

A game changer in solar energy storage



Solar power when you need it

Distributed and dispatchable solar energy even during the dark hours of the day:
Our solution produces renewable electricity in a very cost competitive way, through
highly efficient and multi-hour energy storage.

A high-tech minded company

Azelio is a Swedish company in the game of changing the future of solar energy. Already specialized and a leading supplier of Stirling engine-based renewable energy solutions, we now put an even greater focus on distributed and dispatchable solar electricity.

We stem from a strong heritage of high-tech engineering with access to the most advanced material suppliers and engineering centres of excellence in Northern Europe. Our headquarter is in Gothenburg, Sweden, and we have

production facilities located in the heart of the Nordic automotive and aerospace clusters on the west-coast of Sweden.

Using a combination of proven technology and innovative engineering we have created a flexible solution that opens up unlimited opportunities for hundreds of millions of people around the earth's sun belt.

Azelio is currently in an extensive expansion phase, finding new partners and establishing presence all over of the world. Since inception the company has raised to more than one billion SEK.

The mission

Increase and extend the use of renewable energy for a sustainable future.

The solution

Store solar energy in a sustainable and highly efficient way and convert it to electricity at a low cost whenever it's needed.

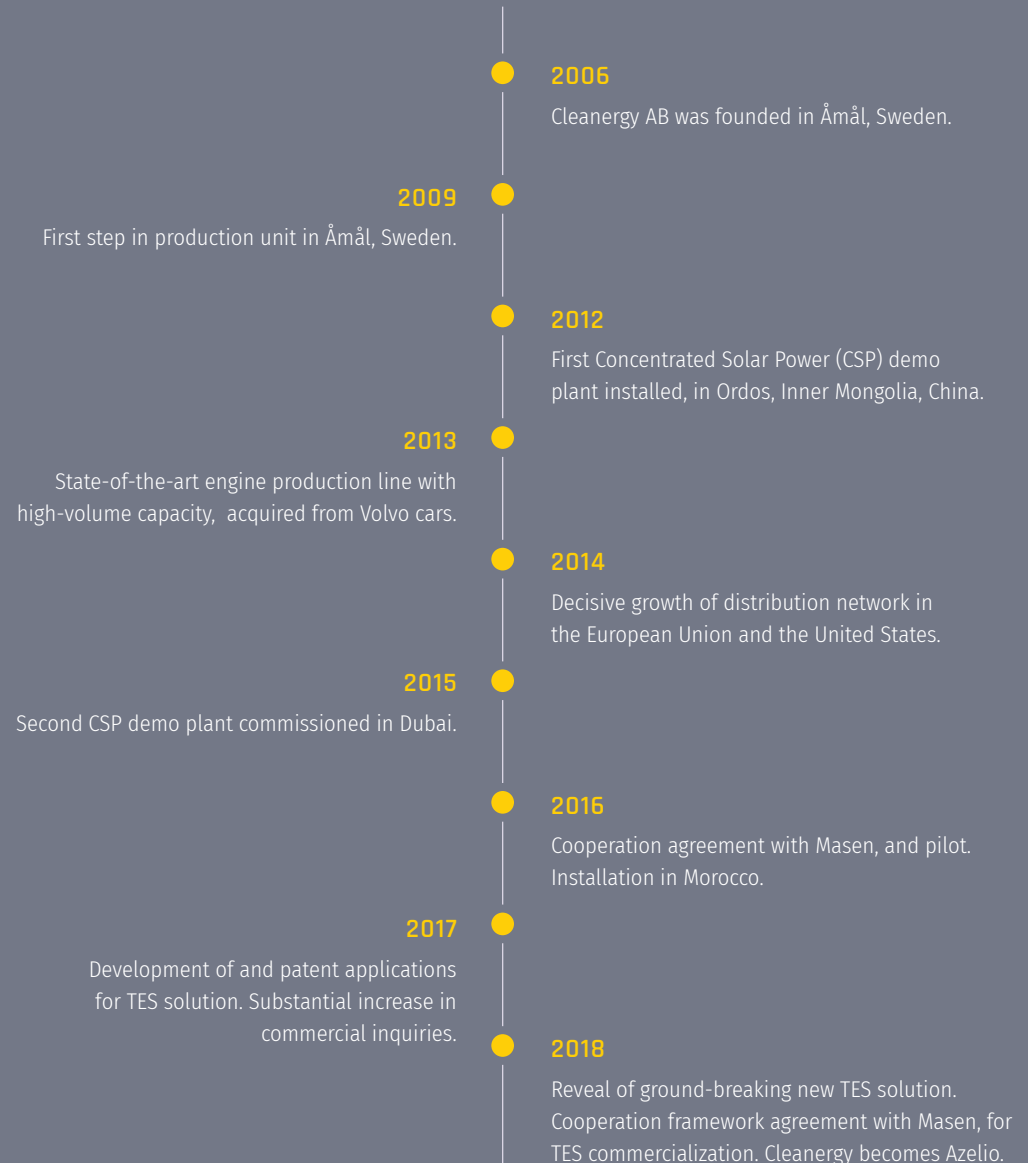
The people

Behind our skilled experts stand a team of highly experienced industrialists.

With a mission to empower

Harnessing the sun's thermal energy and efficiently storing it for timely conversion to electricity, we can offer countless industries and communities in large areas of the world a new outlook. No longer will they be held back by non-existent grids or capricious, expensive and unsustainable sources of electricity. A dispatchable, cost-effective and environmentally optimized system of power generation will be at their disposal. Committed to driving development through empowerment, Azelio shines the light on a smooth and reliable way forward.

SIGNIFICANT MILESTONES



SOLUTION - STIRLING TECHNOLOGY

A 200-year-old invention is the future of energy

The Stirling engine is unique in its ability to provide incredibly efficient conversion of thermal energy into a mechanical movement that can generate electricity. This technology is not only effective – It's sustainable.

Our deep insights in Stirling technology innovation stretches back some 25 years. We also have 2,000,000 operating hours accumulated at landfill sites and solar parks from the UK to Inner Mongolia.

The Stirling solutions are easy to install and maintain – in fact, they last considerably

longer than conventional engines. And they are supported by a team of experts who have spent years (and in some cases decades) perfecting this technology.

PROBLEM SOLVED

Our global R&D team has been exploring new sealing technologies, minimizing oil leakage, and has developed unique simulation software, all to drive the next generation of power distribution. And they have succeeded in their efforts, making the Stirling engine a significant and lasting part of our new unique renewable solution.



BENEFITS OF THE STIRLING ENGINE

Efficient and reliable

The most prominent advantage of the Stirling engine – besides being carbon neutral – is its high efficiency. The Azelio Stirling engine conversion rate to electricity is substantially higher than in traditional

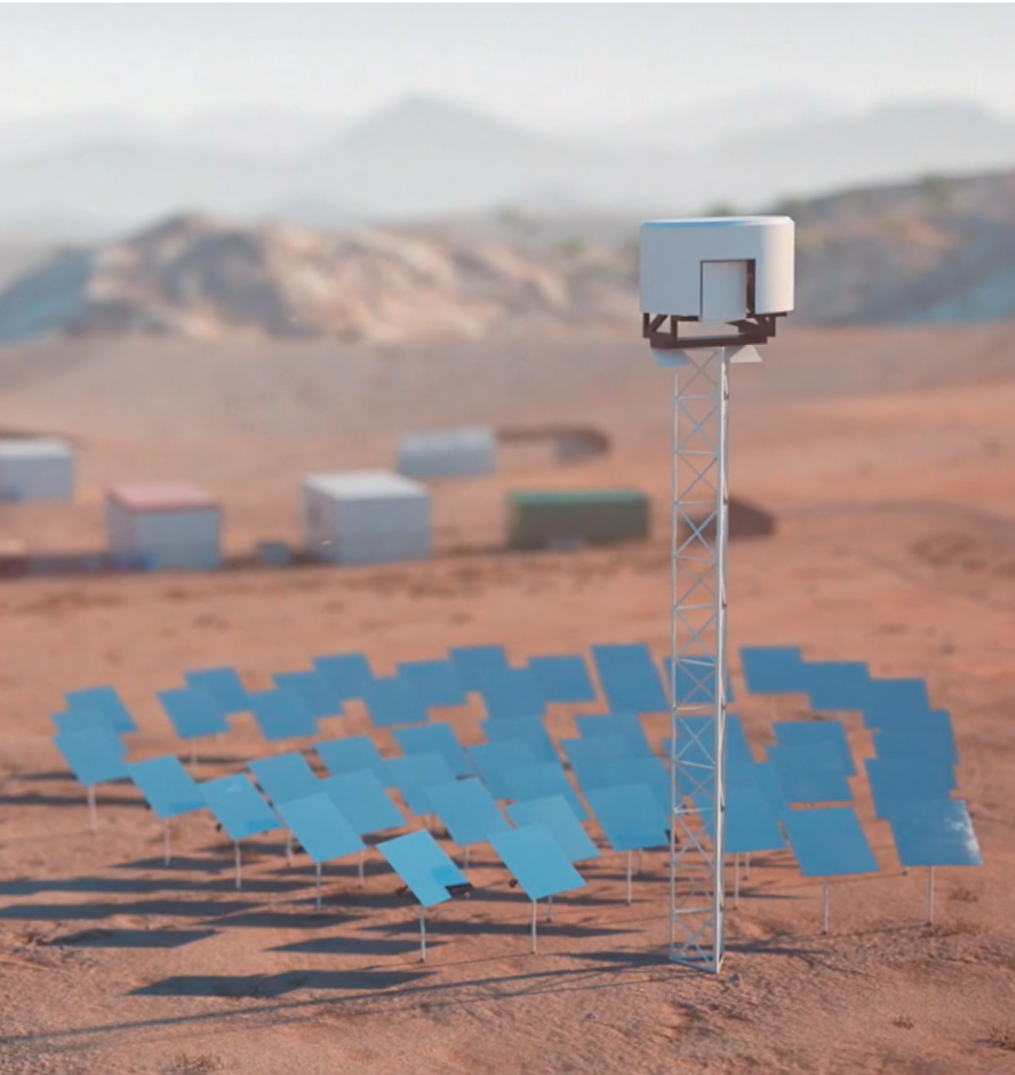
CSP. Having developed a reliable and highly robust design the need for maintenance is kept to a minimum. Owning our own high-volume assembly facility ensures the high quality and keeps production cost down.

THE AZELIO STIRLING TECHNOLOGY HAS
VERY LOW ENVIRONMENTAL IMPACT

25 YEARS OF EXPERIENCE OF
THE STIRLING TECHNOLOGY

CONVERSION RATE TO ELECTRICITY IS SUBSTANTIALLY
HIGHER THAN IN TRADITIONAL CSP

THE AZELIO STIRLING LASTS CONSIDERABLY
LONGER THAN CONVENTIONAL ENGINES



SOLUTION - CONCENTRATED SOLAR POWER (CSP) TECHNOLOGY

Capturing the sun in the most effective way

The success of Concentrated Solar Power (CSP) is based on the ability to store accumulated heat – thermal energy. This is where Azelio's system excels. But in order to concentrate the solar energy into the thermal storage, the actual capturing needs to be optimized for the system as a whole.

Our concept is set up by a fan-shaped heliostat field of an average 50 controlled mirrors of 3m², fitted in up to nine rows. The size can be fine-tuned and adjusted, depending on the local conditions. The mirrors reflect the sun rays up to the power unit that contains the heat storage and the Stirling engine, situated on a tower, eleven meters high.

BENEFITS OF CONCENTRATED SOLAR POWER (CSP)

Lowering the Levelized Cost of Electricity

Working with controlled mirrors has many advantages. The technology is well tested, and the production cost is relatively low. Maintenance is easily handled. There is also a possibility to fine tune every unit.

For every kWh produced our solution needs less mirror area (in comparison to traditional CSP), resulting in less money spent for each installation.

Put together this means that, when in full production, we can offer a much lower LCOE (Levelized Cost of Electricity) than all other competing technologies on the market today.

EASY MAINTENANCE
AND SERVICE

50 CONTROLLED MIRRORS IN A
FAN-SHAPED HELIOSTAT FIELD

WITH HIGH EFFICIENCY, LESS MIRROR AREA
IS NEEDED RELATIVE TO TRADITIONAL CSP

CONTRIBUTES TO THE LOWEST LCOE OF ALL
SIMILAR SOLUTIONS ON THE MARKET TODAY

SOLUTION - THERMAL ENERGY STORAGE (TES) TECHNOLOGY

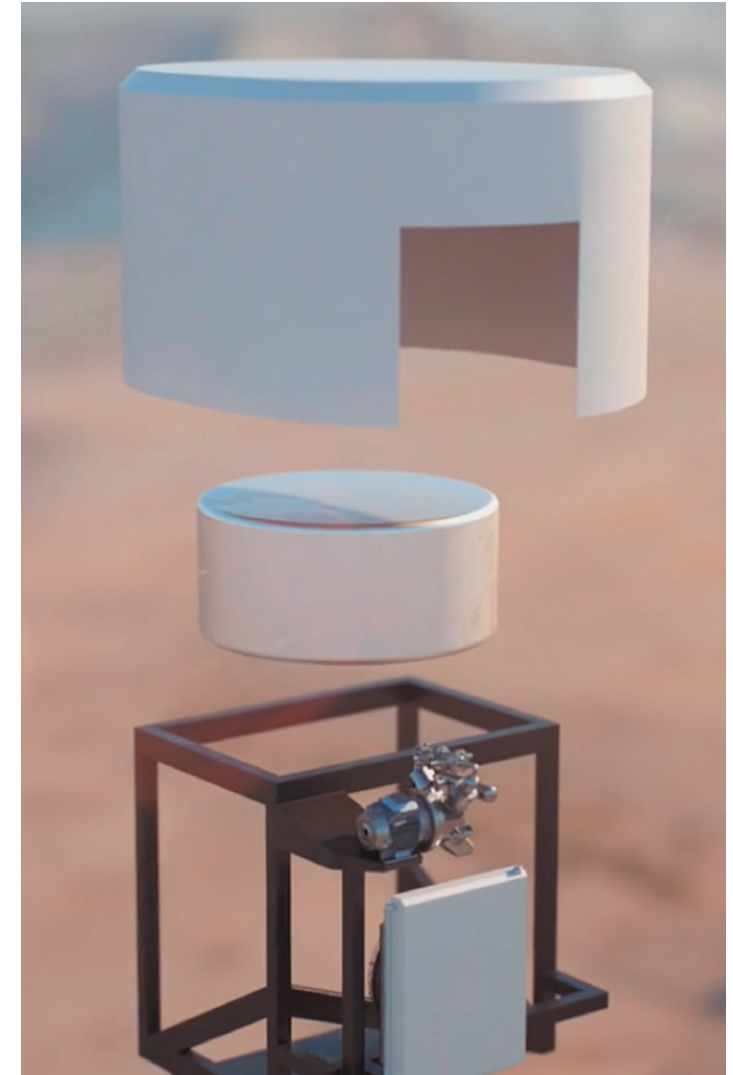
A heart made of metal

Storing electricity is expensive and inefficient but storing heat has significant benefits. That is why we convert the solar power to electricity after the storage instead of before. Thermal Energy Storage (TES) is the obvious and optimal choice for electricity on-demand all hours of the day.

A Phase Change Material (PCM) is liquefied in the container through direct illumination of the container wall by the concentrated solar heat. During discharge, heat is transferred from the PCM to a heat transfer fluid (HTF).

The HTF transfers heat from the thermal storage to the Stirling engine heat exchanger where the Stirling engine working-gas is heated and cooled off by ambient air, and thereby runs the engine.

The Thermal Energy Storage (TES) is the very heart of our new solution. And it's made out of metal. Since the greatest energy recovery is obtained in the conversion phase we have chosen an aluminium alloy for its very specific phase changing characteristics.



BENEFITS OF THERMAL ENERGY STORAGE (TES)

For all the dark hours of the day

Choosing an aluminium alloy as the heat storing material is no coincidence, but the result of long and devoted research and development. The high degree of energy density enables local energy production around the clock in remote locations wherever the sun is reliable.

Aluminium has excellent heating storage ability, making it possible to use the Stirling engine to withdraw electricity locally, at full effect, all the dark hours of the day. At a very competitive cost.

Aluminium is the third most common element and the most common metal

in the earth's crust. The environmental impact of aluminium is primarily due to the energy supply in manufacturing. This will be reduced to a minimum when using recycled aluminium, produced exclusively with electricity from wind and hydro – and of course solar energy in a near future.

OUR ALUMINIUM ALLOY HAS
EXCELLENT HEAT STORAGE ABILITY

13 HOURS OF ELECTRICITY
PRODUCTION AT NOMINAL POWER

A CLOSED SYSTEM THAT DOESN'T
NEED ANY PROCESS WATER

CAN USE RECYCLED ALUMINIUM
FOR ZERO CARBON FOOTPRINT



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