CASE STORY

Transforming sunlight into renewable energy for sustainable heating

Heliac A/S, Denmark

Renewable energy has been hailed as the world's least expensive energy source. To accelerate the renewable energy transition, Danish solar energy supplier Heliac A/S is turning energy from the sun into solar heat for global process industries – at costs well below heat produced from fossil fuel combustion. To do so, Heliac collaborated with Alfa Laval to develop a highly efficient solar receiver for the Heliac Solar Tracker. The Heliac solar thermal technology and business model are redefining the way solar heat is produced, sold and integrated into tomorrow's energy solutions today.

Transitioning to concentrated solar heat

Unlike traditional curved-lens technology, the Heliac Solar Tracker uses flat transparent lenses to concentrate the sun's radiant energy into a single high-intensity beam. A critical system component is the high-performance Alfa Laval STC40 solar receiver, which transforms the concentrated sunlight into heat energy.

The result is a versatile, innovative solar energy solution that drastically reduces the costs and carbon footprint of thermal heating for industrial processes.

Designing a fit-for-purpose solar receiver

Heliac faced difficulties sourcing a solar receiver because its solar tracker concentrated the sunlight at such high intensities that the heat burned through the metal of other solar receivers. That's when Heliac asked Alfa Laval for help.

"Working with Alfa Laval experts to develop a quality fit-for-purpose solar receiver has been a rewarding learning experience. Their structured approach to iterative design and engineering has been invaluable, when dealing with issues that arise," says Henrik Pranov, CEO, Heliac. "Alfa Laval works through and overcomes design challenges. Through continual testing and refinements, we reached our goal, a high-efficiency solar receiver that meets our requirements."

The innovative Alfa Laval STC40 solar receiver, made of 100% stainless steel, provides unbeatable reliability, unmatched corrosion resistance and the capability to withstand temperatures up to 550°C (1,020°F). To absorb sunlight more efficiently and maximize the amount of energy transformed into heat, Heliac applied a special coating to the STC40.

"There are two essential components responsible for the efficiency of our Heliac Solar Tracker. The Alfa Laval STC40 is one of them. The other is our flat transparent lens," says Mr. Pranov. "But without the Alfa Laval STC40, we would not have a product."

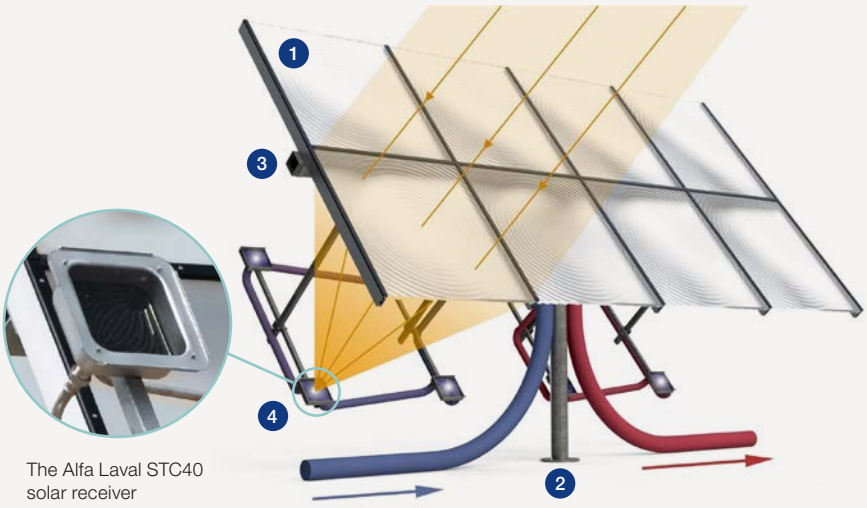
How the Heliac Solar Tracker works

1 Lenses
Each lens in the eight-lens panel concentrates the sunlight 50 times onto the Alfa Laval STC40 solar receivers.

2 Panels
Each panel consists of eight lenses, one foundation vibrated into the ground and piping between the receivers.

3 Follows the sun
Each eight-lens panel tracks the sunlight individually in two dimensions, ensuring optimal harvest of energy.

4 Receiver
The temperature of the water is increased 1–2°C per receiver.



The Alfa Laval STC40 solar receiver

The focused sunlight heats a liquid running through the Alfa Laval STC40 solar receivers. Regulating the liquid flow rate enables temperature control. The Alfa Laval STC40 transfers generated heat by directing the liquid through a standard heat exchanger.

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High efficiency, greater cost savings

Efficiency is at the forefront of the Heliac agenda. The Heliac Solar Tracker and the Alfa Laval STC40 deliver the same efficiency as traditional curved mirror-based solar concentrators at costs far less than comparable traditional technologies. The flat structure of Heliac panels requires less material to manufacture, less site work, and easier-to-install ramp foundations instead of concrete foundations. They are also easy to position in the solar fields, which is especially useful in areas prone to high winds. The STC40 also contributes to sustainable cost savings due to its high efficiency and small footprint.

Innovative solutions to store and sell solar thermal energy

Heliac is not only reinventing solar thermal energy production, but also its storage and sales. Other concentrated solar technologies that produce electricity must store heat at extremely high temperatures. Heliac is focused on meeting the needs of the industrial and district heating sectors where storage temperatures are below 200°C.

It is common, for instance, to store solar thermal energy in the system fluid. Heliac uses large water tanks to store solar thermal energy when the fluid temperature is below 100°C. Temperatures above 100°C require costly pressurized vessels, which prompted Heliac to explore other storage concepts.

“Our focus is scalability and cost – not on high storage temperatures,” explains Mr. Pranov. “This is why we are looking to store thermal heat in tanks containing stone or molten salts at our solar fields. We are also working with Alfa Laval to integrate their plate heat exchangers into our onsite storage solutions.”

Heliac is also applying the business model used to sell solar power to solar thermal energy. Using an agreement like a solar power purchase agreement, Heliac will own and operate its solar tracker fields and sell solar thermal energy to customers on a contractual basis.

Urgent need to transition to clean energy

As global energy demand continues to rise and more countries work to reduce dependency on fossil fuels, the transition to renewable energy is critical to energy security. Concentrated solar heat can provide a sound pathway forward. Deploying renewable heat solutions like the Heliac Solar Tracker with the Alfa Laval STC40 solar receiver can support the transition to renewable energy. Heliac is working to mainstream the Heliac Solar Tracker with the Alfa Laval STC40 solar receiver as an essential energy solution.

“Our aim is to move as quickly as possible to meet the demand for solar heat,” says Mr. Pranov. “Alfa Laval has proven to be a reliable partner who can tailor solutions and support us from pilot projects to commercial-scale solutions. We anticipate that Alfa Laval will be with us every step of the way through the transformation of the energy market, delivering millions of solar receivers as we scale up.”

New energy paradigm for a sustainable world

Heliac and Alfa Laval share the vision of a clean energy future. The Heliac Solar Tracker with Alfa Laval STC40 solar receiver holds the potential to help decarbonize global energy systems through the increased use of renewable energy.

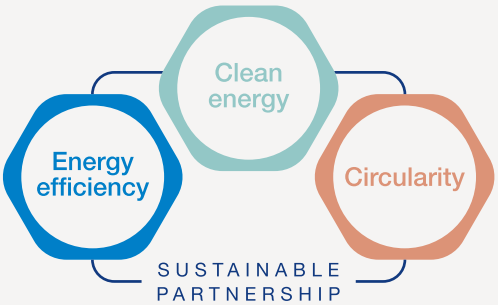
Alfa Laval is advancing innovative energy solutions, accelerating the transition to a cleaner and more sustainable future. These solutions help reduce emissions and improve energy efficiency, while promoting more responsible use of natural resources. As always, Alfa Laval stands ready to support the renewable energy industry to meet the growing global demand.

Working together with customers and partners, Alfa Laval is developing, testing and commercializing a broad range of equipment and services to support the growth of renewables.

Sustainable partnership

At Alfa Laval, we understand the challenges your business is facing, because your business is our business. Your curiosity is our curiosity. And your passion is our passion. We believe that collaboration and strong, lasting partnerships are the key to accelerating tomorrow’s sustainable solutions for reshaping our economy and the world we share.

That is why Alfa Laval works closely with customers and other partners to find innovative solutions for the most challenging issues of our time.



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

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