

A SUN  
THAT  
NEVER  
SETS

# FOREWORD

The motto "a sun that never sets" sums up our mission. What does that mean? We at SOLID constantly strive for the customer's best option to use solar thermal energy. In this regard, we draw on over 25 years of experience and a team of highly qualified employees for offering customer-tailored solutions. With the know-how and success of realizing over 300 solar systems worldwide constantly pursuing improvement and innovation always remains. With this spirit and the versatile applications of solar thermal solutions, we do our part to ensure that the world remains worth living for future generations.

With this in mind, I look forward to many interesting exchanges and fruitful discussions. With courage, commitment and determination I further invite you to embark on a common path towards converting your energy system to a renewable one.

Yours, Stephan Jantscher

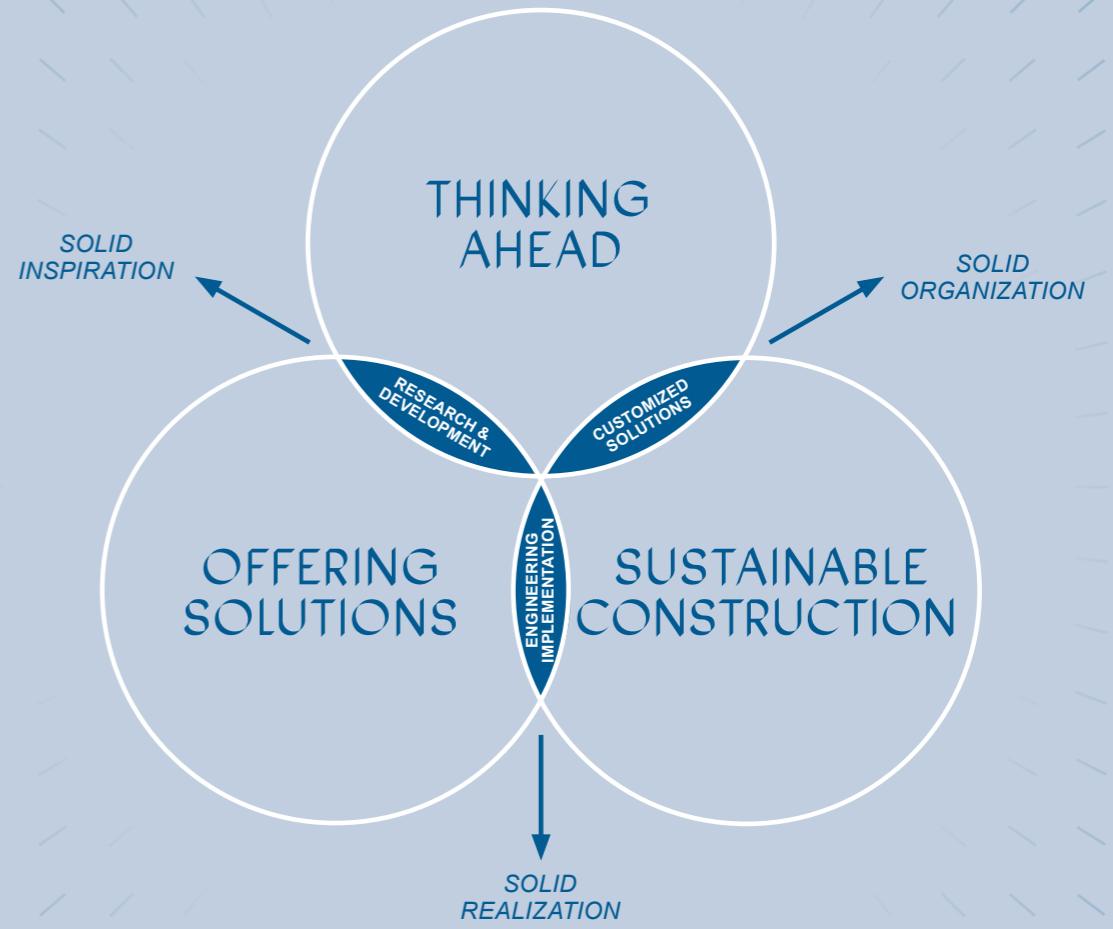


**Stephan Jantscher**  
CEO

## IMPRINT

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# OUR COMPANY VALUES



## OUR PROMISE

SOLID thinks ahead and provides innovative solutions for heat and cold generation, enables ways and means for the implementation of modern energy projects and builds sustainable systems for all our clients.

# OUR PRODUCTS

**More than 300 successful projects worldwide in over 40 countries**

Our customized products provide renewable energy for heating and cooling to our clients. We offer energy solutions with long-lasting quality that are technically reliable, profitable and environmentally sustainable. The highest level of customer satisfaction is our commitment.



**Selected Success Stories around the world.**  
For more information see pages 9 to 15

**Solar Cooling**  
Savings of electricity consumption of 80–90%. Environmentally friendly cooling machine: CFC-free with no Ozone Depleting Potential.

**Solar District Heating**  
Increase renewable heat supply and energy efficiency with solar district heating. Possible shut down of biomass and fossil fuel boilers during summer months.

**BigSolar**  
Seasonal storage allows a solar contribution of up to 50% for the lowest energy rates. A grid-connected supply infrastructure for substituting fossils in urban areas.

**Solar Hot Water & Heating**  
More flexibility. Solar hot water and heating systems enable load management with storage. Easy integration, high space efficiency.

**Solar Process Heat**  
The green solution with temperatures of up to 110° C in industry. Pre-heating for best techno-economic results.

**Absorption Heat Pump**  
More efficiency for heating plants by using absorption heat pumps and cooling machines. SOLID experience since 2002.

**Consulting**  
Customized consulting services in many fields of solar energy: Project consulting and capacity building, financial engineering as well as market development, supply strategies and feasibility studies. We offer technical training, workshops, lectures and site visits, as well as road maps and studies. Our consultancy is focussed on sustainability and innovation.

COMPETENCES

We are committed to provide the optimal solution for our clients. Through the combination of key technologies such as collector, storage, absorption machine, control and monitoring system with long-term experience in engineering and realization SOLID is unique. We are the market leader worldwide.

RESEARCH & DEVELOPMENT

SOLID R&D is the foundation for innovation and new developments. Our technical expertise is acknowledged worldwide. Always being a step ahead, R&D is an integral element of SOLID. We are leading and participating in national and international projects with the world's leading R&D institutions.



*"Solar heating and cooling is the sleeping giant in renewables. By understanding clients' needs, by using our competences and by adding innovation – let us wake him up!"*

**Christian Holter**  
SOLID SES



AWARDS

SOLID has been honored with numerous awards and marks of excellence in its company history for its technical, social and environmental efforts.

# A DIRECT LINK BETWEEN RESEARCH, PLANT CONSTRUCTION AND OPERATION



**The world's largest field test for solar thermal collectors – this solar district heating plant was constructed for both, research and economic operation**

The commercially operating plant feeds solar energy into the district heating network to supply Graz, the 2<sup>nd</sup> biggest city of Austria. Different collector types are operating under real conditions. A test field allows the evaluation of collector performance and to constantly improve quality and increase efficiency. A win-win effect for solar research and industry.



### Science

Unique field test of ten different collector types from seven manufacturers, including flat plate, parabolic-trough and heat pipe collectors.



### Business & Technology

ESCo operation with heat supply to the local utility. The plant has a nominal heating capacity of 5 750 kW. Commissioned in 2014 with latest extension in 2019.



### Environment

Solar hot water supply for around 8000 citizens of Graz. More than 740 tons of CO<sub>2</sub> are saved each year.

SOLAR DISTRICT HEATING / AUSTRIA

## FERNHEIZWERK GRAZ

### TECHNICAL SPECIFICATIONS

Collector field  
8 213 m<sup>2</sup> [5 750 kW]

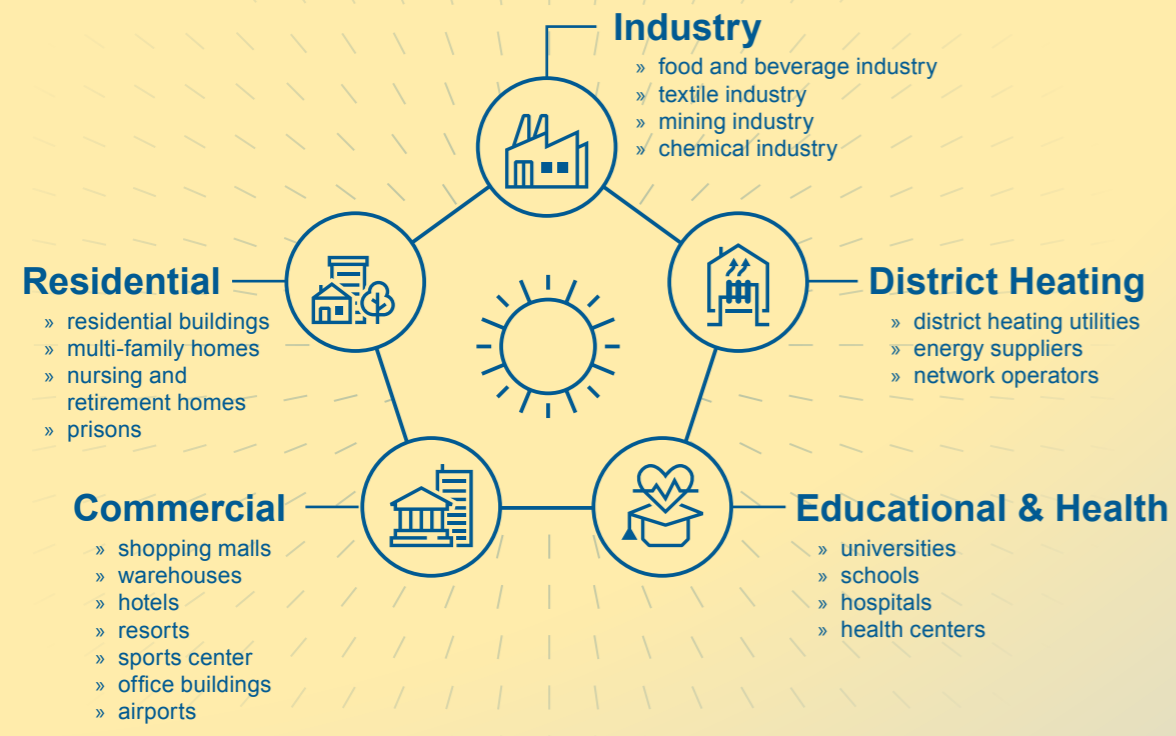
### SPECIAL FEATURES

- Environment hot water supply for 8 000 people
- Annual CO<sub>2</sub> savings 740 t

# OUR CUSTOMERS

**Our customers are corporate groups and companies that want to benefit from a sustainable, more independent and economic energy supply system**

Cold for air conditioning and refrigeration. Hot water for showers, laundry and kitchen. Heat for industrial processes such as cleaning, pasteurizing, sterilizing, cooking, defrosting and much more. Our customers are users of solar cooling down to 6°C, as well as consumers of solar hot water and solar heat up to 110°C.



# SUCCESS STORIES

**More than 25 years of international experience – an insight in our global success stories**

As the market leader in solar cooling, SOLID provides customized turnkey solar energy systems for buildings. The intelligent integration of renewable energies into industrial processes has allowed SOLID to obtain innovative projects in different industries. Sustainable heating supply projects for entire cities are currently under development. Our success stories include lighthouse projects with maximized customer value.



SOLAR COOLING / SINGAPORE

## IKEA

IKEA Alexandra is the first commercial enterprise in Singapore to activate a large-scale solar cooling system, converting solar heat into air conditioning for its store and warehouse. With this project, the furniture giant shows the technical and economic potential of the technology for the whole industry.

### TECHNICAL SPECIFICATIONS

- Cooling capacity** 880 kW
- Collector field** 2472 m<sup>2</sup> [1730 kW]
- Storage capacity** 15 m<sup>3</sup>
- Commissioning** 2017

### SPECIAL FEATURES

- Building space** 20 000 m<sup>2</sup>
- Annual CO<sub>2</sub> savings** 380 t

*“Apart from the general reduction of electricity consumption of the integrated air-con system for the whole IKEA Alexandra store, the solar cooling system also matches peak solar radiation with peak cooling demand by covering a major portion of the store’s entire cooling load during the hottest period of a typical sunny day, i.e 12–3pm”*

**Patrick Soo**  
SOLID SOLAR ENERGY SYSTEMS ASIA PACIFIC PTE. LTD.



IKEA also made a video about the plant, watch it here: <https://tinyurl.com/Ikea-Alexandra>






INDUSTRIAL PROCESS HEAT / USA

# PEPSICO GATORADE

Solar thermal is used to improve the efficiency of reverse osmosis and to preheat for pasteurization. The water is then used for the production of soft drinks. PepsiCo decided to test solar thermal in 2008 and was so satisfied that they tripled the size of the plant two years later. Finally in stage three, the plant was extended to the maximum capacity required by the manufacturing line.

### TECHNICAL SPECIFICATIONS

-  **Collector field**  
3793 m<sup>2</sup> [2640 kW]
-  **Storage capacity**  
114 m<sup>3</sup>
-  **Commissioning**  
2008 / 2010 / 2013

### SPECIAL FEATURES

-  **Annual CO<sub>2</sub> savings**  
1250 t







SOLAR COOLING, HOT WATER & HEATING / CHINA


# OLYMPIC SAILING CENTER

The International Olympic Committee has a strong commitment to sustainability and to minimizing its CO<sub>2</sub> footprint. SOLID contributed two systems to the Olympic sailing village. One plant heats and cools the press and administrative center of the Olympic sailing village. A second system supplies sanitary hot water and pool heating to a building hosting the athletes.

### TECHNICAL SPECIFICATIONS

-  **Cooling capacity**  
545 kW
-  **Collector field**  
1300 m<sup>2</sup> [910 kW]
-  **Storage capacity**  
26 m<sup>3</sup>
-  **Commissioning**  
2006

### SPECIAL FEATURES

-  **Annual CO<sub>2</sub> savings**  
190 t










SOLAR COOLING AND HOT WATER / NICARAGUA



# HOSPITAL MANAGUA

Hospitals, especially in sunbelt countries, have a huge demand for hot water for sanitary use, laundry and kitchen and also air conditioning. Nicaragua's largest and most modern hospital has, on the recommendation of UNIDO, a combined system for Solar Cooling and hot water production. A single installation reduces electricity consumption, allows boilers to be shut down and reduces CO<sub>2</sub>-emissions and avoids the use of refrigerants. It is the first solar thermal project worldwide financed by a 'soft loan'.

## TECHNICAL SPECIFICATIONS

-  **Cooling capacity**  
1023 kW
-  **Hot water capacity**  
350 kW
-  **Collector field**  
4450 m<sup>2</sup> [3115 kW]
-  **Storage capacity**  
75 m<sup>3</sup>
-  **Commissioning**  
2017

## SPECIAL FEATURES

-  **Beds**  
400
-  **Annual CO<sub>2</sub> savings**  
560 t






SOLAR HOT WATER / USA

# HARVARD UNIVERSITY



The world famous Harvard University, Cambridge (Massachusetts), launched a green campus initiative. As part of the program, the initiative invited SOLID to highlight the potential and possible applications of solar thermal heating and cooling for Harvard's premises. SOLID joined forces with a local contractor and installed 145 m<sup>2</sup> solar collectors (peak power 100 kW), renewed and extended the hot water storage capacity and linked the system to remote monitoring.

## TECHNICAL SPECIFICATIONS

-  **Collector field**  
145 m<sup>2</sup> [100 kW]
-  **Storage capacity**  
16 m<sup>3</sup>
-  **Commissioning**  
2009

## SPECIAL FEATURES

-  **Appartments**  
98
-  **Annual CO<sub>2</sub> savings**  
25 t

SOLAR HOT WATER & HEATING / ARUBA & ARIZONA



# HYATT HOTELS

The tourism sector is very energy intensive. The Hyatt group decided to use solar hot water on several of its buildings, e.g. the Hyatt Regency Aruba Resort Spa and Casino and Hyatt Regency Scottsdale Resort & Spa At Gainey Ranch in Arizona, USA.

## TECHNICAL SPECIFICATIONS

-  **Collector field**  
500 m<sup>2</sup> [350 kW]
-  **Storage capacity**  
26 m<sup>3</sup>
-  **Commissioning**  
2012

## SPECIAL FEATURES

-  **Rooms**  
359
-  **Annual CO<sub>2</sub> savings**  
150 t






SOLAR DISTRICT HEATING / AUSTRIA

# MÜRZ-ZUSCHLAG

The customer Stadtwerke Müzzuslag wanted to keep its high share of renewable energies in the district heating grid and wanted to keep emissions low. After a suitable area close to the heating grid was found, SOLID developed a solution with a large collector field and three heat storages of 180 m<sup>3</sup> in total. The buffer storages are also used for load management in winter.

## TECHNICAL SPECIFICATIONS

 **Collector field**  
5043 m<sup>2</sup> [3530 kW]

 **Storage capacity**  
180 m<sup>3</sup>

 **Commissioning**  
2020

## SPECIAL FEATURES

 **Annual CO<sub>2</sub> savings**  
930 t

WHAT OUR  
CUSTOMERS SAY



*"Being a utility, sustainable and secure heat supply is very important for us. In SOLID we found an enthusiastic partner with the right know-how with whom we could implement our project and meet our goals."*

**Hubert Neureuter  
& Reinhard Welsler**  
CEOs of utility  
Stadtwerke Müzzuslag




SOLAR DISTRICT HEATING / GERMANY

# LIGGERINGEN

In Radolfzell-Liggeringen, near Lake Constance, the local utility Stadtwerke Radolfzell installed a new heating grid in replace the existing oil boilers in the private houses of the village with a renewable heat supply. At the edge of the village a biomass plant and a solar plant by SOLID were erected.


## TECHNICAL SPECIFICATIONS

 **Collector field**  
1171 m<sup>2</sup> [820 kW]

 **Storage capacity**  
240 m<sup>3</sup>

 **Commissioning**  
2019

## SPECIAL FEATURES

 **Annual CO<sub>2</sub> savings**  
160 t





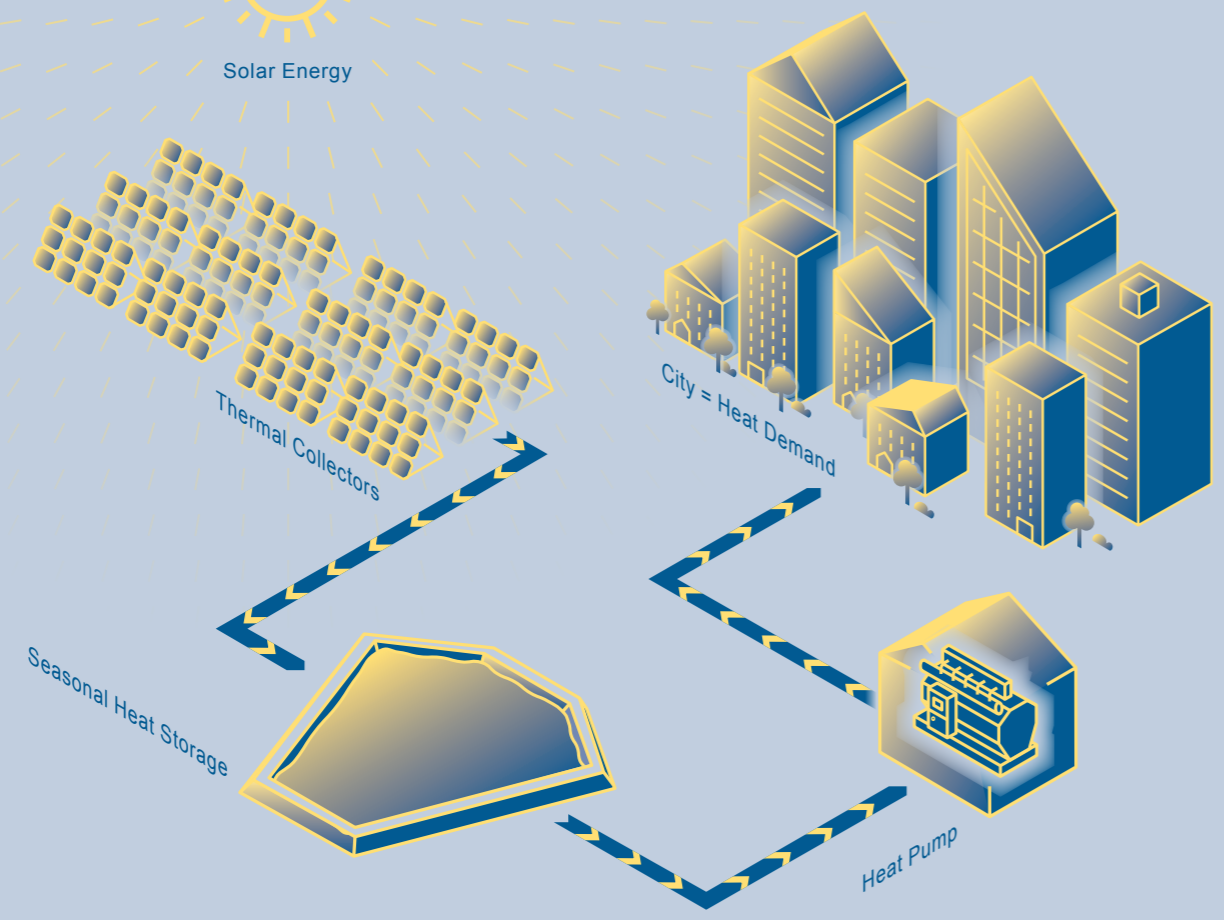
# BIGSOLAR

**Sustainable heat supply for cities – BigSolar makes a significant contribution to the heat transition – shifting summer heat to winter use!**

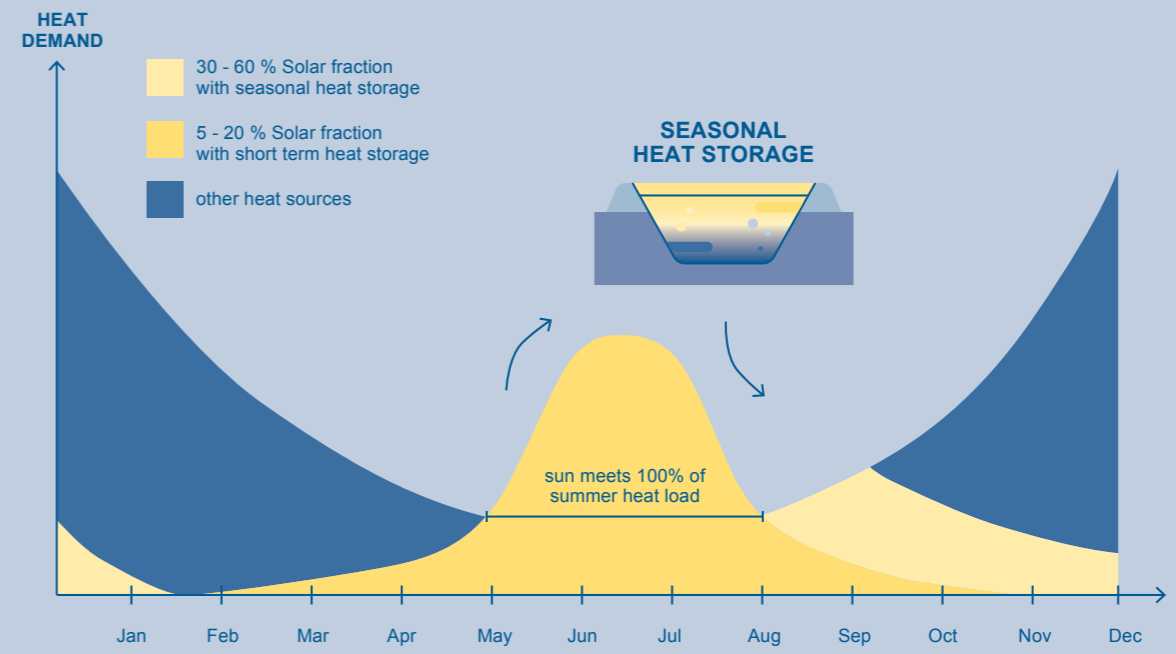
High solar fractions of up to 50 % can be achieved for cities with a district heating grid. BigSolar is a smart combination of large-scale solar thermal collectors, a seasonal thermal energy storage and absorption heat pumps. An intelligent control engineering of these advanced hybrid generation technologies reflects SOLID's knowledge and expertise. Our holistic approach is economically competitive for a long-term substitution of fossil fuel, saving green house gas emissions and offering peak load management and waste heat integration.



Solar Energy



## STORE SOLAR ENERGY IN SUMMER FOR HEATING IN WINTER



### Solar thermal collectors

- » State-of-the-art high temperature flat-plate collectors (12–15 m<sup>2</sup> per collector up to 95° C operating temperature)
- » Tested under real outside conditions at SOLID collector test field in Graz

### Seasonal storage

- » Shifting solar heat from summer into winter (hot water & space heating)
- » Increase of solar fraction up to 50 %

### Absorption heat pump

- » Utilization of low-temperature level resulting into higher efficiency of storage and solar yield
- » Driving energy is heat which can be easily integrated into current fossil-fired heat generation systems (i.e. combined heat and power, natural gas boiler, etc.)

## SMART CITIES USE SOLAR HEAT

 <b>KEEPING HEAT AFFORDABLE</b> Price of solar heat will remain stable for at least 20 years.	 <b>CREATING LOCAL JOBS</b> Solar heat replaces imported fuels and provides new jobs.	 <b>INCREASING ENERGY SECURITY</b> Solar heat is an unlimited resource of your municipality.	 <b>MEETING CLIMATE TARGETS</b> Solar heat is emission-free and 100% renewable.
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# A SOLID PROCESS

**A proven quality-controlled process providing our customers a single point of contact in the SOLID one-stop-shop**

A SOLID team develops, designs and builds turnkey solar installations based on Engineering – Procurement – Construction (EPC) contracts. In addition to operation and maintenance services we provide Solar Energy Service Contracts (ESCo). Experience gathered since 1995 means that our clients can count on a customized realization of the solar plant that works for them.

## CUSTOMER SATISFACTION

### OPERATION & MAINTENANCE

Optimization and regular maintenance support lead to noticeably higher solar output. For our clients with a SOLID turnkey solar system we offer one year monitoring and system control services free of charge. During this period, the solar system is optimized from a technical and economic point of view. Fast reaction provided by an efficient remote maintenance system. SOLID also operates plants on an ESCo model.

### COMMISSIONING

Completion of all required plant testing to full commissioning. Comprehensive trainings for all plant employees by our highly qualified and experienced technicians.

### PLANT CONSTRUCTION

On-site supervision provided by experienced SOLID specialists. Long-term cooperation with tried-and-tested suppliers. Global experience in project implementation.

### PROJECT MANAGEMENT

Clear communication interface through only one face to the customer from project start to handover. Professional supply chain management done by internationally experienced project managers.

### ENGINEERING

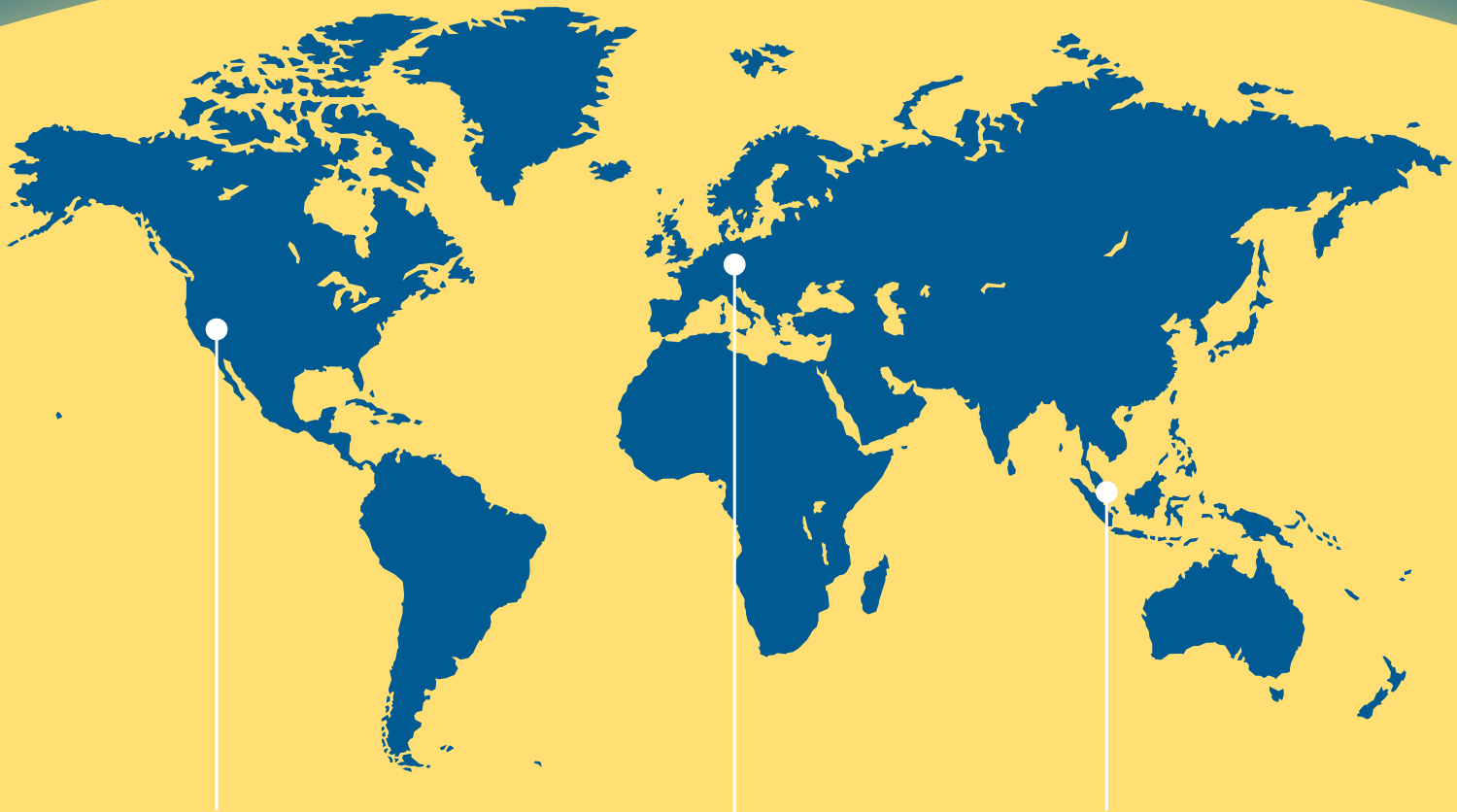
Engineering of complete turnkey solutions with state-of-the-art technology. SOLID is independent from any manufacturer or vendor and only uses products with high quality standards. Efficient interface management for effective results.

### CONSULTING & STUDIES

In early project stages, SOLID performs prefeasibility and feasibility studies in order to define key parameters of the project.

## CUSTOMER REQUIREMENTS

# CONTACT US



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