

WORLD WIDE PROJECTS INDUSTRIAL SOLAR THERMAL



REVOLUTIONIZING **HEAT SUPPLY**

HEAT IS HALF OF THE GLOBAL FINAL ENERGY USE. IN ORDER TO ENSURE THAT FUTURE GENERATION GET THE SAME PRIVILEGES WE HAVE TODAY. THE RISING ENERGY DEMAND MUST BE MET WITH RENEWABLE ENERGY. THIS IS WHY ABSOLICON EXISTS.

Heat is half of the global final energy use. In recent years, due to geopolitical situations, renewable heating solutions have gained significant attention. In order to ensure that future generation get the same privileges we have today, the rising energy demand must be met with renewable energy. This is the reason I started Absolicon.

Absolicon Solar Collector was founded with the vision to transform industrial heat supply. To reach the climate goals, burning fossil fuels for heating needs to be a thing of the past. Transforming to sustainable energy solutions is not a goal of Absollicon, it is a must for everyone on our planet.

The company Absolicon was established in 2005 as a research and development company in solar technology. Today, Absolicon is a business company with more than ten years of operational experience from thousands of square meter installed area in installations worldwide.

By providing world-leading, costeffective solar heat solutions for industries around the world, we are on a mission to lead the change towards a sustainable heat supply for our planet

Joakim Byström CEO & Founder of Absolicon

TRANSFORMING TO SUSTAINABLE **ENERGY SOLUTIONS** IS NOT A GOAL, IT IS A MUST FOR **EVERYONE ON OUR** PLANET.

KEY REASONS

WHY INDUSTRIES AROUND THE WORLD TURN TO SOLAR THERMAL



LOW CO₂ EMISSIONS

Significantly lower CO₂ emissions per unit of heat generation on a life-cycle basis compared to conventional and other renewable technologies.



AVAILABILITY

Solar heating technologies have achieved a high technology readiness level, indicating maturity and high deployment levels.



COST-EFFICIENCY

Solar heat has achieved cost parity with fossil fuels in regions, and it also offers stable heating costs, insulating users from price volatility.



VERSATILITY IN SUPPLY

Solar heating systems can deliver a broad range of supply temperatures (50-400 °C), making them adaptable to various industrial needs.



MANUFACTURING

The EU has a strong manufacturing base for solar heating components, with local supply quality, expertise, and capacity.



Click or scan to learn more about Absolicon Solar Collector AB

ww.absolicon.com

COLLABORATION OF **HEAT TECHNOLOGIES**

Once solar thermal technology is implemented, the remaining demand (not met by the solar field) can be fulfilled using electricity-based technologies.

These technologies include, for example, high-temperature heat pumps, PV systems with high-temperature storage, biofuel, and electric boilers. The combination of these systems can result in a 100% decarbonized heating solution.

The Absolicon team is widely experienced in designing these systems from several different industry segments and client conditions.



Simon Boas Hoffmeyer, Senior Director, Group Sustainability & ESG by Carlsberg Group

ABSOLICON & CARLSBERG JOIN FORCES

CAN ONE BREW BEER WITH THE HELP OF THE SUN? THE ANSWER IS YES.

That's exactly what the Carlsberg Group and Absolicon are doing together in a new demostration project. In early 2023, they commissioned a field of solar thermal collectors at the Olympic Brewery in the company's facility in Sindos, Salonika, Greece.

This is a first step in our cooperation with Absolicon, we want to see how much carbon neutral heat their technology can produce, says Simon Boas Hoffmeyer, Senior Director, Group Sustainability & ESG at the Carlsberg Group.

The beverage industry is one of the most suitable sectors for solar thermal as the processes in a brewery essentially operate below 100 degrees celcius. Since most beverages are consumed on hot summer days, both breweries and soft drink producers are busy during the sunniest months of the year. This gives the beverage industry a great advantage over other industries when replacing their fossil fuel consumption with solar heat. Here, Absolicon will play a major role both now - and in the future. This is something that Carlsberg has noticed.

One of our main sustainability goals is to reach zero carbon emissions in our brewing processes already by 2030. Our partnership with Absolicon is an important step in the right direction, says Simon Boas Hoffmeyer.

Phasing out fossil fuels requires both patience and a willingness to test new technologies. Already in 2021, Absolicon and Carlsberg signed an agreement to build a demostration solar field at the Olympic Brewery in the company's production facility in Sindos, Salonika, Greece. The solar field with the patented Absolicon T160 concentrating solar collector was installed in 2022. The solar collectors will power industrial processes in the brewery with solar heat, financed by a heat purchase agreement.

Our vision is that this installation will be a good example of how the brewing industry can gradually exclude fossil fuels from its processes and thus reduce its dependence on fossil fuels, says Simon Boas Hoffmeyer.

The project was commissioned in spring 2023 when the sun is at its strongest in Greece. By using solar heating instead of natural gas, Carlsberg will be able to reduce its brewery CO₂ emissions, contributing to their target of achieving ZERO carbon emissions at their breweries by 2030.

The land area is about 1 900 square meters, about the size of seven tennis courts. We look forward to evaluating the technology to see how we can use it in the future, says Simon Boas Hoffmeyer.

The initiative in Greece is fully in line with Carlsberg's sustainability program "Together Towards ZERO and Beyond" which, among other things, will contribute to the group's commitment to mitigate the effects of climate change by using renewable energy to power the production processes in breweries.

Our idea is to also use the demostration project in Greece to demonstrate the potential of solar thermal for the brewing industry, but also for other industries so that we can build a carbon-free future together, he says.

Absolicon solar thermal field at Carlsberg Group's **Olympic Brewery**

It takes almost three times as much thermal power as electricity for Carlsberg Group to produce its beer. In a one-year pilot, Absolicon solar collectors will generate 150 °C/4bar (g) steam for the can pasteurization at the Olympic Brewery site.

During sunnier summer months, the solar collectors will ramp up their solar thermal contribution to satisfy up to 70% of the energy demanded by the can pasteurizer.

TOGETHER TOWARDS ZERO

CARLSBERG GROUP

We're excited by the potential of this technology to support the decarbonisation of our breweries globally by 2030, by harnessing the ultimate source of renewable heat energy – the sun.

Collaborating across our business and with partners like Absolicon is vital to identifying and scaling the solutions to create renewable heat energy, and we're pleased to be going together towards zero.

SURINDER SINGH, SENIOR DIRECTOR NEW TECHNOLOGIES, CARLSBERG GROUP



CARLSBERG GROUP, GREECE BREWERY INDUSTRIAL CASE

IN 2023 CARLSBERG INSTALLED ABSOLICON SOLAR THERMAL TO GENERATE STEAM AT OLYMPIC BREWERY'S SITE, IN SINDOS, SALONIKA.

In line with Carlsberg Group's ambitious sustainability program "Together Towards ZERO". the initiative arises from the commitment of the Group in helping mitigate the effects of climate change through the incorporation of renewable energies in its production During sunnier summer months, the processes.

One of Carlsberg Group's main sustainability targets is to achieve zero carbon emissions during the production process by 2030.

The Group envisions this initiative to be an example in the brewing industry towards the gradual

exemption and reduction of dependence on fossil fuels.

In Olympic Brewery, solar collectors across a total area of 1900m² will cover 2,2% of the brewery's annual thermal energy demand. collectors will ramp up their solar thermal contribution to satisfy up to 5% of the total brewery's thermal energy demand, which corresponds to 70% of the thermal energy demanded for the can pasteurizer process.

IT TAKES ALMOST THREE TIMES AS MUCH THERMAL **ENERGY AS** ELECTRICITY **TO PRODUCE** CARLSBERG **GROUP'S BEER.**





SOLAR FIELD POWER PERFORMANCE



DAILY OUTPUT PROFILES



Solar steam separator Solar steam network Customer steam network



0	80	0

Solar Sensor set1

olar Sensor set2

olar Sensor set3

0



LOCATION Sindos, Salonika, Greece

INDUSTRY Вгеwегу

TYPE OF PROCESS Pasteurization

INSTALLATION Solar Collectors Plant Integration

NUMBER OF COLLECTORS 120

APERTURE AREA 660 m²

SOLAR FIELD FOOTPRINT 1900 m²

STEAM GENERATION PRESSURE 4,5 bar(g)

INSTALLED CAPACITY 460 kW

STEAM FLOW RATE AT NOMINAL PEAK 0.75 tons/h



Click or scan QR code for a 2 min video about the installation of the solar thermal field.



BREWING WITH THE SUN BIRRA PERONI, ITALY

PERONI

In line with our long-term sustainability goals, we are committed to go zero emissions in our breweries by 2030. Sustainability performance in our Bari plant is already on the right track and thanks to the Absolicon technology we will take another big step closer towards our destination.

ENRICO GALASSO, MANAGING DIRECTOR OF BIRRA PERONI

Repair A A Ask







BIRRA PERONI, ITALY BREWERY INDUSTRIAL CASE

BIRRA PERONI GO FOR ZERO CARBON PRODUCTION WITH CONCENTRATED SOLAR HEAT FROM ABSOLICON

Birra Peroni is part of global brewer Asahi Group. The Bari plant in Italy is part of Asahi Europe & International that produces the beer Peroni and Peroni Nastro Azzurro as well as other well-known Asahi brands like Raffo, Wuhrer and Tourtel.

Absolicon is providing its patented solar collector Absolicon T160 and plant integration. Birra Peroni will then buy the solar heat produced through a heat purchase agreement to run the brewing processes.

The Absolicon T160 technology, with an operational temperature of up to 160°C heat and 8 bar steam, suits perfectly the thermal energy demand in the plant and secures energy independency of the brewery processes. The solar collector Absolicon T160 and plant integration provides Birra Peroni with solar

heat to run the pasteurizer in the Bari brewery. The 460 kW solar thermal field will cover part of the brewery's annual thermal energy demand. During sunnier summer months, the collectors will ramp up their solar thermal contribution to satisfy a larger part of the thermal energy demanded for the pasteurizer process.

One of Birra Peroni's main sustainability targets is to achieve zero carbon emissions during the production process by 2030. Using solar energy for a wide range of brewery processing applications provides Birra Peroni the possibility of renewable heat at a constant energy price, enabling long term reductions in fuel costs and CO₂ emissions.

DURING SUNNIER SUMMER MONTHS, THE COLLECTORS WILL RAMP UP THEIR SOLAR THERMAL CONTRIBUTION **TO SATISFY** A LARGER PART OF THE THERMAL ENERGY DEMANDED FOR THE PASTEURIZER PROCESS.



OPERATIONAL SUNNY HOURS





800

700

600

≥ 500

400

300

200

100

DNI ____ Solar field ____ Steam delivery ____ Hot water delivery





COMMISSIONING/TRAINING

11%



Thermocline tank (hot water) charging first, then steam production

Heat delivered 50% of the night in summer 2023

LOCATION Bari, Italy

INDUSTRY Beverages and Brewing

TYPE OF PROCESS Supplying heat for pasteurizer

INSTALLATION Solar collectors Plant integration Heat battery

NUMBER OF COLLECTORS 120

APERTURE AREA 660 m²

SOLAR FIELD FOOTPRINT 1700 m²

STEAM GENERATION PRESSURE 5.3 bar(g)

HOT WATER **TEMPERATURE** (FROM SOLAR FIELD) 142 °C

HOT WATER TEMPERATURE (TO HEAT EXCHANGER) ~75 °C

INSTALLED CAPACITY 460 kW

STORAGE TANK VOLUME 30 m³



Click or scan QR code for a 1.5 min video about the installation of the solar thermal field.





COLGATE-PALMOLIVE, GREECE BREWERY INDUSTRIAL CASE

THE SOLAR FIELD WAS BUILT IN TWO PHASES SINCE 2018, IN COMBINATION WITH A HEAT RECOVERY SYSTEM TO FILL THE GAP BETWEEN HEAT DEMAND AND RECOVERED HEAT.

Absolicon and Sarvanos Solar++ installed a rooftop solar collector field for Colgate-Palmolive's plant in Athens, Greece. The solar field was built in two phases since 2018, in combination with a heat recovery system to fill the gap between heat demand and recovered heat.

After the first successful installation in 2018, Colgate-Palmolive followed up with a second order to extend the field size in 2021.

The savings helped this project become a 'no brainer' and a win-win for the planet and the plant's bottom line.

DJ D'AGOSTINO,

GLOBAL SUSTAINABILITY MANAGER

MONTHLY HEAT OUTPUT



HOURLY HEAT OUTPUT OVER A DAY

Hourly heat output [KWh]



Best day Worst day

LOCATION Athens, Greece

INDUSTRY Household chemicals

TYPE OF PROCESS Fabric softener reactor

INSTALLATION Solar collectors

NUMBER OF COLLECTORS 48

APERTURE AREA

264 m²

SOLAR FIELD FOOTPRINT 550 m²

HOT WATER TEMPERATURE (FROM SOLAR FIELD) 107 °C

HOT WATER TEMPERATURE (TO HEAT EXCHANGER) 60 °C

INSTALLED CAPACITY 185 kW



Click or scan QR code for a 1.5 min video about the installation of the solar thermal field.

SOLAR DISTRICT HEATING

SWEDEN'S LARGEST CONCENTRATING SOLAR COLLECTOR FIELD FOR DISTRICT HEATING

I State The State

20 Absolicon Solar Collector AB

Adding solar heat to our existing heating network is a step into the future, and for us as a customer it feels good to be able to offer our customers a modern future-oriented product.

ANN-SOFIE BERGLUND, CHAIRMAN OF THE BOARD OF HEMAB

Absolicon Solar Collector AB 2



HÖGSLÄTTEN, SWEDEN **DISTRICT HEATING**

ABSOLICON SOLAR THERMAL PARK PROVIDE RENEWABLE HEATING AS HOT WATER FED DIRECTLY INTO THE CITY DISTRICT HEATING NETWORK

In Västernorrland, Absolicon is building a unique demonstration facility for large-scale solar district heating. The plant will be Sweden's largest solar field with small concentrating collectors connected to district heating. The solar collectors are designed to produce up to 160°C working temperature and will provide the district heating network with temperatures up to 120°C.

Starting in 2020, Absolicon is building Sweden's largest solar field connected to district heating using concentrating solar collectors, Högslätten 2023 Solar Thermal Park.

The heat from the solar thermal field has a working temperature between 73°C to 120°C, fed directly into the city district heating network.

The solar heat produced in the park is sold through a heat purchase agreement (HPA) with the local district heating supplier. The plant performance and its system benefits are validated by third parties Research Institute of Sweden (RISE) and Umeå University.

Absolicon headquarter, with an automated production line of concentrators, and the plant together constitute the perfect hub for research and business collaborations on solar thermal technology for industries and district heating.

We have shown that our technology works, referring to Absolicon's patented technology

for modern concentrating solar collectors that allow higher system temperatures and efficiencies for

BENJAMIN AHLGREN. **PROJECT MANAGER**

district heating.



Swedish **Energy Agency** Högslätten Solar Thermal Park is financed by Absolicon Solar Collector AB together with the

Swedish Energy Agency.



ACTUAL MONTHLY HEAT DELIVERY_2022 /2023







LOCATION Härnösand, Sweden

INDUSTRY District Heating

TYPE OF PROCESS Household heating and DHW

INSTALLATION Solar collectors Network integration

NUMBER OF COLLECTORS 192 commissioned 192 planned

APERTURE AREA

1056 m² commissioned 1056 m² planned

SOLAR FIELD FOOTPRINT 2600 m² commissioned 2600 m² planned

HOT WATER **TEMPERATURE** (FROM SOLAR FIELD) 73 to 120 °C

INSTALLED CAPACITY 0.5 MW commissioned 0.5 MW planned



Click or scan QR code for a 2 min video about the installation of the solar thermal field.

ELEVATED PERFORMANCE

SOLAR PILOT FOR PEAK POWER PLANTS WITH IBERAFRICA IN KENYA

We have witnessed a seamless operation of the solar thermal system since its commissioning in early May. The power plant's heating load and accompanying costs that erstwhile were supplied by electricity through heating coils and a HFO steam boiler have now been significantly displaced.

JEFF KIMANTHI, TECHNICAL MANAGER IBERAFRICA

24 Absolicon Solar Collector AB





IBERAFRICA, KENYA POWER PLANT

IBERAFRICA, ELEVATED 5.5M FROM THE GROUND TO MAXIMIZE THE AVAILABLE SPACE AND THE IRRADIATION ON THE INSTALLATION.

The solar thermal installation of 330 m² aperture area is provided by Ariya Finergy, which is a Nairobi-based engineering, construction, and financing December 2021. firm that develops and builds renewable energy and power stabilization projects for critical commercial and industrial facilities.

Ariya Finergy used Absolicon solar collectors delivered directly from Sweden to Nairobi.

The solar field provides energy for fluid preheating and delivers 95 °C temperature. Installation of the collectors was made in

To integrate the solar field to the Iberafrica plant in Nairobi, Absolicon has provided a custom solar central shipped directly from Sweden.

THE ELEVATED STRUCTURE **OF THE ABSOLICON T160** FIELD, 5.5M FROM THE **GROUND, SHOWCASES** THE FLEXIBILITY AND **MODULARITY OF ABSOLICON TECHNOLOGY AND ITS ABILITY TO MAXIMIZE THE AVAILABLE SPACE AND THE IRRADIATION ON THE INSTALLATION.**

Ariya Finergy is a specialist in clean energy supply to commercial and industrial customers. Ariya is also working on innovative financing solutions.

Iberafrica, one of Kenya's leading Independent Power Producers (IPPs) with a capacity of 52.5 MW, was recently acquired by A.P. Moller Capital as an effective platform for it to invest further in greenfield and brownfield power and energy infrastructure assets in Kenya.





ACTUAL MONTHLY HEAT PRODUCTION 2023 Heat Output [MWh]



FORECASTED HOURLY HEAT OUTPUT OVER A DAY





heat - data. collector h ar weather to c vear refer t rmal y Simulations r utput for nor LOCATION Nairobi, Kenya

INDUSTRY Peak Power Plant

TYPE OF PROCESS Fluid Pre-Heating

INSTALLATION Elevated Solar Collectors Plant Integration

NUMBER OF COLLECTORS 60

APERTURE AREA 330 m²

SOLAR FIELD FOOTPRINT 552 m²

HOT WATER **TEMPERATURE** (FROM SOLAR FIELD) 100 °C

INSTALLED CAPACITY 230 kW



Click or scan QR code for a 1.5 min video about the installation of the solar thermal field.

ITC, CANARY ISLANDS

SHOWCASE SOLAR INSTALLATION

SOLAR INSTALLATION AND A SOLAR CENTRAL UNIT TO PRODUCE STEAM AT 4 BAR TO SHOWCASE HOW THE TRANSITION FROM FOSSIL FUEL TO SOLAR HEATING CAN WORK IN CANARY ISLAND INDUSTRIES LOCATED AT THE CANARY ISLANDS INSTITUTE OF TECHNOLOGY'S (ITC) FACILITIES IN POZO IZQUIERDO (GRAN CANARIA).





In 2021 Absolicon won a procurement with ITC to install a concentrated solar field to produce steam. ITC sought disruptive technologies in the industrial sector to reduce the dependency and climate impact of fossil fuels.

Absolicon's solar thermal installation now serve as a reference for industries in Canary Islands on how to introduce solar heat in their processes.

ITC initiated the solar heating project based on a calculation that the industry in the Canary Islands can easily install 100,000 m² of solar collectors and replace 10.000 tonnes of fuels.

SYSTEM OPERATION OVER SEVERAL DAYS IN APRIL 2024







- Temperature to Collectors - Temperature from Collector







LOCATION Pozo Izquierdo, Gran Canaria, Spain

INDUSTRY **Research Institute**

TYPE OF PROCESS **Dissipation Skids**

INSTALLATION Solar collectors Plant integration

NUMBER OF COLLECTORS 16

APERTURE AREA 88 m²

SOLAR FIELD FOOTPRINT 220 m²

STEAM GENERATION PRESSURE 4 bar(g)

HOT WATER **TEMPERATURE** (FROM SOLAR FIELD) 80-150 °C

INSTALLED CAPACITY 60 kW

STEAM FLOW RATE AT NOMINAL PEAK 96 kg/h



Click or scan QR code for a 1 min video about the installation of the solar thermal field.









TECHNOLOGY SHOWCASE TECHNOLOGY AT THE WORLD EXPO IN DUBAI.

To embrace the topic of sustainability, one of the World Expo's major themes, the Swedish pavilion 'The Forest' opted to use Absolicon technology to supply heat The heat battery tanks store the for its domestic hot water demand during the exhibition period.

The solar field is a rooftop installation of 4 T160 Solar collectors, with an aperture area of 22 m².

The solar heat collected with Absolicon patented technology was stored using 2 heat battery tanks.

excess energy from the solar field during the daytime, to meet the customer's energy demand also when there is no sunlight. The batteries are also supported with electrical heaters to prevent energy issues.

f In every part of the project we have strived for sustainability. Absolicon is contributing this by cooling the air of the pavillion.

STAFFAN SCHARTNER.

HEAD OF CONSTRUCTION OF THE SWEDISH PAVILION



HOURLY HEAT OUTPUT OVER A DAY



WORLD EXPO 2020 - DUBAI, UAE

ABSOLICON WAS SELECTED AS A SHOWCASE OF INNOVATIVE SWEDISH SUSTAINABILITY

LOCATION Dubai

TYPE OF PROCESS Demo Field

NUMBER OF COLLECTORS 4

COLLECTORS APERTURE AREA

22 m²

COLLECTORS GROSS AREA 24 m²



Click or scan QR code for a 1 min video about the installation of the solar thermal field.

OUR TECHNOLOGY

BASED ON MORE THAN 20 YEARS OF RESEARCH AND DEVELOPMENT, THE ABSOLICON T160 IS A STATE-OF-THE-ART SOLAR COLLECTOR WITH RECORD-HIGH PERFORMANCE. IT'S CERTIFIED WITH SOLAR KEYMARK AND ICC-SRCC, PROVING ITS HIGH RELIABILITY AND QUALITY, AND THE TECHNOLOGY IS PROTECTED BY SEVERAL PATENTS.

TRUSTED PIONEERS

ABSOLICON HAS MORE THAN TEN YEARS OF OPERATIONAL EXPERIENCE AND OVER 20 INSTALLATIONS WORLDWIDE. WORKING WITH PIONEERS LEADING THE WAY FOR A SUSTAINABLE INDUSTRY.





THE INDUSTRIAL HEAT JOURNEY

TOWARDS ENERGY SECURITY WITH SOLAR THERMAL





MEET THE TEAM

OUR EXPERT TEAM IS EXPERIENCED AND READY TO WORK CLOSELY WITH YOU TO IDENTIFY AREAS WHERE ENERGY EFFICIENCY CAN BE ENHANCED AND RENEWABLE ENERGY SOURCES CAN BE INTEGRATED.

When choosing a renewable heat solution, it's critical to consider the type of technology you'll use.

Not sure which option best fits your production needs? No problem, we're here to help! Our expert team is experienced in working closely with companies to identify areas where energy efficiency can be enhanced and renewable energy sources can be integrated.

Over the past 20 years, Absolicon has been developing high-quality solar thermal systems. These systems, powered by our advanced technology, function effectively even in challenging environments, producing not just heat but also steam and cooling as needed.

The quality of our systems is verified by the numerous certificates they've garnered. These certificates demonstrate our commitment to providing reliable and eco-friendly solar solutions that prioritize safety, sustainability and profitability.

Regardless of the unique features of your site, our flexible solar field solution can be adapted to fit. Our partnerships with respected vendors ensure seamless integration and reliability of your heating system components.

At Absolicon, we believe in taking small steps today towards a sustainable future, and we're here to guide you on this journey.



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We're here to help you design a 100 % cabon free heating system combining different sustainable energy sorches in the most optimized way due to your conditions.

Learn more about the different Absolicon solutions by following this QR,



AT ABSOLICON. WE BELIEVE IN TAKING SMALL STEPS TODAY TOWARDS A SUSTAINABLE FUTURE, AND WE'RE HERE TO GUIDE YOU ON THIS JOURNEY.

REVOLUTIONIZING HEAT SUPPLY

At Absolicon, we are committed to the transition to renewable heat. We help industries change from fossil fuels, providing a profitable, easy-to-install, and emission-free energy solution using solar thermal resources.

Absolicon was established in 2005 as a research and development company in solar technology. Today, Absolicon is a publicly listed company with more than ten years of operational experience from all parts of the world.



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