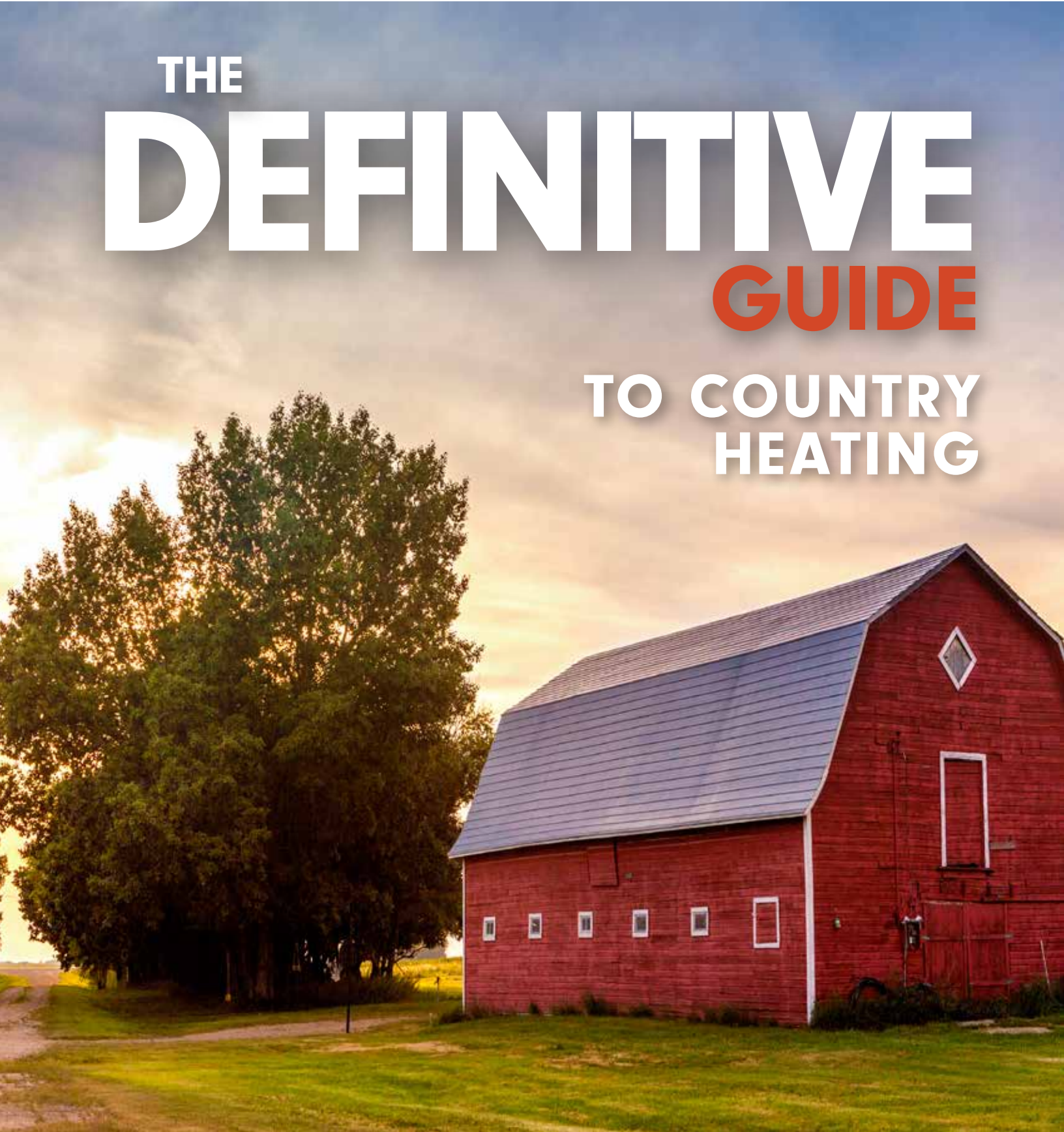




THE
DEFINITIVE
GUIDE
TO COUNTRY
HEATING



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HEATING OPTIONS

AND KEY DIFFERENCES

Living out in the country is a kind of freedom most city-dwellers can't understand. **But you do.** It's the open sky and the acres of fields and trees, the room to drive a quad or dirt bike, and true peace and privacy.

But with the cost of fuel going up, heating your home or shop is getting expensive. Whether it's a 100-year-old farmhouse or your new build dream home, there are a lot of heating systems to consider.

That's where this guide comes in. It will give you a rundown of what's available and the pros and cons of each.

Here's to finding your rural heating solution.

Some of the most common heating sources include heating oil, wood, electricity, geothermal, natural gas, and propane. No matter which you choose, you'll want to keep these metrics and key differences in mind...

Efficiency: The percentage of a fuel's energy that is converted to useable heat.

Safety: The inherent risks of transporting and storing fuel, and any dangers when using the heating solution.

Availability: Which fuel solutions are feasible in your area.

Capital cost: Some options require a higher investment at the start, but hopefully pay for themselves over time.

Labour and maintenance: How much time and elbow grease is required.

Fuel price and price volatility: How dependent are you on the energy companies and the energy market.



HOME HEATING OIL

Home heating oil furnaces can be hooked up to a forced-air duct system, or in a boiler to heat up the water in a hydronic heating system and tied into applications like in-floor radiant heat. In the winter of 2020-2021, approximately 5.3 million households in the U.S used home heating oil as their primary heat source.

Efficiency:

New oil furnaces can produce up to 86 percent efficiency with heating oil coming in at 38.2 megajoules per litre.

Safety:

Home heating oil has a high flashpoint (140 F) and at most temperatures is not flammable, making transporting and storing extremely safe. It's also easy to spot a leak as the soot and smell are telltale signs. Fumes are also known to cause minimal lung irritation.



Figure 1

Availability:

Readily available across North America, though a majority of users are in Northeastern U.S. However, you do need to store and schedule regular deliveries to ensure you don't run out of oil.

Top 5 Residential Oil Consuming States

Figure 1 (2020)

- 1 - New York
- 2 - Massachusetts
- 3 - Pennsylvania
- 4 - Connecticut
- 5 - Maine

Capital Cost:

Depending on the brand and efficiency, a home heating oil furnace can cost anywhere from \$2,000 - \$10,000, not including installation.

Labour and Maintenance:

Because of the high amount of sulfur in home heating oil, soot can build up and clog the spray nozzle greatly lowering your efficiency. It's often recommended you get your furnace professionally cleaned by an HVAC technician once a year. While it doesn't require much work or time for you, the annual cleanings mean a regular bill to budget for.

Fuel Price and Price Volatility:

Extremely volatile. Unfortunately, because home heating oil depends on the cost of petroleum, global politics can heavily influence the price and make predicting your annual heating budget more difficult.

US No.2 Heating Oil Residential Price

Figure 2

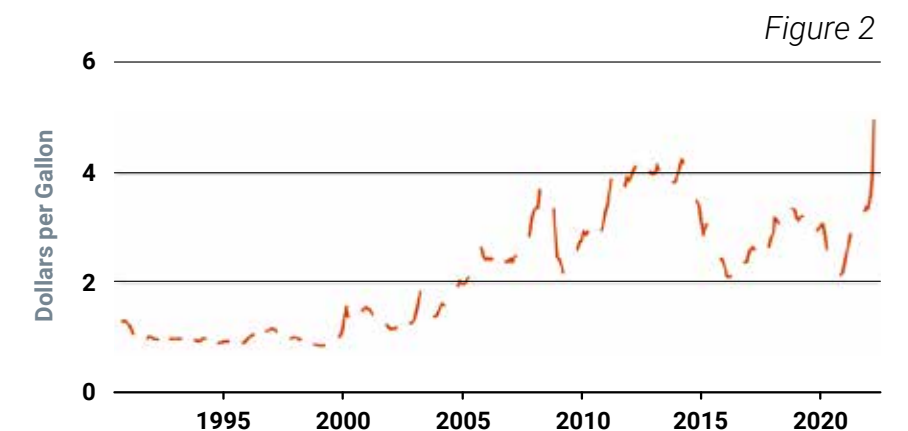


Figure 2

Who Should Consider Heating Oil?

Anyone who is looking for a lower upfront investment and relatively little maintenance and sweat equity should consider home heating oil, just be prepared to pay more per winter as fuel costs continue to rise.



NATURAL GAS

With natural gas, you have the option of a gas fireplace without the fuss of preparing the wood. However, fireplaces are not as efficient as a furnace. Natural gas furnaces can be hooked up to a forced-air duct system, or in a boiler to heat up the water in a hydronic heating system and tied into in-floor radiant heat.

Efficiency:

Natural gas burns cleaner than fuel oil. The energy content of natural gas is 37.5 megajoules per cubic metre. Depending on the furnace, you can get up to 96 percent efficiency.

Safety:

While the odds are slim, there is the danger of an explosion as Natural Gas is extremely flammable. Odour is added for safety.

Availability:

Natural gas may not be available in all rural areas. You will have to check with your local providers.

Capital Cost:

A natural gas furnace will cost \$2,000 - \$6,000 or \$5,000 - \$9,000 installed. Additional costs may be incurred to connect natural gas line to your home.

Labour and Maintenance:

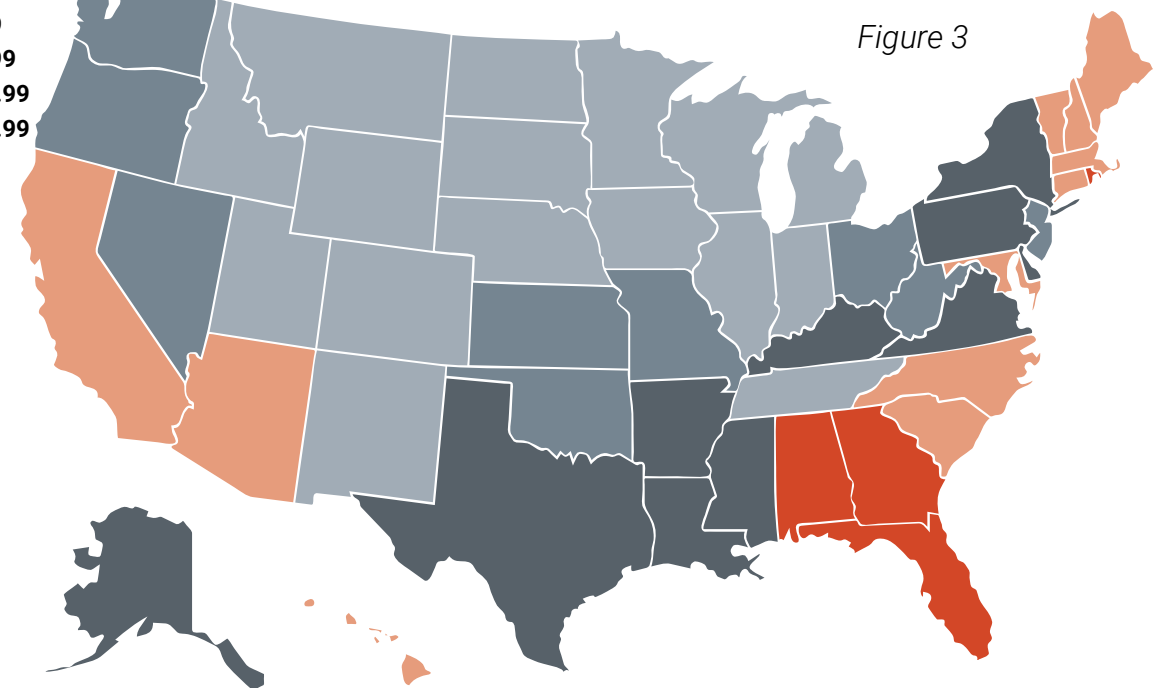
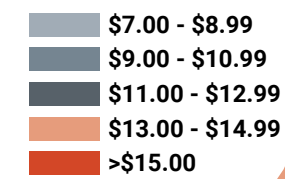
A natural gas furnace requires little day-to-day maintenance, though it's recommended to get your furnace checked annually by a professional.

Fuel Price and Price Volatility:

Extremely volatile. Unfortunately, like many fuel options, natural gas depends on the cost of petroleum and global politics can heavily influence the price and make predicting your annual heating budget more difficult.

US Average Annual Residential Natural Gas Prices by State

(2020) Figure 3



Who Should Consider Natural Gas?

If you have access to a natural gas line in your area, you may want to consider getting hooked up depending on the price in your province or state. Natural gas has a medium upfront investment and relatively little maintenance and sweat equity, though rising fuel costs are an important factor to consider.



PROPANE

Propane is often set up as natural gas, and also has the option of a gas fireplace without the fuss of preparing wood.

Efficiency:

Propane burns cleaner than oil. The energy content of propane comes in at 25.3 megajoules per litre. Depending on the furnace, you can get up to 96 percent efficiency. However, the fuel used to create the electricity may be inefficient: coal, natural gas, oil. Common types of electric heating include electric furnaces, radiators, and convection heaters.

Capital Cost:

If you're ok with a large tank in your yard, an above-ground 500-gallon propane tank can cost between \$1,000 - \$2,500, or up to \$3,000 if installed below ground. Depending on the furnace size and model, you can expect to pay \$1,000 - \$6,000, not including installation.

Fuel Price and Price Volatility:

Propane can often be the most expensive fuel in the area, and the price is known to fluctuate.

US Propane Residential Price

(2020) Figure 4

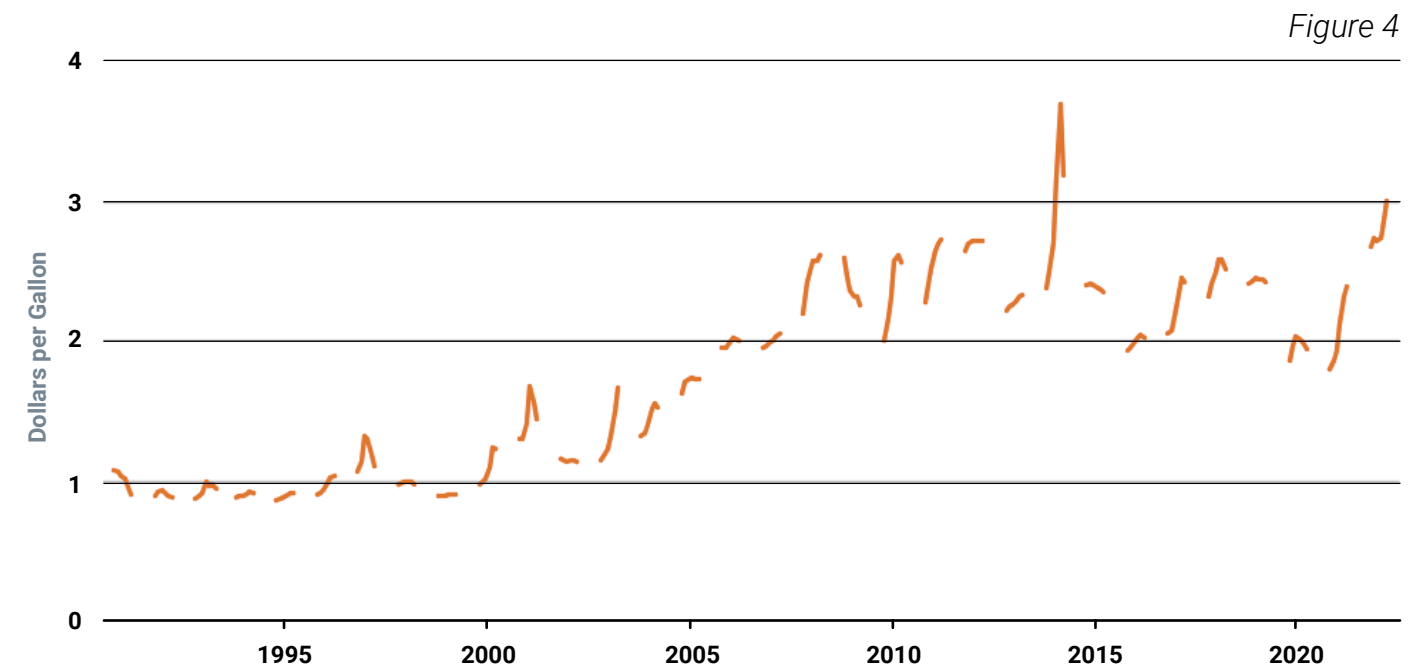


Figure 4

Safety:

Propane is highly flammable and an undetected leak could result in carbon monoxide in your home.

Availability:

Propane can be easily delivered to rural areas.

Labour and Maintenance:

If you own your propane tank, you'll need to schedule regular inspections and pay to fix any corroded spots that could lead to a leak. If you rent your tank, you'll have to factor the rental fee into your budget.

Who Should Consider Propane?

If you're looking for a heating solution that requires little labour and maintenance, propane is a great choice. If you rent your tank and have your inspections and deliveries scheduled in advance, you can relax and let others take care of things. However, it does mean less control over your budget.



ELECTRICITY

Electricity is a common and self-explanatory heating solution. However, depending on the application, electricity can be a very expensive option, especially if you're heating a building with less than stellar insulation.

Efficiency:

Electricity produces 3.6 megajoules per kilowatt-hour but unlike other sources provides a full 100 percent efficiency. Common types of electric heating include electric furnaces, radiators, and convection heaters.

Safety:

As long as your heater is unobstructed, they remain a relatively safe and dependable heat source.

Availability:

Widely available.

Capital Cost:

Electric heaters and radiators cost around \$800 - \$6,000 installed.

Labour and Maintenance:

Minimal, though if using forced air annual cleaning of ducts and heat exchangers is needed, same as gas, propane and oil.

Fuel Price and Price Volatility:

Depending on the application, electric baseboard heaters can be one of the most expensive ways to heat your home, especially considering your electricity rates.

US Average Retail Price by State - Cents per Kilowatthour

The overall US average price per kilowatthour is 10.59 cents

Figure 5

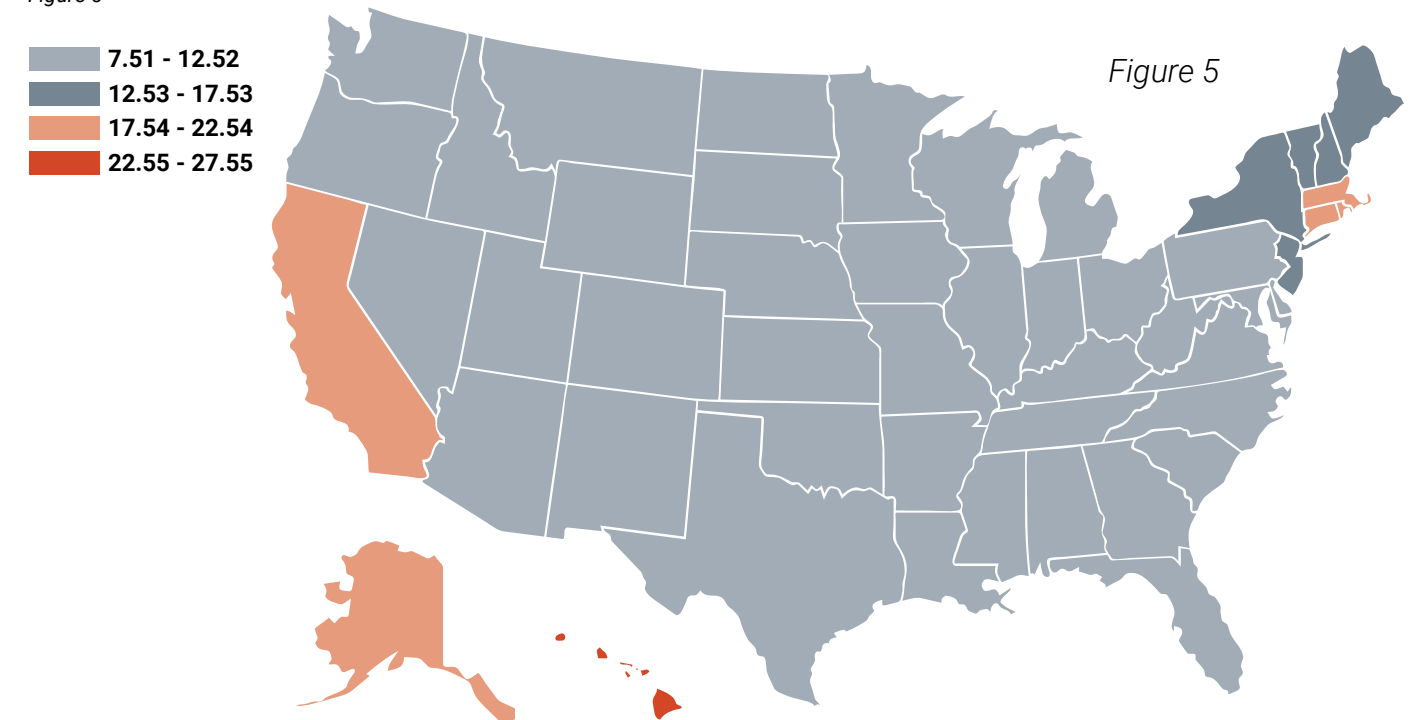


Figure 5

Who Should Consider Electricity?

If you're looking for a heating solution that requires little maintenance or upfront investment, electricity is a great option. However, just keep an eye on electricity rates and be prepared for higher electricity bills during the coldest winter months.



INDOOR WOOD STOVE

Like a fireplace, an indoor wood stove can create a very inviting atmosphere. Though they do create a fire hazard concern, and the regular ash and wood mess inside the house.

Efficiency:

Wood provides 30,600 megajoules per bush cord, though an indoor stove can't match the efficiency of other heating solutions, which means more energy goes to waste.

Availability:

For those who live in a forested area, wood can be abundant, free, and renewable.

Labour and Maintenance:

An indoor wood furnace means regular trips to the woodshed to reload the firebox. And you'll want to clean out the ash and wood mess regularly, including chimney cleaning.

Safety:

An indoor wood stove does carry the risk of a fire and smoke inhalation.

Capital Cost:

An indoor wood stove can cost anywhere from \$800 - \$4,000 plus installation.

Fuel Price and Price Volatility:

If you live on a wooded property or have a neighbour who will let you clean up their deadfall, it's free. If you have to buy wood and truck it a long way it can get expensive.

Who Should Consider Indoor Wood Heat?

If you have wood readily available to you, an indoor stove can be a fantastic, economical option. However, you should be prepared for ash and wood mess in your home and the smell of smoke. But for those who want control over their heating bill and appreciate the cozy feeling of warming up by the fire.

OUTDOOR WOOD BOILER

The latest outdoor wood gasification furnaces can achieve much higher efficiency numbers compared to more conventional wood furnaces, up to 90%. Because the furnace is often outside, they eliminate any issues with fire hazards and wood mess in the home. And one furnace can pump heated water to multiple buildings using a variety of applications including in-floor heat. However, wood gasification furnaces do require well-seasoned wood.

Labour and Maintenance:

An outdoor furnace means a morning and evening trip to the woodshed to reload the firebox. Cutting and seasoning your wood is also highly recommended, which means some extra Saturdays spent working and extra tools like a wood splitter. Outdoor furnaces also require regular maintenance including cleaning out the ash and end-of-season care if you turn off the furnace in the summer.

Fuel Price and Price Volatility:

If you live on a wooded property or have a neighbour who will let you clean up their deadfall, it's free. If you have to buy wood and truck it a long way it can get expensive. Wood prices are a lot less dependent on the economy.

Safety:

Because an outdoor wood furnace is installed outside away from other buildings, the only damage that could occur is to the furnace itself.

Availability:

For those who live in a forested area, wood can be abundant, free, and renewable.

Capital Cost:

High, outdoor furnaces can cost around \$8,000 - \$16,000 depending on the make and model.

Efficiency:

Wood provides 30,600 megajoules per bush cord, and can provide approximately 90 percent efficiency depending on the top wood gasification furnaces.

Who Should Consider Outdoor Wood Heat?

If you have wood readily available to you, wood heat can be a fantastic, economical option. However, you should be ready to put in the sweat equity and have access to the tools to cut and season your wood.



HEAT PUMP

Heat pumps are a newer trend in heating. Interestingly, they don't actually create heat but extract the existing heat outside and pump it into your home or building to raise the indoor temperature.

Efficiency:

While heat pumps can be very efficient in most temperatures, during colder months they can struggle to generate much heat, making them less practical in colder climates.

Availability:

Widely available and doesn't require any fuel.

Labour and Maintenance:

While heat pumps don't require much maintenance or cleaning, because of their complex nature technical support might not always be readily available in rural areas.

Safety:

Heat pumps are incredibly safe as they don't require any fuel or produce noxious gases. They don't have super heated components so there's no danger of burning or scalding either.

Capital Cost:

High. Heat pumps can cost anywhere from \$5000 - \$9,000 not including installation.

Fuel Price and Price Volatility:

None.

Who Should Consider a Heat Pump?

If you live in a milder climate and can stomach the higher upfront cost, a heat pump can be an excellent heating solution. Though if your winters get frigid where you live, you might want to consider a heat pump as a spring and summer appliance.

GEO THERMAL

Geothermal moves heat from one place (the ground) to another (your home). A loop of pipes essentially takes the heat from underground where it stays constant at around 50F year-round and pipes it into your home with a compressor. However, like a heat pump, you may still need a secondary heating system in colder climates.

Efficiency:

Extremely efficient. For every unit of electricity required to run the system, geothermal can provide 3 units of heating energy.

Safety:

With no combustion or fuel required, a geothermal system is very stable and safe.

Availability:

Unfortunately, geothermal contractors are not available everywhere, and you'll have to check your local market.

Labour and Maintenance:

There is minimal ongoing maintenance to the installed lines themselves, but you'll need to take good care of the equipment pumping water and antifreeze through the system as it transfers heat.

Fuel Price and Price Volatility:

Never pay a heating bill again, but expect a larger electricity bill to run the compressor. Unfortunately, you'll still likely require a backup heating system to ensure your indoor temperatures remain consistent.

Capital Cost:

Quite high, upwards of \$30,000. The cost of excavation and the network of pipes is a large investment, plus the cost of landscaping. You'll also want to factor in the electricity costs to run the compressor. However, if installed poorly, the system will never reach its potential. If designed and installed well it can pay itself back in less than ten years.

Who Should Consider Geothermal?

If you live in a warmer climate, geothermal systems can be an optimal solution. Like heat pumps, however, they still make great supplemental heating options if you can stomach the upfront costs. Then you can watch your heating bill drop dramatically as the system pays for itself over the course of multiple winters.

CONCLUSION

It's easy to see that where you live can become the biggest factor in which heating solution is available to you and which one is the most cost-effective.

Your preference for a hands-off solution vs. one that requires a bit of elbow grease can determine your ongoing costs both to your wallet and your personal time, and how beholden you want to be to fuel companies.

Finally, whether you're interested in making the investment in a system with a higher upfront cost that pays itself off over time, or one that requires a small initial investment but costs more month-to-month is another critical decision to make.

In the end, you have to find the heating solution that best meets your needs.



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