Australian Government
Department of Industry

Heat Pump Water Heater Guide

for Households

Have you been thinking about installing a heat pump water heater but aren't sure what type of system to get?

Do you have a heat pump water heater but suspect it may not be working as well as it could?

BEFORE INSTALLATION
PAGE 3

AFTER INSTALLATION
PAGE 9

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Heat pump water heaters can help households reduce electricity costs and their impact on the environment. To ensure you get the most out of installing a heat pump water heater and avoid any potential problems, it's important to have an understanding of how to select a heat pump water heater and how it is best used in your specific circumstances.

Whether you are considering buying a heat pump water heater, or you already have one, this guide is designed to help you gain a basic understanding of heat pump water heaters. For more detailed information on heat pump water heaters, please visit the web pages listed at the end of this guide.

BEFORE INSTALLATION

What are the key advantages of a heat pump water heater over other water heaters?

Heat pump water heaters use over 60 per cent less electricity than a traditional electric water heater, reducing your household electricity bill and greenhouse gas emissions. They can be easily installed to replace most traditional electric water heaters, without the need for a gas connection or solar panels on your roof.

How does a heat pump water heater work?

A traditional electric water heater uses electricity to heat water directly through an element, similar to how a kettle works.

Rather than using electricity to directly heat water, as a traditional electric water heater does, a heat pump water heater only uses electricity to operate a pump that circulates a refrigerant around the system. This refrigerant picks up heat from the air and transfers it to the water. In this way it uses much less electricity to heat water than a traditional electric water heater.

The technology is similar to that used in refrigerators, but instead of pumping heat out of a fridge to keep it cool, it pumps the heat from the outside air into a tank of water to make it hot.

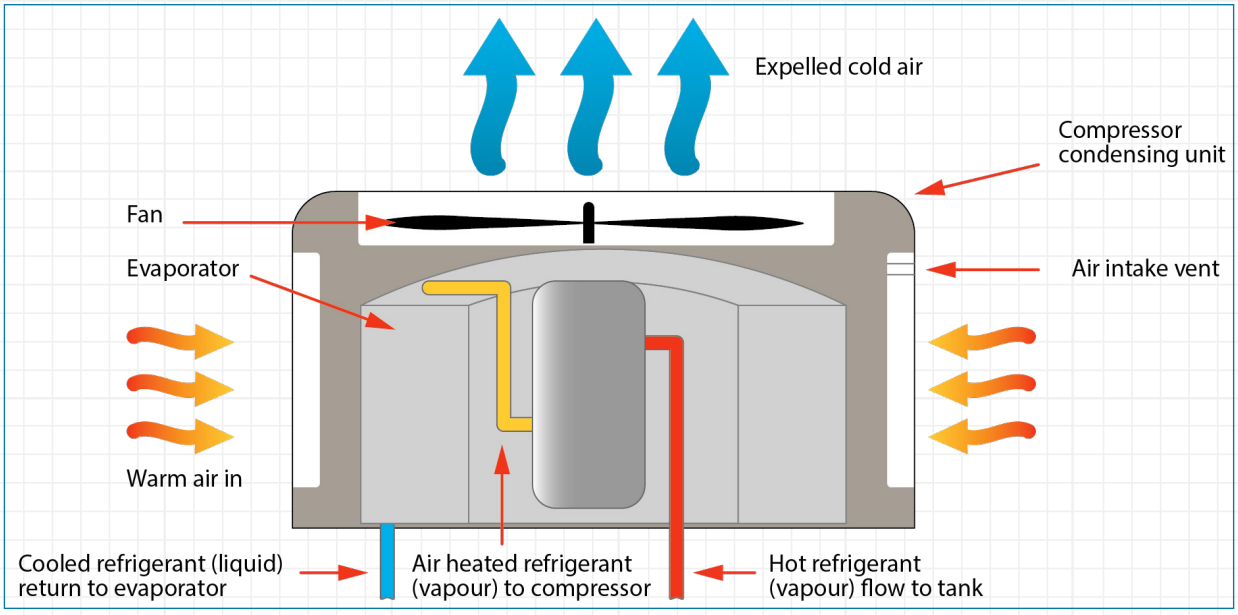

Figure 1. Heat pump compressor (Source: Solar & Heat Pump Hot Water Systems Plumber Reference Guide).

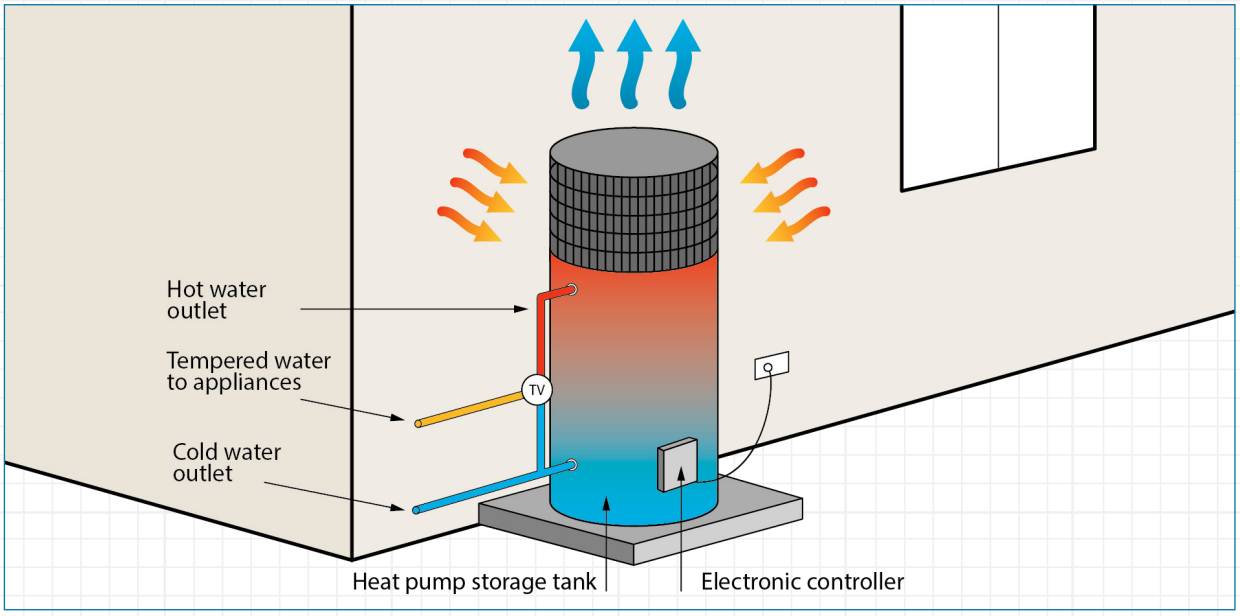

Figure 2. Integrated heat pump water heater system (Source: Department of Industry)

What types of heat pump water heaters are there?

There are different types of heat pump water heaters available. Some are designed to be installed as a single outdoor unit (integrated systems), some have components both inside and outside of your home (split systems), while others can be retrofitted to your existing hot water tank (retrofitted systems). Some models can be provided with an electric booster element or defrost cycle for use in colder climates. The range of products makes it likely that there will be one that suits your home.

Figure 3. Integrated system (L) and split system (R)

What is the best type of heat pump water heater for my household?

While there is a heat pump water heater suited to most situations, the best type for your household will depend on the:

- Climate you live in
- Amount of hot water your household uses
- Electricity tariffs (rates) available in your area

When considering climate suitability, hot water use and tariffs, getting advice from several retailers and installers is important. Below is information to ensure you can ask the correct questions when selecting a heat pump water heater.

What should I consider in my local climate?

The performance of heat pump water heaters will vary depending on your climate and some models may not be suited to where you live. Heat pump water heaters generally perform most efficiently in warmer climates. Some heat pump water heaters are designed to perform efficiently in cold climates. The table and map below will help identify what you need to consider for the climate you live in:

Climate guide

No Frost	Low Frost	High Frost
Brisbane, Darwin	Adelaide, Perth, Sydney	Canberra, Hobart, Melbourne
• *No need* for frost protection	• *May need* frost protection, which can be provided with an electric booster element or defrost cycle to work in colder climates.	• *Will need* frost protection, which can be provided with an electric booster element or defrost cycle to work in colder climates.

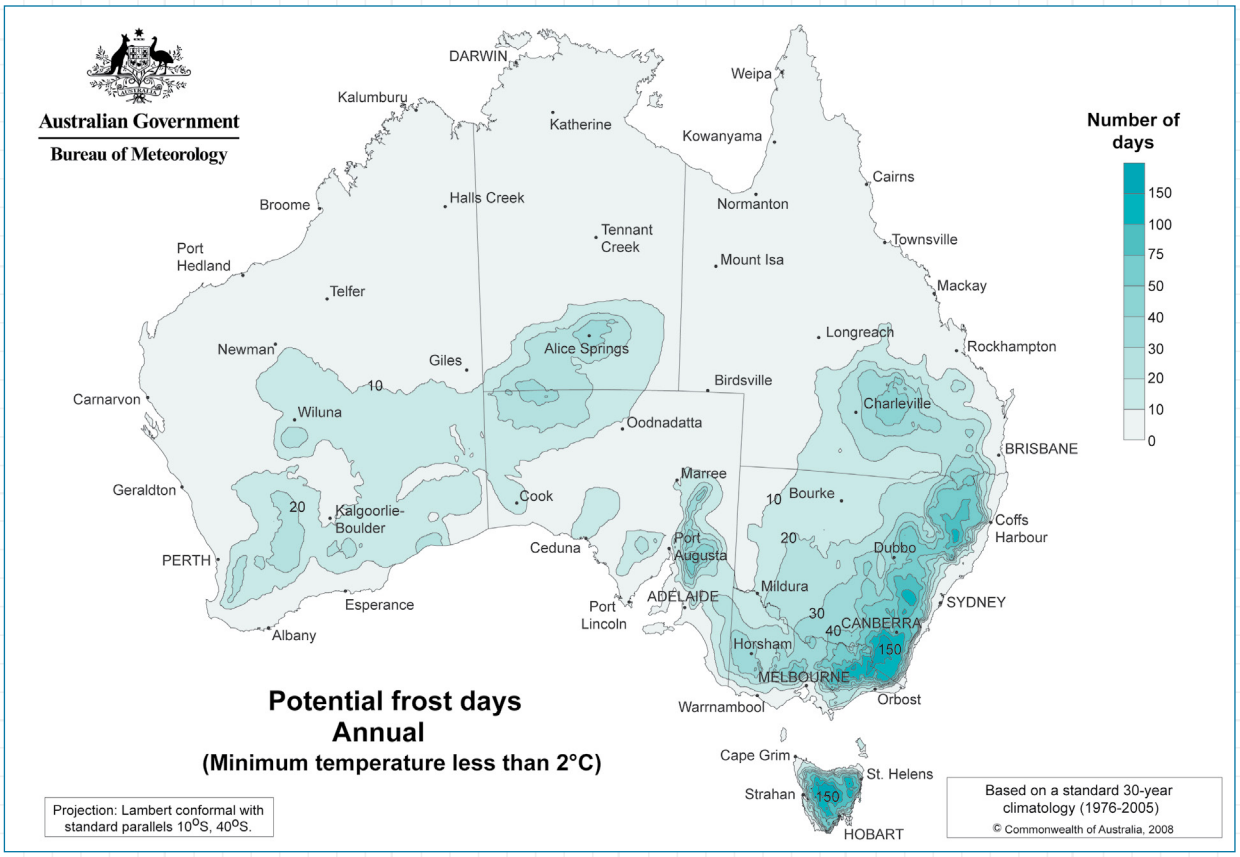

Figure 4. Potential frost days in Australia (Source: Bureau of Meteorology)

For further information you should speak to your retailer or installer to determine the model most suited to your location.

What tariff is best suited for a heat pump water heater?

Heat pump water heaters can be connected to different electricity tariffs, and the tariff chosen can have a large impact on the operating costs of the system. If you are currently running an electric water heater on an off-peak tariff, then it's worth noting that a shift to a continuous tariff can more than double the costs of running a heat pump water heater. More information about tariffs and tank sizes is provided below.

The type of tariff available varies across states and territories. Tariff options should be discussed early with your retailer or installer as only some models are suited to the cheaper tariffs. You can search the Energy Made Easy website for offers in your area.

Ask your retailer about the efficiency of the heat pump water heater you are considering, as well as suitable tariffs for its operation. Contact your electricity retailer to find out the costs of different electricity tariffs. The table below will help you identify what you need to consider for the types of tariff available:

Tariff guide

Tariff	What is it? When can I use it? What does it cost?	Considerations for heat pumps
Off-peak and Restricted hours tariff	• Can be used at prescribed off-peak periods. Can vary widely from between 6 to 18 hours a day, depending on your electricity provider. • Has a significantly lower price per kilowatt hour (kWh) than a continuous electricity tariff.	• Some models are suitable for off-peak electricity supply, but systems with smaller tanks are often not suited as they might run out of hot water. • Manufacturers can provide guidance on suitability. During periods of high hot water use that occur outside the off-peak period, hot water supply may be insufficient. • Systems suited to off-peak supply often have relatively large tanks to ensure there is enough hot water to last the whole day. • Common for traditional electric water heaters and heat pump water heaters with larger tanks.
Continuous electricity supply	• Provides continuous power so your water can be heated at any time of the day or night. • Has a substantially higher price per kilowatt hour (kWh) than off-peak or restricted hours electricity tariffs. • Often over twice the cost of off-peak supply.	• All heat pump water heaters can use it. • As heat pump water heaters are able to switch on at any time on a continuous tariff, there is less chance of running out of hot water, and a smaller tank can be used. • Common for small traditional electric water heaters and smaller heat pump water heaters.
Time-of-use tariff	• Time-of-use tariffs are broken into peak, off-peak and shoulder time periods. • This tariff only applies to homes where a new digital smart meter or interval meter has been installed. • All electricity use is charged at different rates depending on the time you use the electricity.	• All heat pump water heaters can use it. • Check with your electricity provider to see if you are eligible to have a smart meter or interval meter installed. • Can be used for both small and large heat pump water heaters.

What size system should I get?

The tariff you plan to use, the number of people in your household, the amount of water you use and when you use it will all influence what system size you should get. It's important to select the right size water heater for your household's needs. A system that is too small may run out of hot water, while a system that is too large will waste energy keeping the unused water hot. A larger tank volume is especially important if using off-peak power.

The types of appliances and features in your home, as well as how you use them will affect your household's hot water consumption. Factors that can increase your hot water consumption include:

- spa baths
- taking long showers
- living in a cold climate
- the number of people in your home

While tank volume is not a direct guide of how much hot water a heat pump water heater can produce, it can be a handy indicator to select an appropriately sized model. If a system is on an off-peak tariff, then a larger volume tank that can operate efficiently at night is likely to be required.

The table below will help you identify what you need to consider for the types of sizes available:

Size guide

Small (less than 200L)	Medium (between 200-300L)	Large (more than 300L)
• Apartments/small houses • 1-2 bedrooms, 1 bathroom • 2 people maximum • Not normally suited to off-peak tariffs	• Average sized house • 3 bedrooms, 1 bathroom • 3 people maximum • May not be suited to an off-peak tariff, but some can run on restricted hours tariffs that cover shoulder and off-peak times (e.g. Tariff 33 in QLD and Off-Peak 2 in NSW)	• Large house • 4 or more bedrooms, 2 or more bathrooms • 4 people minimum • Restricted hours and off-peak tariffs are generally okay

For more information, speak to your retailer or installer to determine the model most suited to your circumstances.

How can I reduce noise issues?

Heat pump water heaters make a humming sound similar to an air conditioner. Different brands and models will have different noise levels, so when you are choosing a heat pump water heater, try to select one with a low decibel level. When considering noise, be aware that manufacturers' claims around noise are currently not tested to an agreed standard. Ask your plumber for more advice.

Properly located heat pump water heaters are unlikely to cause noise issues, but it is advisable to install them away from bedrooms and neighbouring properties to avoid potential issues. Noise impacts can be further reduced by locating the heat pump at ground level and facing the condenser fan discharge away from living areas and bedrooms.

It is a good idea to check with your local council on noise control laws. Your installer should be aware of any restrictions and will be able to advise the best position to place your heat pump water heater to reduce any noise impacts.

Figure 5. Split heat pump water heater system

Where should it be located?

Heat pump water heaters generally require access to plenty of fresh air from outside. Most heat pump water heaters are best located outside, however some models are able to operate in a large garage and some can draw air from the ceiling space.

You should try to have your heat pump water heater installed as close as possible to your main areas of hot water use (i.e. bathrooms, laundry, kitchen etc.) so that the pipes are shorter. This helps to minimise heat loss and decrease the time it takes for hot water to reach the taps.

Thinking about the most suitable location for your heat pump water heater may help you choose between an integrated system and a split system configuration. If you choose a retrofitted or split system it may be possible to have the tank in the house and the heat pump outside. In this case, the distance between the two should be minimal.

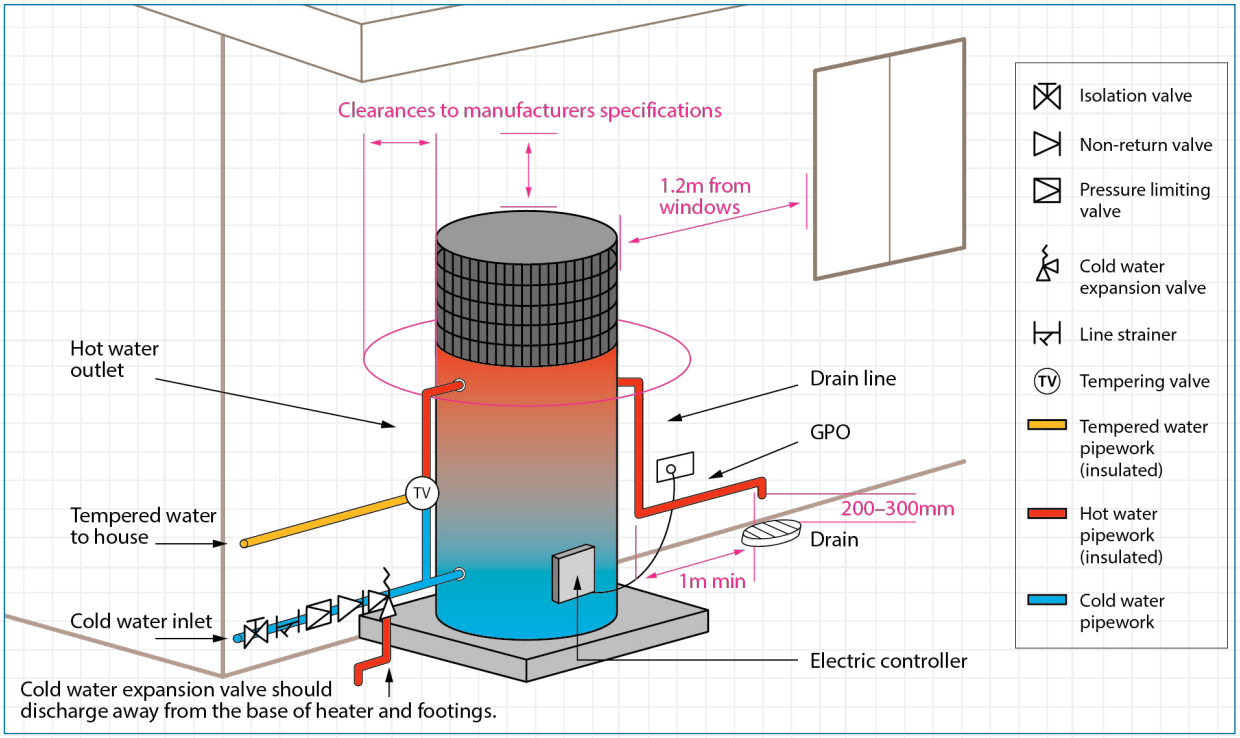

Figure 6. Heat pump water heater system showing clearances (Source: Solar & Heat Pump Hot Water Systems Plumber Reference Guide).

Who can install my heat pump water heater?

Anyone installing a heat pump water heater must be licensed to install these systems. This generally means being both an accredited plumber and an accredited electrician. For details on what accreditation installers are required to have, contact your local council or state government.

What financial incentives or rebates are available for heat pump water heaters?

Check what state and federal rebates or incentives may be available to you. Visit Living Greener to find programs in your area: www.livinggreener.gov.au/rebates-assistance

The purchase and installation of a heat pump water heater may entitle you to Small-scale Technology Certificates (STCs) if your system is eligible under the Small-scale Renewable Energy Scheme (SRES). For more information visit the CleanEnergyRegulator.gov.au: http://ret.cleanenergyregulator.gov.au/Hot-Water-Systems/choosing-hot-water-heat-pump

AFTER INSTALLATION

How do I maximise the efficiency of my heat pump water heater?

After your heat pump water heater has been correctly installed, there is no need to make any adjustments to maximise efficiency. Unlike solar water heaters, a heat pump water heater will automatically work efficiently without the need to make adjustments.

How do I maintain my heat pump water heater?

- Before your installer leaves your property, make sure that you have clear instructions on how to operate your new heat pump water heater and what maintenance is required to ensure optimal performance.
- If you have a user's manual, make sure you follow the manufacturer's maintenance advice.
- Talk to your installer about having your water heater regularly inspected and serviced, checking the integrity of the refrigeration system and replacing the pressure relief valves where required. Refer to manufacturer's instructions and installer's advice on when your system should be inspected and serviced.
- Regularly check that the air vents around the evaporator are kept clean and clear of dust, leaves and other debris so that air flow is not restricted.
- Most tanks have a sacrificial anode (a metal rod that protects the metal hot water tank by attracting corrosion) that a licensed service person needs to replace approximately every five years.
- Request a Certificate of Compliance from your installer so that you can be confident that the installation of your heat pump water heater meets all regulatory requirements.

Figure 7. Integrated heat pump water heater system

Why are my electricity bills still high?

It is important to check your electricity bills to make sure your heat pump water heater is working efficiently. In particular, if your system has an electric booster element make sure you check your electricity bills for spikes in electricity use. Remember that the tariff your system is on will affect the cost of running your heat pump water heater so check your bill to ensure you are on the correct tariff.

Can I change the temperature of the water coming from the system?

The water in your heat pump water heater is required to be heated to a certain temperature to prevent the growth of Legionella bacteria. Changes to the temperature of your system should only be made by a licensed plumber.

Regulations state that water used in the house for personal hygiene purposes must not be higher than 50 degrees Celsius, to prevent scalding. A tempering valve must be fitted to your hot water pipes to cool the water to 50 degrees Celsius or lower before it enters the house. Consumers should not attempt to change the tempering valve temperature.

What should I do if I'm having problems with my heat pump water heater?

The first point of contact for any issues you have with your heat pump water heater should be your retailer or installer. They should be able to identify what the issue is and suggest a solution or possibly send someone to fix the problem.

WHERE CAN I GET MORE INFORMATION?

- Department of Industry: Energy efficiency—Heat pump water heaters:
  http://www.ee.ret.gov.au/energy-efficiency/water-heaters/alternatives-electric-water-heaters/heat-pump-water-heaters
- Clean Energy Council: Fact sheets—Solar hot water and heat pumps:
  www.cleanenergycouncil.org.au/technologies/solar-water-heater-and-heat-pumps
- Solar & Heat Pump Hot Water Systems—Plumber Guide and Handbook:
  www.energyrating.gov.au/products-themes/water-heating/heat-pump/information-for-industry/
- Living Greener
  - Heat pump hot water systems:
    www.livinggreener.gov.au/energy/hot-water/heat-pump-hot-water-systems
  - Understand your energy bills:
    www.livinggreener.gov.au/energy/energy-efficient-living/understand-your-energy-bill
  - Electricity and gas market offers:
    www.livinggreener.gov.au/energy/energy-efficient-living/electricity-gas-market-offers#what_to_consider
  - Off peak hot water and time-of-use pricing:
    www.livinggreener.gov.au/energy/energy-efficient-living/off-peak-smart-meters-time-of-use-pricing#off-peak_hot_water
- Energy Made Easy
  Information on understanding energy tariffs and a tool to see how you compare with average energy use in your area.
  www.energymadeeasy.gov.au
- Clean Energy Regulator:
  http://ret.cleanenergyregulator.gov.au/Hot-Water-Systems
- Speak to your installer, retailer or manufacturer and obtain several quotes

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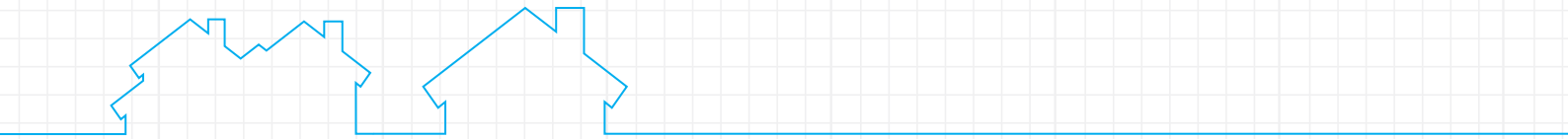

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