Cool change for air conditioning, refrigeration

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ARENA is providing $2 million in funding for Adelaide-based Glaciem Cooling Technologies to demonstrate its refrigeration, thermal energy storage and heat transfer technologies.

Unlike the products commonly available today, Glaciem uses natural refrigerants which are not harmful to the environment. Its system is designed to integrate with solar PV, offering energy efficiency advantages and minimising the need for grid-sourced electricity.

The $4.95 million project will trial the innovative technology at three locations – Ceravolo Orchards at Oakbank in the Adelaide Hills, Pernod Ricard Winemakers in the Barossa Valley and the Reef HQ Aquarium in Townsville.

The sites will employ three different technologies which make up the Glaciem system. These are:

- thermal energy storage and discharge through a heat transfer process
- use of carbon dioxide as a natural refrigerant for transfer fluid in heat pumps, instead of harmful hydrofluorocarbon
- an Advanced Control and Forecasting Algorithm (ACFA) control system which reduces costs by forecasting weather and

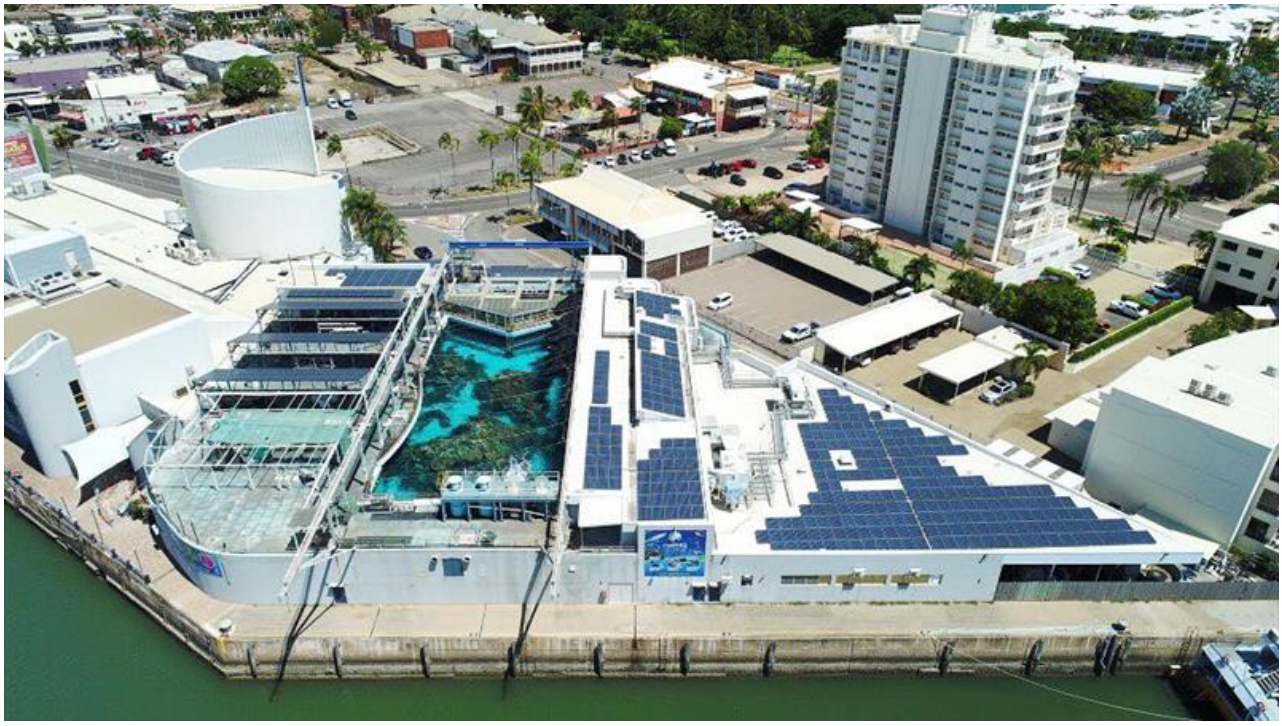
- electricity prices to make the most of the energy storage available

Glaciem's saltwater phase change (PCM) material has been developed with the University of South Australia to have a freezing and melting point of -6 degrees celsius, which is suitable for cold storage and air conditioning. The system captures renewable energy from solar panels to freeze the PCM solution, which can be thawed to provide a source of cold air for cooling or refrigeration when electricity prices are high.

The system was developed with the support of an ARENA research and development grant announced in 2016.

Ceravolo Orchards and Pernod Ricard Winemakers will pair the system with on-site solar panels to optimise their cold storage systems, while the Reef HQ Aquarium will integrate the technology with an expanded solar system for their air conditioning and water cooling.

The PCM thermal energy storage technology was first demonstrated commercially at Parilla Premium Potatoes in 2014. Findings from that research will be incorporated into the new trials as the technology moves into a demonstration and deployment phase.



The existing solar system at the Reef HQ Great Barrier Reef Aquarium in Townsville. Image: Commercial Drone Photography

Glaciem Managing Director Julian Hudson said the project "will demonstrate that there are real viable alternatives for end users of HVAC&R [heating, ventilation, air conditioning and refrigeration] that drastically reduce operating costs, maximise the economic potential of renewable energy assets and reduce direct and indirect CO2 emissions."

The project is the latest to receive funding from ARENA under its focus on helping industry reduce emissions. Last month, funding was announced for the Australian Alliance for Energy Productivity to help businesses make the transition to renewables. A potato processor, brewery and food manufacturer will be amongst five projects that progress to undertake feasibility studies.

ARENA CEO Darren Miller said Glaciem's system will help industrial energy users to reduce their emissions and maximise the value of their on-site renewable energy.

"The pilot sites trialling Glaciem's technology will demonstrate that refrigeration equipment, grid supply and on-site renewable energy generation can be reliably integrated across a range of commercial businesses," Darren Miller said.

"Heating and cooling is a huge driver of our electricity consumption including peak demand, which drives higher electricity prices for everyone."

In Australia, heating, ventilation, air conditioning and refrigeration alone consume around 22 per cent of all electricity produced and are responsible for around 50 per cent of peak demand on the electricity grid.

"There are significant opportunities across the heating and cooling sector to reduce energy costs and emissions by combining renewable energy alternatives with innovative storage technologies, and we're proud to support a homegrown startup like Glaciem do just that," Mr Miller said.

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