SeaWarm

Biotechnology and Biological Sciences Research Council

ROSLIN INNOVATION CENTRE

Transforming greenhouse productivity through low-carbon water-source heating

SeaWarm Limited

SeaWarm Ltd is a clean-tech spin out from the University of Edinburgh developing modular, low-cost heat-exchange systems that harness thermal energy from water sources, including rivers, lochs, seawater or mine-water, to provide sustainable heating and cooling.

Their technology adopts heat-pump principles to harness stable water temperatures, delivering higher efficiency in colder climates. Designed for sectors with high heat needs, **SeaWarms'** systems reduce reliance on fossil fuels, lower carbon emissions and cut energy costs.

Based at the **Roslin Innovation Centre** Agri Field Station, opened in early 2024, **SeaWarm** benefits from facilities dedicated to supporting agriculture research.

The agriculture sector faces a significant challenge in maintaining stable, energy-efficient temperatures in greenhouses and polytunnels, particularly in cooler climates like the UK. Limited heating capacity restricts growers to one or two growing cycles per year, reducing domestic production and increasing reliance on imports. Traditional fossil-fuel heating systems are costly, carbon-intensive, and incompatible with net-zero targets, leaving growers without an affordable, sustainable alternative. The challenge is to develop a low-carbon heating solution that can stabilise greenhouse temperatures, extend the growing season, improve crop yields, and reduce operational costs. Addressing this requires technology that is economically viable, technically robust, environmentally sustainable, and scalable across commercial horticultural settings.

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The **Campus Innovation Award** enabled the successfully demonstration of SeaWarm's low-carbon, water-source heating technology within a commercial greenhouse environment, validating its potential to transform UK horticulture. The system stabilised temperatures in glasshouses and polytunnels, extending the growing season and significantly accelerating plant development. Plants grown in the heated zone reached saleable size in just two months instead of six, demonstrating strong commercial benefits and helping reduce reliance on imported produce. Technical validation confirmed improved energy efficiency, reduced diurnal temperature swings and a high Seasonal Coefficient of Performance, while carbon-footprint assessments showed substantial emissions reductions compared to fossil-fuel heating.

The project also established an ongoing demonstration site, generating real-world performance data that has strengthened the business case for wider industry adoption. This installation has led to the first commercial sale of the SeaWarm technology. Engagement with the commercial nursery has been highly positive, including a request for SeaWarm to quote for heating a proposed on-site café using the same technology.

Overall, the project positions SeaWarm-Agriculture as a scalable, practical and sustainable heating solution with strong future potential to support horticultural productivity, lower energy costs and contribute to net-zero goals across the sector.

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"Thanks to the Campus Innovation Award, we were able to trial our system in a real commercial nursery. The project showed growers that water-source heating can lower energy bills, extend the growing season and improve crop output—giving the industry a practical, scalable pathway to sustainable heat."

Prof. Christopher McDermott, Lead academic of SeaWarm Ltd.