

**Project Title:** A super performance dew point cooler for data centres

**Main Applicant:** University of Hull

**Technology Developer:** University of Hull

**Industry Partners:** AIRCO Refrigeration and Air Conditioning Ltd., NPS Humber Ltd.

**Demonstration Capital Cost:** £1,076,486.64

**Funding Awarded:** £676,503.95

**Project timeline:** 18 months

**Project Description:** The project aims to demonstrate a higher coefficient of performance (COP) evaporative dew point cooler for data centres. Through improvements to the heat and mass exchanger design, the wet agent formulation and fan and pump operation, the device has demonstrated a COP of 52.5 in a laboratory environment. This is a significant improvement over other evaporative cooling technologies, which have a COP of around 20, and over more traditionally used mechanical vapour compression cooling devices, which have a COPs of roughly 3.

The University of Hull is partnering AIRCO Refrigeration and Air Conditioning Ltd to demonstrate their technology at the Maritime Data Centre managed by NPS Humber Ltd. The site is considered a 'small data centre' with a 100kW cooling load, comparable to many data centres across the UK.

The goals of the project are to demonstrate a COP of 40 and to experience no failures during the project. It is anticipated that a successful demonstrator project will take the technology from TRL 6 to TRL 8/9 and into commercialisation.

**Size of the target market:** The target market is the UK data centre market with 286 sites presently operating within the UK. The market is constantly growing, and it is estimated that a further 1000 data centres will be built in the UK between 2021-2030. An additional market this technology can target is the traditional air conditioning market.

**Barrier to market:** Scale up of the system and components to size appropriate for demonstration. Demonstration of the reliability and energy savings associated with the demonstrated lab scale COP. Once proven, the system is modular in design so larger scale systems reducing a barrier to adoption.

**Initial TRL:** TRL 6

**Targeted Final TRL:** TRL 8/9

**Estimated energy and carbon savings:** The project aim is to save 270,100kWh per year at the demonstration site. This amounts to an overall electrical energy saving of 92.5%. Using current figures, this would represent a carbon saving of approximately 69tCO<sub>2</sub>.

**Why IEEA funding was important to this project:**

The proposed super performance dew point cooling technology will significantly reduce the power consumption of the data centre, hence making them competitive with conventional vapor compression air conditioning systems. This project will bring this technology from TRL6 to TRL8/9 by demonstrating the technology in an operational environment, i.e. Maritime Data Centre. The consortium partners have the skills and appetite to undertake this project, but none of them has the

resource to support such a multi-disciplinary, high investment project unilaterally. The IEAA funding will be wholly directed into additional demonstration activity within the partner organisations; presenting not only the means to meet project costs but also a unique support framework that will bring together partners whose combined expertise will produce a high quality outcome that is both innovative and scalable.