

Cornafulla National School

Air Source Heat Pumps for Heating and Hot Water

The School

Founded in 1843, Cornafulla National School is a mixed primary school near Athlone. It has more than 290 pupils.



Project Background



In April 2021, Minister of Education Norma Foley and the Minister for the Environment, climate, and communications, Eamon Ryan, launched a €14 million Pathfinder programme with the SEAI, with a view to demonstrating the approach to deep retrofit in schools and testing energy efficiency solutions and renewable heat technology.

Cornafulla National School was one of six schools, initially selected to take part in the programme. The upgrades target a Building Energy Rating of B, 50% energy efficiency improvement, and 50% emissions reduction. **RVR has provided heat pump solutions for two of the projects.**



**CLIMATE
ACTION
PLAN**

The pathfinder programme provides a template for large scale retrofit of all schools in Ireland, which will be required to help Ireland reach its ambitious national targets. The public service must reduce emissions by at least 50% by 2030 and net zero by 2050.

Installation at Cornafulla National School

The primary objectives of the installation were to:

- Achieve a Building Energy Rating of B
- 50% energy efficiency improvement and 50% emissions reduction
- Provide a template for large scale retrofit of schools in Ireland



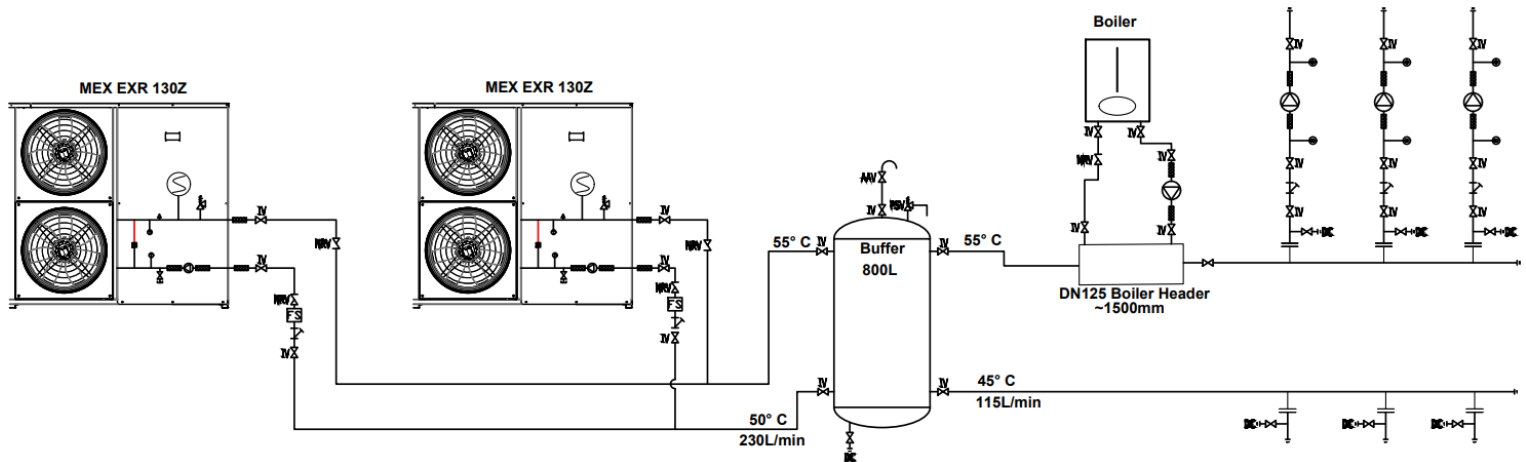
Two Thermocold MEX EXR 130 heat pumps were installed in August 2021.

The Thermocold MEX EXR 130 is a three-phase air/water heat pump with a nominal capacity of 37.7kW.

MEX EXR units are characterized by an extended operating map and can reach high outlet water temperatures even at low outdoor temperatures. The ability to provide 65°C water at an outdoor temperature of -10°C allows operation year-round with medium or high-temperature heat emitters.



Hydraulic schematic



To help reach capacity when required, a supplementary boiler was installed for both water heating and central heating. It is intended that 90% of the space heating load is met by the heat pumps. If the flow temperature setpoint is not achieved within a defined period (60 minutes), the boiler will be fired.

This hybrid system provides a lower capital cost than a system based on 100% heat pump technology.

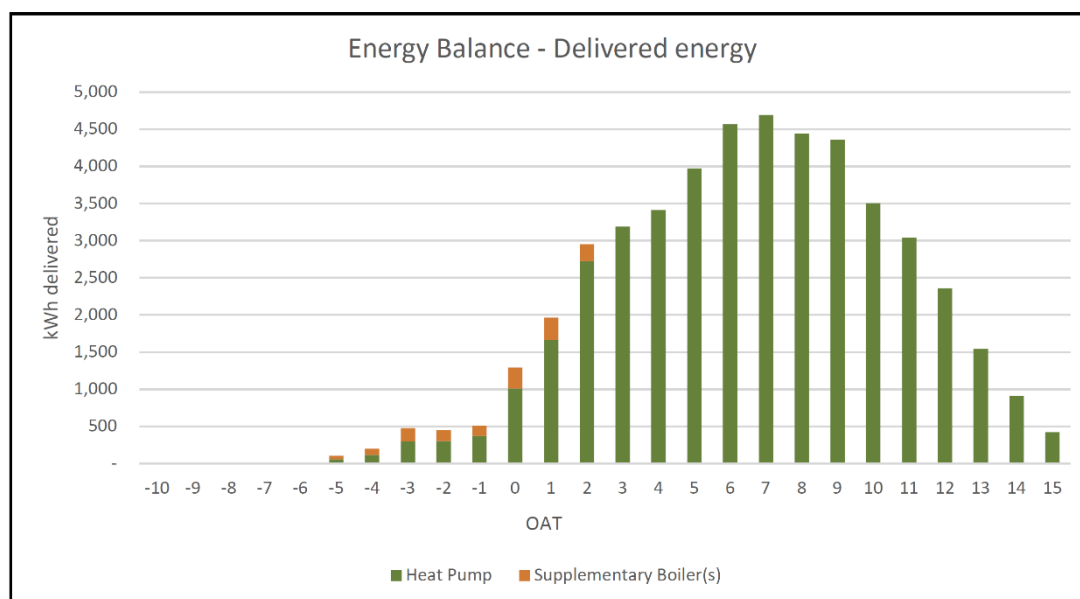


Additionally, an 8.5kW Mitsubishi Ecodan PUZ-WM R32 Monobloc heat pump was installed to provide hot water for the school.

Hybrid Heating System

The system was designed as a hybrid system with the existing boiler providing additional capacity at times of peak demand.

90% of the heating load is provided by the heat pumps. The graph below demonstrates the energy balance based on the EN14825 methodology and the manufacturer's EN14511 and EN14825 data.



Control

Heat Pump Cascade

The heat pumps operate in a cascade arrangement with rotation of the primary heat pump periodically. This configuration provides very good load matching.

The MEX EXR130 has a stepped type compressor control which allows for excellent controllability. When combined with cascade operation it offers very precise capacity control and increased efficiency as a result.

Boiler Control

The boiler offers additional capacity at times of peak demand – usually during wintertime.

Applications

The MEX EXR is perfect for new buildings due to compliance with ErP Directive 2009/125/EC and NZEB. Eco-design compliant EN14825 data is available for low (35°C) and medium temperature (55°C) applications. This makes them ideal for use in new build and retrofit applications as the data required for NEAP is readily available.

Applications include:

- Schools
- Hotels
- Nursing Homes
- Light Commercial applications



Benefits

- Designed in compliance with the ErP Directive 2009/125/EC
- Environmentally friendly system for central heating
- Extended operating map with the ability to reach high outlet water temperatures even at very low outdoor temperature

Parties involved

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