Case story

Securing optimal efficiency for innovative solar energy storage

Alfa Laval provide heat exchangers for advanced renewable energy generation and long duration energy storage in Australia. When Cleantech start-up company, RayGen, was to build the world-first PV Ultra and Electro Thermal Storage power plant in Victoria, Australia, Alfa Laval provided plate heat exchangers to optimize energy efficiency and system design. With our global presence, expertise in thermal performance optimization, and superior technology, Alfa Laval is the perfect partner for Cleantech companies.

Sustainable technology for a decarbonized future

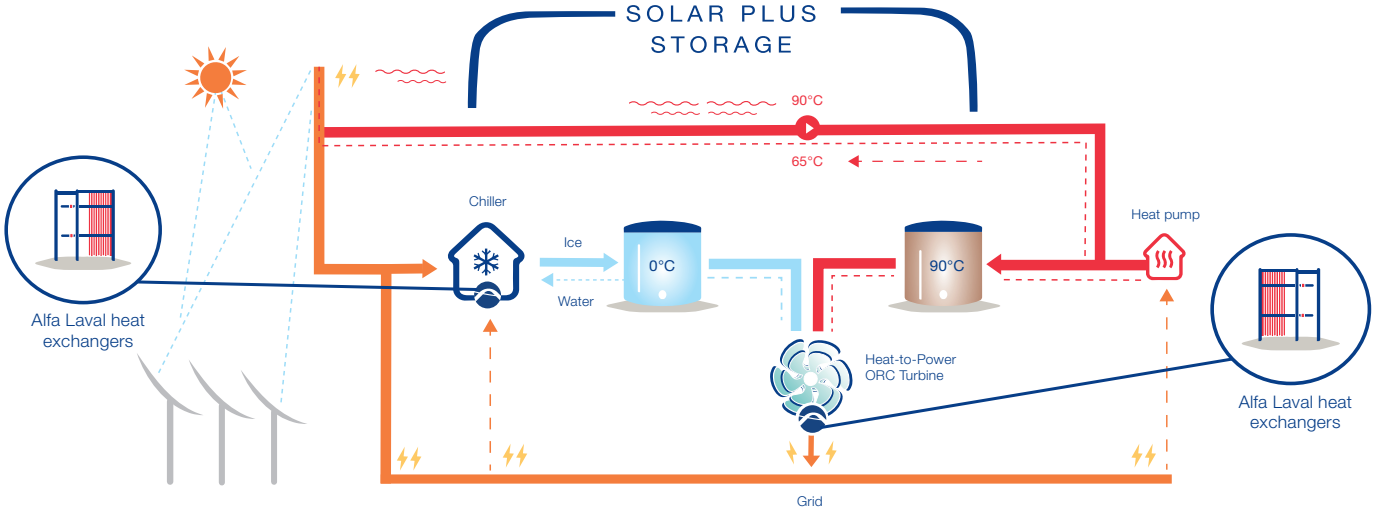
RayGen Resources is an Australian technology company with world-leading breakthroughs in solar power technology and renewable energy storage. They deliver solar plus storage with the economics of pumped hydro and the flexibility of batteries. The PV Ultra and Electro Thermal Storage technology captures sunlight using mirrors and stores energy in water. With energy stored as hot and cold water, electricity will be produced during the night using an Organic Rankine Cycle (ORC) turbine.

RayGen has pioneered the PV Ultra and Electro Thermal Storage System technologies to provide dispatchable renewable electricity on demand. They deployed their first PV Ultra project in Newbridge in 2015, and the first deployment of the combination of PV Ultra and Electro Thermal Storage technology in Carwarp in 2023.

The Carwarp project comprises 4 MW solar power plus a 3MW/50MWh ETS system that will save 10,000 tonnes CO_2 emissions per year and provide renewable electricity day and night to approximately 1,000 homes.

Proven technologies for a revolutionary system

Three proven technologies work together to create a revolutionary system. The solar field focuses the radiation to the receiver on top of a tower, where PV ULTRA - satellite grade photovoltaic module – is located



and produces both electricity and heat. The heat is stored in the water-based thermal storage reservoir (90 °C), while the electricity is either fed into the grid or is stored by powering a chiller which cools the water in the cold storage reservoir (0 °C).

The two storage reservoirs - each roughly the size of four Olympic size swimming pools - act as the hot and cold sinks for the Organic Rankine Cycle (ORC) system, which is the power block that dispatches renewable electricity on demand from the stored energy.

Alfa Laval semi-welded and fully gasketed heat exchangers are used in both the chiller and the ORC system.

Helping to make a difference

To meet RayGen's requirements, Alfa Laval experts worked closely across borders to deliver superior technology combined with profound application and thermal performance optimization expertise. The collaboration stretched across continents with RayGen for the chiller as well as subcontractors in Turkey for the ORC.

Fifteen units have been provided to this project of the gasketed and semi-welded plate heat exchangers type. Equipped with the unique features RefTight™, a high-performance gasket sealing for high-pressure duties, CurveFlow™ a distribution area that improves media flow and minimizes the risk of fouling and OmegaPort™ with noncircular port holes which enhances the media flow and thermal efficiency. Alfa Laval supplied the perfect solution on time and completely according to the specifications set up for the project.

Alfa Laval provided deep knowledge in system design development as well as support and collaboration which provided important insights to the project development. The PV Ultra and Electro Thermal Storage technology can easily be scaled-out to larger projects at lower costs, with flexibility in configuration and operation, where Alfa Laval can be a reliable strategic heat exchanger supplier.

RefTight™ sealing system

CurveFlow™ distribution area

OmegaPort™ noncircular portholes

Product specifications

Package	Type	Position
ORC	8 Semi-Welded PHE	Recuperator, Condenser
Chiller	6 Semi-Welded PHE	Flooded Evaporative Chillers, Ammonia Desuperheaters, Oil Coolers
	1 Gasketed PHE	Brine/Water PHE

Alfa Laval is committed globally to collaborating with cleantech pioneers like RayGen to accelerate energy transition by leveraging its extensive experience in thermal and mechanical design for optimum and reliable thermal performance. With the capacity and know how to help cleantech startups and accelerate their development, Alfa Laval makes a difference.

"A reliable partner, Alfa Laval shares our commitment to the global transition to renewable energy and has delivered superior heat transfer technology and expertise at our Carwarp power plant."

Richard Payne, CEO, RayGen

Technology shift

Innovative long duration energy storage solutions

Co_2 Emission

Save 10,000 tonnes CO_2 emissions every year

Homes

Provide renewable electricity day and night to approximately 1,000 homes

How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com.

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Alfa Laval reserves the right to change specifications without prior notification.