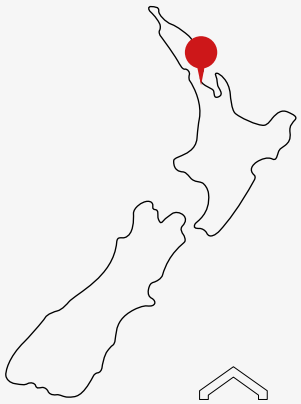
Project Showcase:

Ecodan Rothesay Bay Renovation Project

AUCKLAND



RESIDENTIAL

Located on the sunny east coast of Auckland, a Rothesay Bay family completed a basement excavation project that features an Ecodan Hot Water Heat Pump at the heart of their hydronic underfloor heating and potable water heating.

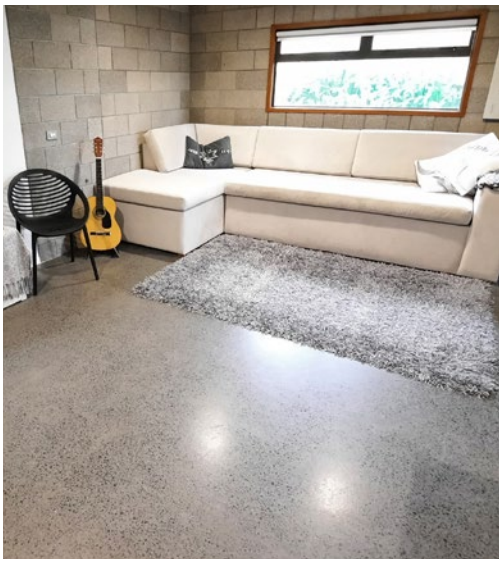
Initially the homeowners set out to find an energy efficient, low carbon way to heat an underfloor heating system. In their search they were surprised to discover a solution that could also replace their potable water heating system, to deliver quick and reliable hot water whenever needed.

EQUIPMENT BREAKDOWN

- Ecodan Hot Water Heat Pump
- Domestic Hot Water
- Underfloor Heating

The Goal

When planning the development of their excavated basement into a habitable area with a laundry, bathroom, double garage and a rumpus room that could also be a guest suite, an underfloor heating system for the concrete flooring was decided on. Underfloor heating would not only help beat the winter chill in the space but also offer passive convection heating to the upstairs living area and allow the owners to forgo the dividing door, the only protection from the encroaching cold.



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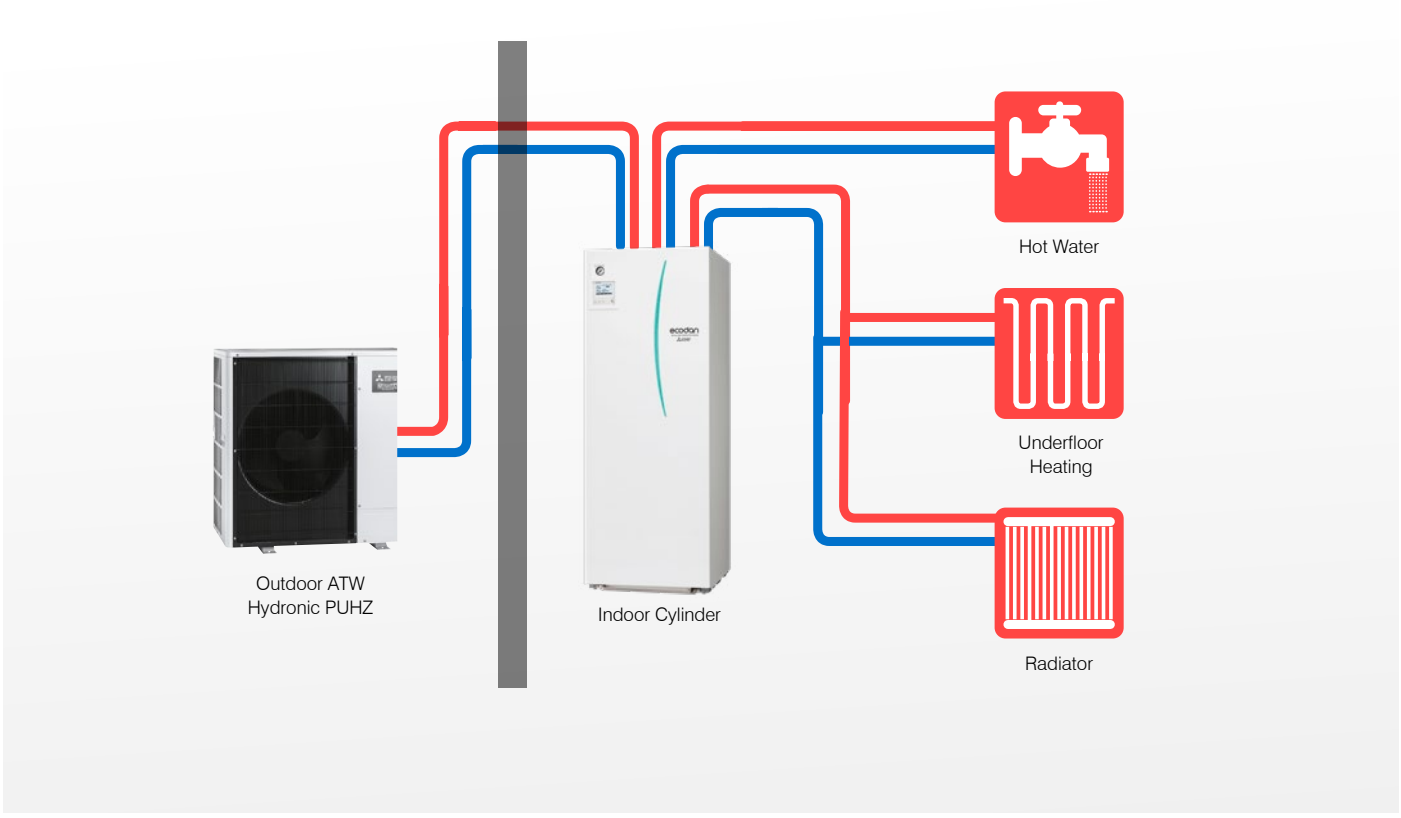
The Challenge

With underfloor heating in their renovation blueprint, the homeowners needed a system that would allow them to individually control each space and avoid wasted energy by heating the areas not in use from time to time such as the double garage.

However, with an ageing electric 180L hot water cylinder in need of replacement, the owners opted for more energy efficient heat pump technology – that would ensure reliable home water heating and also meet their newly added hydronic underfloor heating demands.

The Mitsubishi Electric Ecodan Hot Water Heat Pump Solution

An Ecodan Air-to-Water Heat Pump System with a packaged 200L cylinder was chosen to achieve the overall goal of having an effective and efficient solution that delivers both hydronic underfloor heating for the ground level, as well as the home's potable water heating, all from a single heat pump system.



Project Showcase: Rothesay Bay Renovation Project

Convenient Packaged System

The chosen packaged system conveniently comes pre-plumbed and pre-wired. This solution incorporates a 200 litre water cylinder that provides improved performance and fast heat-up times through the use of the onboard Plate Heat Exchanger Technology.

Not being able to install the new cylinder in the original upstairs hot water cupboard, the homeowners needed to utilise a storage cupboard in the basement, resulting in a tidy installation.

An Ultra-Quiet Outdoor Unit

The outdoor unit needed to be quiet enough not to be heard due to its placement in close proximity to their neighbour's bedroom. Fortunately, the Ecodan Hot Water Heat Pump operates discreetly with a sound pressure level as low as 45dBA*.

* Measured at 1m from the front of the outdoor unit operating under normal heating conditions at outdoor temperature 7°CDB/ 6°CWB, outlet water temperature 55°C.

Hydronic Underfloor Heating with Multiple Zones

During winter the large basement level would often be very cold and the chill would creep into the main upstairs living area. With an Ecodan Hot Water Heat Pump, the family can enjoy warm ambient air rising from the underfloor heating when working downstairs, hosting guests or doing laundry. And with a love for the ocean, water sport equipment and wetsuits can dry quickly in the garage without needing to air outside.

Featuring 4 independent zones of underfloor heating and a dedicated controller, the owners can switch off areas when not in use to avoid wasteful energy use.

Built-In Smart Control with Energy Monitoring

Energy monitoring is built-in as standard and the homeowner can check to see how much energy they have consumed and how much heat is delivered to the home.

The intelligent FTC5 Controller also actively manages the heat required via the combined user interface and thermostat. At the same time as managing the heat load with minimum energy use, this system will also actively manage the hot water by checking the tank every half hour for a 10°C drop in temperature. The tank is then quickly topped up back to 60°C when required to ensure hot water is always on tap.

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The Results

This Rothesay Bay family now enjoy the inviting warmth of the new ground floor area which has proven to be a real asset over the past year of lockdowns, using it as a comfortable home office when not in use as a rumpus room or entertainment area for the whole family.

Now with reliable potable hot water supply to meet their washing and cooking needs, the owners also enjoy a passive heating effect into the upstairs living area from the underfloor heating. In addition, as the home features double glazing and insulation, the systems space heating is maximised.

Doug the homeowner says, “The underfloor heating of basement slab has not only given us a warm and dry living area downstairs during winter, but also we are getting some ‘passive’ heating affect upstairs on the main living area, significantly reducing the time we have the gas wood burner fireplace on. Normally we would go through a 45kg gas bottle a fortnight – now we’ve only needed 1 gas bottle replacement this winter!

The system with incorporated Hot Water Cylinder has so far provided us with all our water heating requirements as a family of 4 – while also keeping our underfloor areas downstairs at a warm cosy level throughout some pretty cold nights for our coastal North Shore location.”

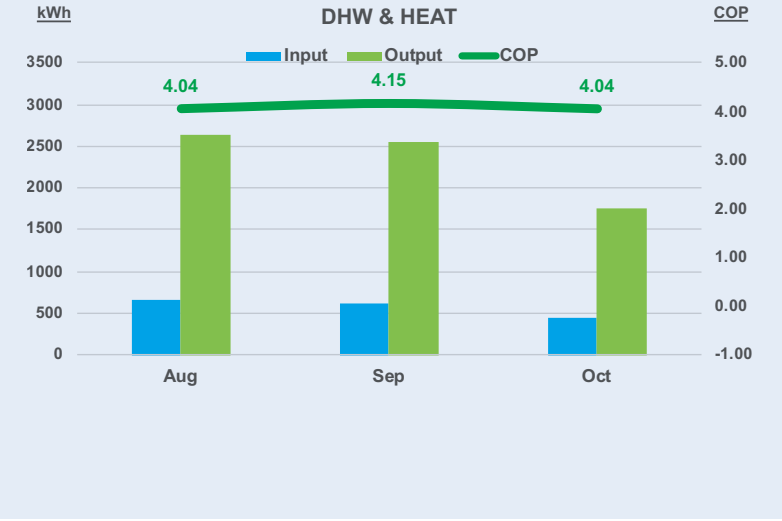
Project Showcase: Rothesay Bay Renovation Project

Proven Energy Efficiency

The efficiency of a heat pump is known as the Coefficient of Performance or COP and is a ratio of the heat delivered to power consumed. For the months of August-October 2021, when the family were spending more time at home due to a city lockdown, the Packaged Ecodan Hot Water Heat Pump System performed with an impressive COP of 4*1.

In comparison, typical gas and direct electric heating systems can have higher running costs with COPs as low as 0.82*2.

By choosing an Ecodan Hot Water Heat Pump instead of a natural gas hot water and heating system their carbon footprint is reduced by approximately 1.65 tonnes in the 3 months since installation*3. Furthermore, they would have also reduced their running costs when comparing to an electrical resistive heating system by approximately $1,422.1 or 70%*4 by selecting Ecodan.



*1 Based on the unit's August 2021-October 2021 electrical consumption (1698 kWh) and heat delivery through heating and hot water (6925 kWh).
*2 Based on manufacturer information for gas instant hot water heater (non-condensing).
*3 Assuming natural gas CO_2 equivalent emissions = 0.2167kg per kWh (source: https://tools.genless.govt.nz/businesses/wood-energy-calculators/co2-emission-calculator/) and Electrical CO_2 Equivalent emissions = 0.1347kg/kWh (source: MBIE Electrical generation data 2020).
*4 Based on data supplied by MBIE of electrical charges of 29.11 c/unit and at Ecodan COP of 4.07 (source: homeowner supplied data).

Full Equipment Breakdown

Ecodan Hot Water System

1x PUHZ-W60VAA 6kW Outdoor Unit
1x EHPT20X-VM2CR2 200L Hot Water Cylinder

Controller

1x PAR-W31MAA

Accessories

3x TW-TH16-E Thermistors

Installer:

HVAC MANAGEMENT LTD