CASE STUDY | DOMESTIC
NEWBUILD | PRIVATE

Bennachie Hills, Aberdeen

New home for Scottish heating boss makes strong case for renewables

A remote newbuild family home north of the Scottish Highlands makes a bold expression of support for renewable energy to ensure year-round warmth and hot water.

It is also an early adopter of advanced heating technology with one of the first installations of the R32-based Daikin Altherma 3 low temperature Hydrosplit heat pump, which heads a trio of Daikin systems on the site.

The 252m^2 three-bedroom house with separate 55m^2 one-bedroom flat is built on part of a farm on the edge of a tiny hamlet – some 20 miles inland from Aberdeen. It's the new home of ClanCool Refrigeration director David Watt and his family, who have moved a few miles from the larger village of Old Rayne.

An extensively glazed lounge and decking outside the new house provide a spectacular cross-country view southwards to the Bennachie Hills, a favourite area for family walks.

The Watts' 16kW Daikin Altherma 3 heat pump serves the main house, providing hot water at 45°C to the underfloor heating loops and towel rails so as to maintain a temperature of 21°C throughout (22°C in the bathrooms). The system also ensures ample hot water at 55°C is on tap in the kitchen and bathrooms. This will be no problem, given the system's ability to extract heat energy from the air – even if the outside temperature drops to -28°C – and to deliver hot water up to 65°C.

The twin-fan outdoor unit is sited on the outside wall of the plant room, giving the shortest possible through-the-wall connectivity to the system's wall mounted indoor hydrobox, and through it to the adjacent 300 litre Daikin domestic hot water cylinder and third party underfloor heating manifold.

The outdoor unit features Daikin's Bluevolution technology, combining high-efficiency compressor technology and R32 refrigerant. The combination of a substantially lower Global Warming Potential and a reduced charge volume of 3.5kg translate to a 75% lower CO_2 equivalent rating, compared to earlier R410a systems.

Year of installation

› 2020

Project requirements

- [x] LT Split
- [ ] LT Mono
- [ ] HT Split
- [ ] Hybrid
- [ ] Combustion
- [x] Smart Controls
- [ ] Solar Thermal
- [ ] UFH
- [ ] Heat Pump Convector

Installed systems

› Daikin Altherma 3 outdoor unit
› Daikin Altherma 3 indoor unit

A new gas injection scroll compressor ensures reliable performance in sub-zero outdoor temperatures and supports a 35% improvement in heating capacity. A leaving water temperature of 60°C can be achieved, even when it is -10°C outdoors.

The Daikin Altherma 3 has a factory-sealed refrigerant circuit, simplifying installation, reducing the risk of gas leakage and eliminating the need for refrigerant inside the house. There is a heat exchanger in the outdoor unit, and simple water connections to the wall-mounted hydrobox indoors.

The compact hydrobox contains all the hydraulic components – including pump and expansion vessel – needed for serving heating and DHW systems. It also has the main system controls.

Also, outside the plant room is part of the second Daikin system – a 6hp mini-VRV air conditioning outdoor unit. This R410a system serves a pair of concealed ceiling units (medium static pressure), each of which is connected to a Daikin Easyzone unit – to deliver variable flows of cooled (or warmed) air to seven ceiling grilles through the house.

The loft-mounted units have anti-vibration mountings, and 300mm insulation provides additional sound attenuation.

Easyzone units have thermostatically operated motorised dampers that maintain set temperatures by adjusting the flow of air in each of the delivery ducts. The units are controlled via a Blueface controller in conjunction with touchscreen room thermostats and Daikin's elegant Madoka wired controllers.

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For the adjacent apartment, over a triple garage, a 4kW Daikin Altherma Low Temperature outdoor unit serves a wall mounted hydrobox and delivers water at 45°C to the radiators and maintains 55°C in the Daikin 200 litre unvented DHW cylinder. The 55m² apartment consists of a kitchen-living room, bedroom and shower room with toilet.

ClanCool, which is based at Kintore, south of Inverurie, specialises in both refrigeration systems and renewable energy heating, with 10 years' experience of Daikin Altherma air source heat pumps. The company has a team of 10, which includes three generations of the Watt family.

According to ClanCool's website: "Using the latest technology and energy saving equipment has become essential to us and our customers to ensure the best running costs and increased life cycle of equipment are provided."

David Watt says: "We install Daikin Altherma heating systems because we get the products we need for our customers. If they are installed and serviced properly, they are never a problem. I can deal with the Daikin team in Glasgow, and if I need it theres always someone I can call to help me."

Kit list

Code	Description	No of units
EPGA-DV	Daikin Altherma 3 outdoor unit	1
EABH-DA6V	Daikin Altherma 3 indoor unit	1
EKHWSU	Daikin unvented cylinder	2
ERGA-DVA	Daikin Altherma LT outdoor unit	1
EHBH-D6V	Daikin Altherma LT indoor unit	1
RXYSQ-TV9	Mini VRV outdoor unit	1
BRC1H519W7	Madoka wired controller (white)	2
FXSQ-A	Concealed ceiling unit (MSP)	2
AZEZ6DAIST07-	Easyzone unit	2
AZCE6BLUEFACECB	Blueface wired controller	2
AZCE6THINKRB	Room thermostat	4

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