



*UniSA Research Node
for
Low Carbon Living Industry
Friends Forums*

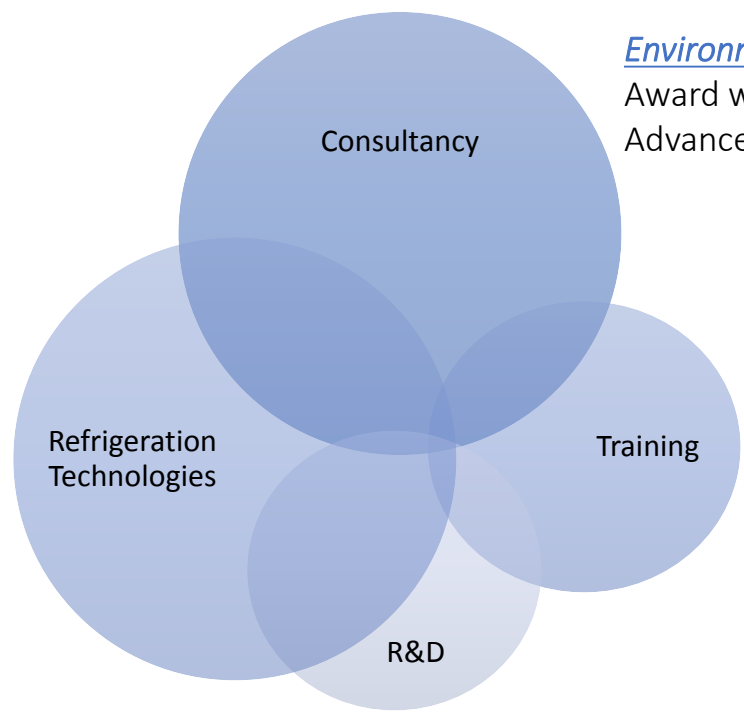
Innovative Natural Solutions



About Glaciem Cooling Technologies



Glaciem Cooling Technologies is a specialist refrigeration consultancy that implements bespoke solutions. Our unique business model configured in four distinct parts.



Environmentally Sustainable Energy efficient Technology

Award winning Renewable Thermal Energy Storage (Thermcold)
Advanced CO₂ systems (CO2LDCARBON)

Consultancy

To build on our innovative product portfolio, Glaciem offers a complete range of consulting, engineering and project management services that ensure that these technologies are applied correctly. These services “enables” our clients to transition away from old technologies to new more sustainable solutions.

Training

A cornerstone of Glaciem’s business model is Training & Education, we understand that for new technologies to succeed plant operators and service technicians need the knowledge and appropriate skill sets in order for our clients to get the full benefits of the new technology they have invested in. Glaciem provides full training on all its products together with courses on servicing and maintaining CO₂ and ammonia systems.

R&D

In collaboration with the University of South Australia, Glaciem Phase Change Material technology won the converted [Australian Museum ANSTO Eureka Prize for Innovative Use of Technology in 2015](#)

Building on this Success University of South Australia and Glaciem Cooling have just obtained an Australian Renewable Energy Agency ([ARENA](#)) grant to maximise solar photovoltaic with phase change thermal energy storage & a Australia-India Strategic Research Fund (AISRF) grant for enhancing the milk shelf life for the Indian Dairy Industry utilising PCM TES and Renewable Energy

Innovative Natural Solutions



Why Refrigeration Matters

Direct & Indirect CO₂ emissions

Mechanical refrigeration requires electricity and is energy intensive

This energy intensity leads to an increase in indirect CO₂ emissions (electricity generation) and depending on the type of refrigerant used direct CO₂-e emissions from refrigerant leaks and end of life destruction can also be large.

Figures to the right give an example of the amount of electricity refrigeration equipment in Australia consumes & associated CO₂ emissions

59,000 GWh Electricity
> 20%
of all Electricity
Produced
in Australia in 2012



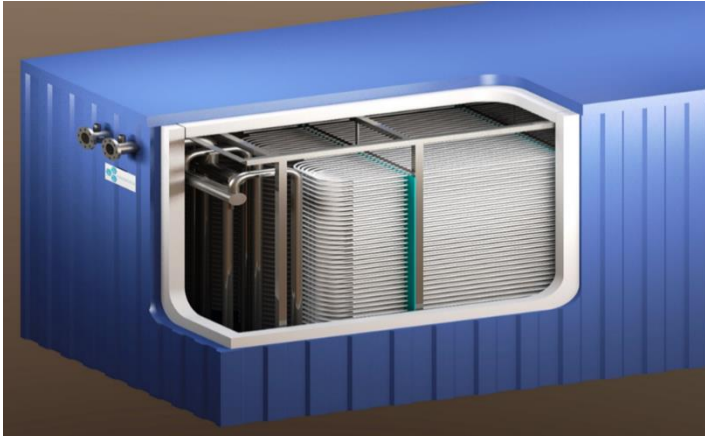
57 Mt CO₂-e, > 11%
of all Australia's Total
Annual Green House
Gas Emissions



Innovative Natural Solutions



Thermcold Thermal Energy Storage (TES)



*Thermal Battery;
Potential to store excess
electricity generated by
Solar PV or Wind in the
form of thermal energy.*



*Medium & low
Temperature Food
Storage (0°C to -21°C)
Using secondary glycol
solutions*



*Ideal suited for food
process requiring -6°C
glycol temperatures*



*Ideal for increasing
winery refrigeration
plant efficiency at low
loads outside vintage*

Glaciem Cooling Technologies thermal storage system **Thermcold** utilises the development of new **PCM's** to provides a **revolutionary breakthrough** that can significantly reduce energy costs for medium & low temperature refrigeration applications.

Phase Change Material (PCM) devolved by **UniSA winner** of the Australian Museum 2015 **ANSTO prize** for Innovative use of Technology

The technology has been **fully commercialised** by obtaining an **Australian government CleanTech grant** in 2013 and a **3200kW/h Thermal Energy Storage (TES)** system has been operating successfully at an Onion and Potato storage facility in South Australia.

The phase-change system:

Resolves the mismatch between generation hours and electricity use, so that solar and wind power can form an even larger slice of the national generation grid.

Reduces refrigeration electricity costs by up to 50% by charging during non-peak hours to discharge during peak-cost hours

Smooths out electricity use, reducing the need for expensive, peak-driven infrastructure, and for extra fossil-fuel generation of power during daylight hours

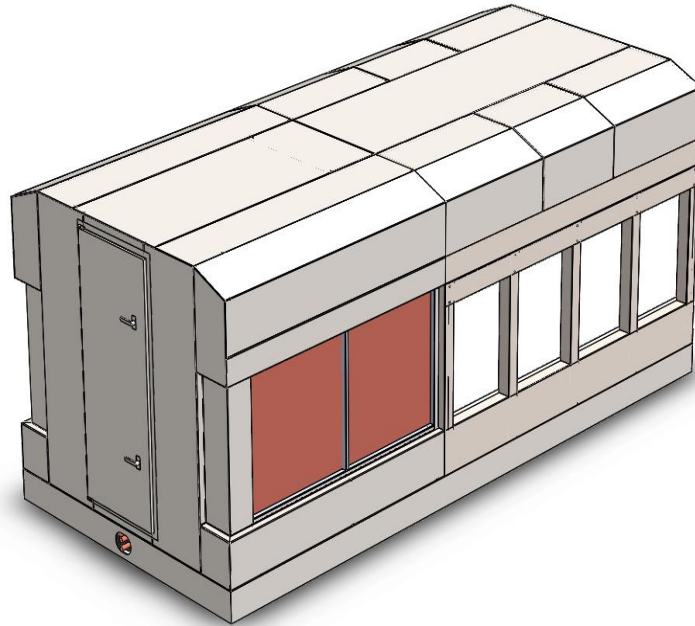
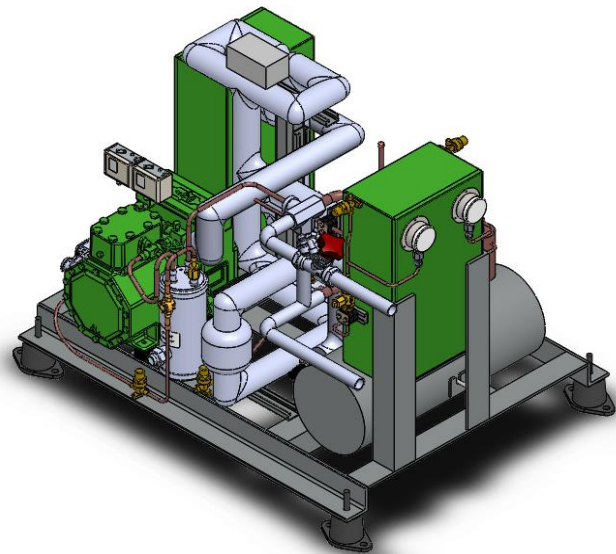
Innovative Natural Solutions



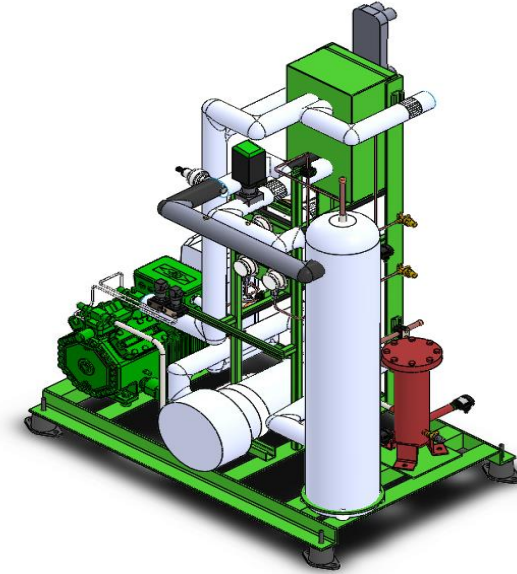
CO₂ (R744) Only Refrigeration Systems

Glaciem's CO₂ cooling platform (Patent Pending)
Commercial & Industrial Refrigeration
Commercial & Industrial Air Conditioning

Up to 74% Increase in efficiency than current
CO₂ only designs = Reduced direct & Indirect CO₂
Emissions



GLACIEM
COOLING TECHNOLOGIES



Innovative Natural Solutions

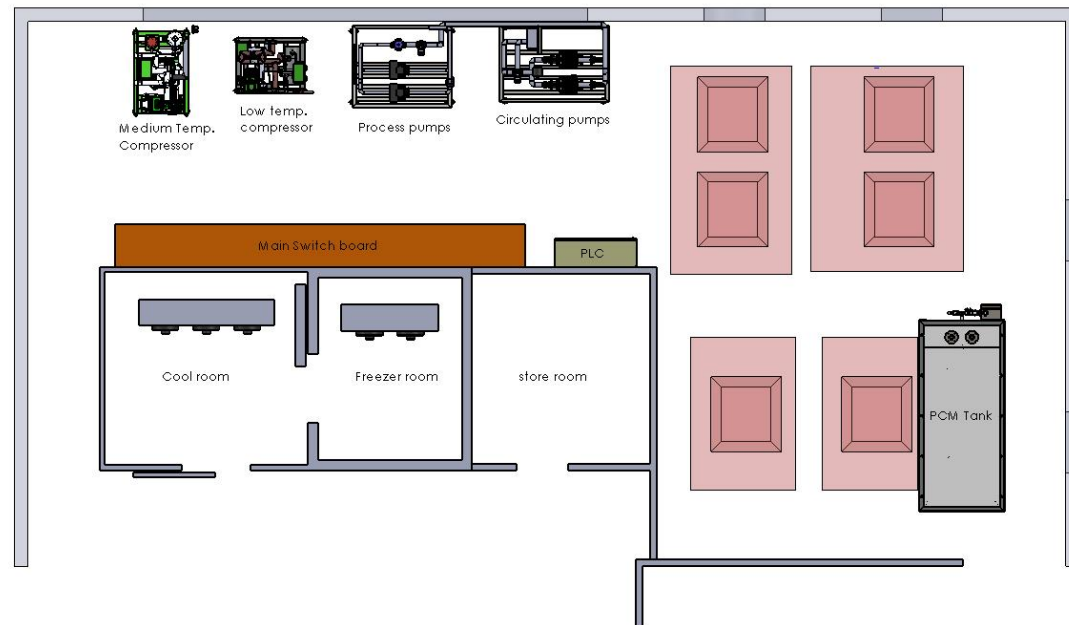


Talem Bend Motor Sports Park (TBMSP) Fully Integrated Cooling Solution (FICs)

Glaciem working with Peregrine Corporation
Infrastructure (PCI) & UniSA will be installing a
Fully Integrated Cooling Solution (FICs)

Fully Integrated Cooling Solution (FICs)

- 100kW/h Thermal Energy Storage (TES)
- Newly developed -6°C Phase Change Material (PCM)
- High efficiency CO₂ only system
- Newly developed hybrid cooling system
- Solar PV
- Battery Storage (enables islanding in the event of a power outage)
- Machine Learning integration software



Innovative Natural Solutions



Thank You for Your Attention

Innovative Natural Solutions

