

Hydronic heating 101

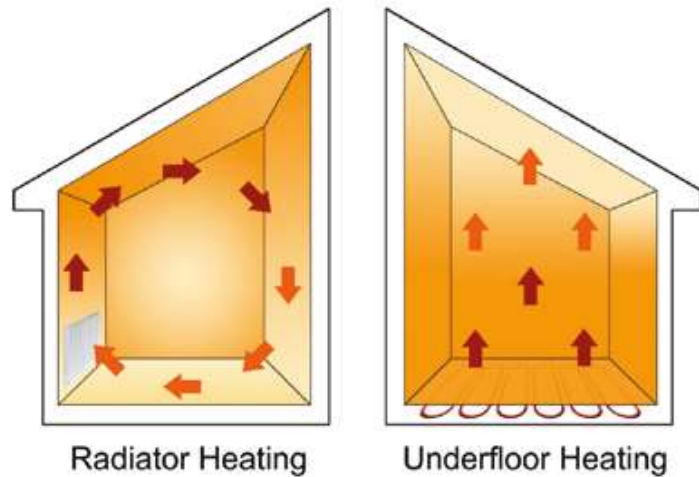
Paul Woodgate of the NZ Institute of Central Heating provides a brief overview of hydronic heating.

IN NEW ZEALAND, anything from a plug-in heater to a wall mounted heat pump is classed as ‘heating’ when, in reality, these are just single area heaters. ‘Hydronic heating’ seems to have been adopted instead of the more widely recognised ‘central heating’ as the term for the heating of a whole house or property, domestic or commercial.

The New Zealand Institute of Central Heating (NZICH) was started up to provide technical assistance and to develop training courses in radiator and underfloor heating.

In brief, modern radiators heat quickly to provide 30% radiated and 70% convected heat. Each radiator is fitted with a thermostatic radiator valve, allowing for moderate control from room to room.

Radiator central heating is one of the most efficient ways to heat your home, due to the high efficiency ratings of condensing heat sources. Water transfers heat at a much higher rate than air, so radiators can heat a room in a matter of minutes. Most



Above: Diagram showing heat flow of radiator heating and underfloor heating.



Above: The concrete pour stage of an underfloor central heating installation.

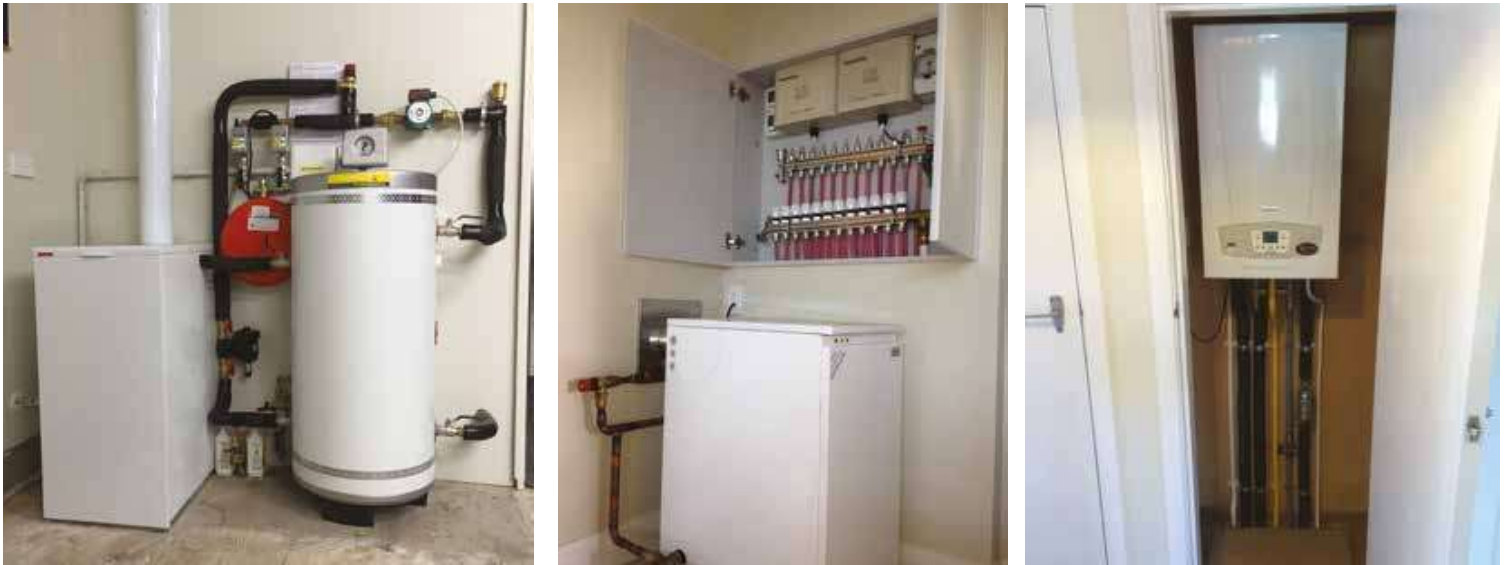


Above: A Queenstown underfloor central heating installation.

importantly, performance is maintained irrespective of outside temperature.

Underfloor heating is an ‘invisible’ heating system for the end user, providing 60% radiant and 40% convected heat. Suitable for both new

builds and existing properties, it works by effectively making the floor a large heater. Because the emitting area is large, sufficient warmth is provided across the whole floor surface to heat the room effectively.



Above: The heat source is the main component of the heating system and options include gas, diesel, heat pumps and solid fuel.

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It enables low temperature and eco-friendly heat sources to perform at their best and reduce carbon emissions. Design is key to an underfloor heating system working at its best. Once up and running, it is virtually maintenance free and pipework leaks are unheard of.

Heat sources

The heat source, or boiler, is the main component of any heating system, with many different options to choose from.

Gas (Natural and LPG)

Condensing system or combi units have taken over from big, heavy cast iron heat exchangers, ensuring good efficiency ratings, with both internal and external options available.

Diesel

Diesel units work much the same way as gas units and are available in condensing and non-condensing models, and both system and combi variants. External units are a popular option, taking the heat source out of the house.

Heat pumps

These units take the available heat from the ground or air surrounding a property and increase it to a more useful temperature for use in the home. This renewable source of heat can be used to

create warm water for central heating as well as hot water for both central heating and domestic hot water supply. Heat pumps achieve this by taking the same principle that allows a fridge to cool your groceries and utilising it in reverse.

Solid fuel

There are two main types of solid fuel boilers: atmospheric and gasification. These are a good choice for those with plentiful wood supply at hand. Atmospheric boilers are natural draft flue whereas gasification boilers are fan controlled, leading to a clean burn process—making them more efficient.

Controls

Controls can take many forms, from 230v to 12v to wireless, and from standard dial thermostats to smart stats to weather compensation.

Hydronic central heating running costs

Costs based on average 200m ² home. Running 6-8 hours per day. Inside temperature 20°C			
Heat Source	Cost of Heat	Heating Season Monthly Cost*	Approximate Install Costs*
Natural Gas	\$0.07-\$0.12 (per kWh)	\$270	\$15,000
LPG	\$0.17-\$0.23 (per kWh)	\$550	\$15,000
Diesel	\$0.11-\$0.16 (per kWh)	\$340	\$20,000
Wood	\$0.05-\$0.10 (per kWh)	\$260	\$25,000
Wood Pellet	\$0.09-\$0.18 (per kWh)	\$300	\$30,000
Air To Water Heat Pump	\$0.04-\$0.15 (per kWh)	\$265	\$20,000
Geothermal Heat Pump	\$0.03-\$0.10 (per kWh)	\$215	\$30,000

* These figures are approximate and will vary due to factors such as insulation levels, window glazing, building design and personal comfort levels.

The more advanced control systems for domestic central heating, generally known as smart heating controls, allow you to manage your heating controls remotely from a computer, tablet or smartphone.

An automated heating control system works out if and when to turn on the heating based on whether there is anyone in the building or approaching the building. It may use sensors in the home or track a phone's location to decide when to turn on the heating.

Running and installation costs

Running and installation costs are the elephant in the room and sometimes come down to the old adage: "The customer is always right, even when they are wrong." Opting for an underfloor heating system running on LPG is the one where you would probably spend the most time trying to change the customer's mind.



Above: Radiators have come a long way since the institutional variety—and can now be customised to suit a client's home.

About the author: Paul Woodgate is Secretary of The New Zealand Institute of Central Heating (NZICH), a community of industry leaders providing technical information and experience. NZICH aims to facilitate best practice through training to raise the standard of central heating in New Zealand. It represents those responsible for the design, installation, commissioning and maintenance of central heating systems. For more information on central heating or becoming an NZICH member: info@nzich.nz 028 411 5690 www.nzich.nz

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