

CASE STUDY

Cosy Double Storey Weatherboard Home, Christchurch



This home features radiators and an air-to-water heat pump.

New Central Heating System

16kW air-to-water heat pump supplying hot water to radiators in each room.

11 DeLonghi PHD radiators, 1 towel rail; total 11kW at 55/45/20 (21kW at 75/65/20).

1 room thermostat in the lounge controlling the heat pump and thermostatic valves on each radiator.

The main living areas are heated to 21°C during occupied times with the bedrooms at 18°C and an overall night time temperature of 18°C. The system is controlled automatically to bring the house up to temperature before the occupants get out of bed.

Previous Heating

2x 6kW air-to-air heat pumps: 1 heating the kitchen dining area and 1 in the hallway providing some heat to the bathroom and 2 bedrooms, but virtually none

to the lounge that was slightly offset from the hallway. 2 column heaters were also used when needed.

The lounge would be 10°C on a cold morning despite an air-to-air heat pump being less than 3m outside the lounge door which was offset from the direction the heat pump faced.

The lounge and bedrooms would be heated by column heaters in cold weather even when the heat pumps were running.

The 2 upstairs bedrooms were partially heated by heat from the kitchen/dining heat pump rising up the stairs.

House Details

- 130m² floor area
- Built in 1940
- Single glazed, timber framed windows
- 200mm loft insulation
- 75% walls insulated
- No floor insulation



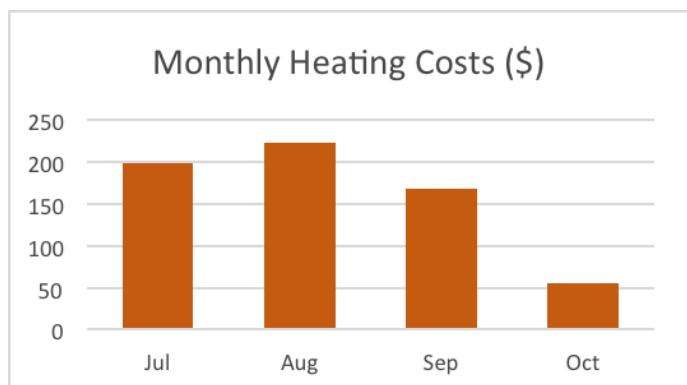
Monitoring Results

The new heat pump had a meter attached that measured the amount of heat it produced, and re-absorbed for defrost; and an electrical meter that measured all the electricity used by the heating system.

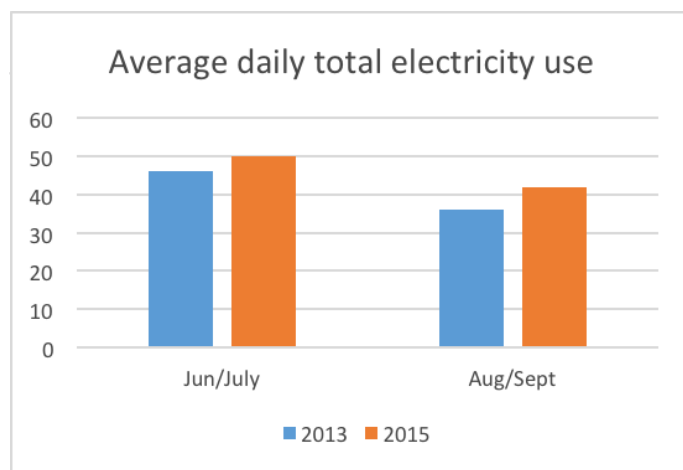
Month	Heat (kWh)	Power (kWh)	COP	Cost (\$) @ 25c/kWh
Jul	2242	794	2.82	199
Aug	2682	891	3.01	223
Sep	2070	669	3.09	167
Oct	741	224	3.31	56
Total	7735	2579	3.06	Avg 161

228 kWh of heat was reabsorbed for defrosting over this period.

Overall COP = $(7735 - 228) / 2579 = 2.9$ when defrost is taken into account.



Heating costs, assuming electricity at 25c/kWh.



10% compared to 2013 when the house was last continuously occupied over the winter (The house had EQC repairs during the winter of 2014, and was unoccupied for 2 months).

However, not only was 2015 a cold winter but the whole house was warm in 2015 whereas before the central heating was installed, large parts of the house, in particular the lounge were never properly warm in winter.