Edinburgh Trials New Sea Water-Based Heating System

Photo credit: Dr. Andrew Fraser-Harris, SeaWarm

Scientists at Edinburgh University have developed an innovative new home heating system. SeaWarm uses water from various sources such as seawater, rivers, ponds, and mine water to heat homes. Similar to air and water source heat pumps, which capture the ambient warmth of water with glycol compressed in a heat pump. SeaWarm serves as a compact and suitable solution for homes or small buildings that can be scaled to multiple heating units.

Multiple projects involving the SeaWarm system are being trialled in several locations. These include an affordable housing project near Edinburgh, a lead-mining museum in

southwest Scotland, and a commercial greenhouse in Fife.

Another installation is scheduled for the Scottish Seabird Centre in North Berwick, utilising the university's innovative technology. The system is designed for portable heating provision for homes and small buildings such as those in rural and coastal areas as it can provide stable heating by using local water sources.

The technology serves as another arm in the broader effort to develop small-scale green energy systems. In an effort to decrease the environmental impact of the traditional gas and oil heating systems in the UK, the university seems to have taken inspiration from renewable energy heating systems.

With high efficiencies, it could aid in the transition to zero-carbon energy. Its main feature is the long distances it can deliver heat from and the ability to support multiple heating systems simultaneously.

SeaWarm can use water bodies up to half a kilometre away while delivering 350% to 400% more heat than the electricity it consumes, making it 4 to 5 times more efficient than the average boiler. For context, most heat pumps require a source that is around the home as opposed to multiple 100s of metres away.

Much like traditional heat pumps, SeaWarm uses glycol heat water for radiators and baths. The process then repeats as the glycol cools down. The entire heat flow can also be reversed, extracting heat from the home and transporting it outside to induce cooling.

The current versions of the heat pump have already shown civil applications in multiple projects. The pilot project is currently part of LAR Housing Trust's affordable housing initiative and involves pumping sea water to heat old naval barracks. The SeaWarm system, expected to be costlier than air source heat pumps but cheaper than ground source ones, can

also function with frozen water, enhancing its versatility.

The ability to work with frozen water is unique to this heat pump and may indicate a more versatile set of functions in extreme temperatures. Most heat pumps lose efficiency in the cold and some can even be prone to freezing in excessive cold. With the possibility that such a system can work properly in colder climates, it could make heat pump-style technologies more viable for snowy regions.

The real trial of such a system is what amount of heating and cooling outlets it can support. This could give it an edge over traditional heat pumps which can have space limitations unless you pay for an even more costly system. The ability to power more heating outlets may make the system useful for large properties that would ordinarily have a lot of heating expenses with traditional systems.

While it is more versatile than most domestic heating systems, providing air conditioning for both summer and winter, heat pumps have had some trouble winning over the public due to their costs, which can be anywhere from £2,400 to £14,000 (depending on the specifics of your home, the model, and whether you can receive a grant). For many consumers, this can be exorbitant, especially compared to how much a new boiler will cost.

Currently, the research and development efforts are aimed at targeting various markets and end users, particularly waterside properties and businesses such as marinas that have easy access to the sea. The goal is to establish SeaWarm as an independent company by the end of the summer, with a commercial product potentially available by the year's end.

While the trials have been promising, there are many hurdles for new technologies. They often run up against the difficulties of adjusting already existing homes and convincing people to switch over to the new systems that might

require adjustments.

Whether this new technology will receive government funding like other forms of heat pumps may also be a factor that could decide its ability to survive in the market. Applications for heat pump grants rose to 25,000 with more than £148 million issued. As part of multiple grants such as ECO4 and the Boiler Upgrade Scheme, various schemes and incentives have been promoting heat pumps.

Transitioning towards new, more efficient heating systems can be a crucial effort in reducing heating costs and helping meet net-zero targets. This technology could be a novel addition to heating options for consumers and businesses.