Large Solar Thermal Systems

SOLID
solarinstallation+design



office@solid.at www.solid.at

SOLID Group - What we do

Large solar thermal plants:

- District heating nets
- Resorts and hotels, hospitals, dorms, prisons,...
- Swimming pools & sporting facilities
- Process heat & process cooling
- Solar cooling /air conditioning

Existing References:

- > 250 large plants
- 13 commercial solar cooling systems

SOLID's scope of supply:

- Project Development
- Engineering
- Construction
- Supervision
- Operating & Maintenance

R&D activities for Solar Thermal

Financing:

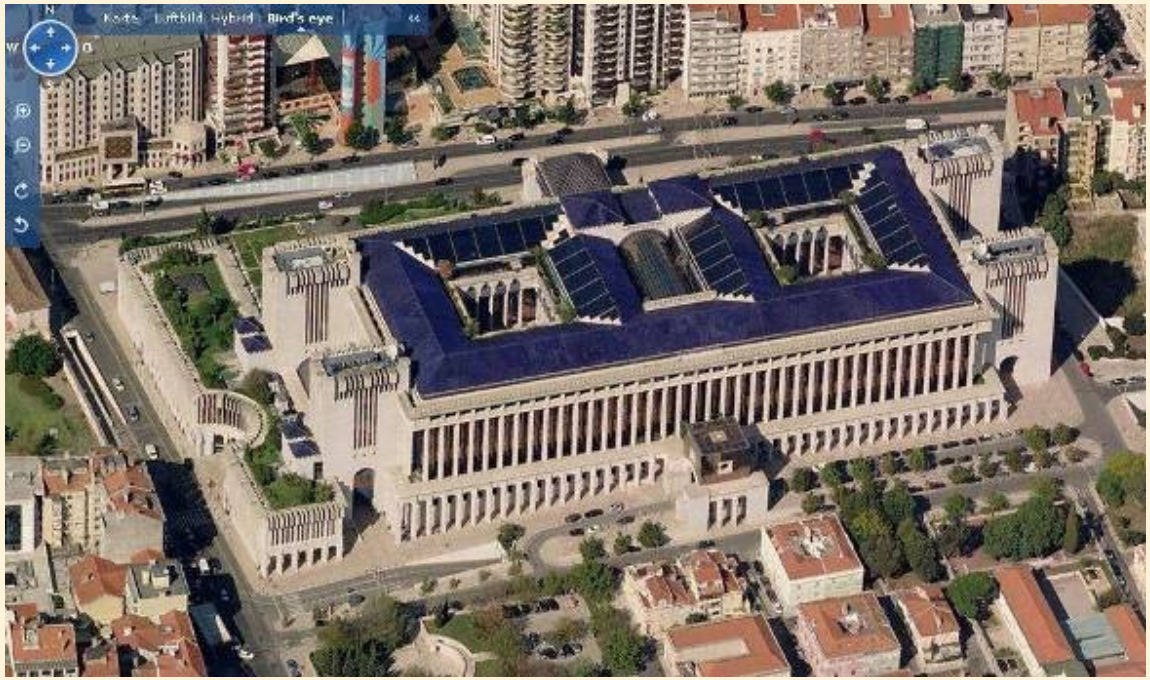
- Third Party Financing models
- Guarantee contracts
- ESCo arrangements



Orust Sweden, 768 m² , 540 kW , 1997

SOLAR COOLING

Lisbon: Overview







Lisbon CGD Bank (2008)

100,000 m² Offices

5,000 people working in the building

Solar Panels: 1580 m²

Solar Cooling: 545 kW

Cooling, Reheating, Heating, DHW

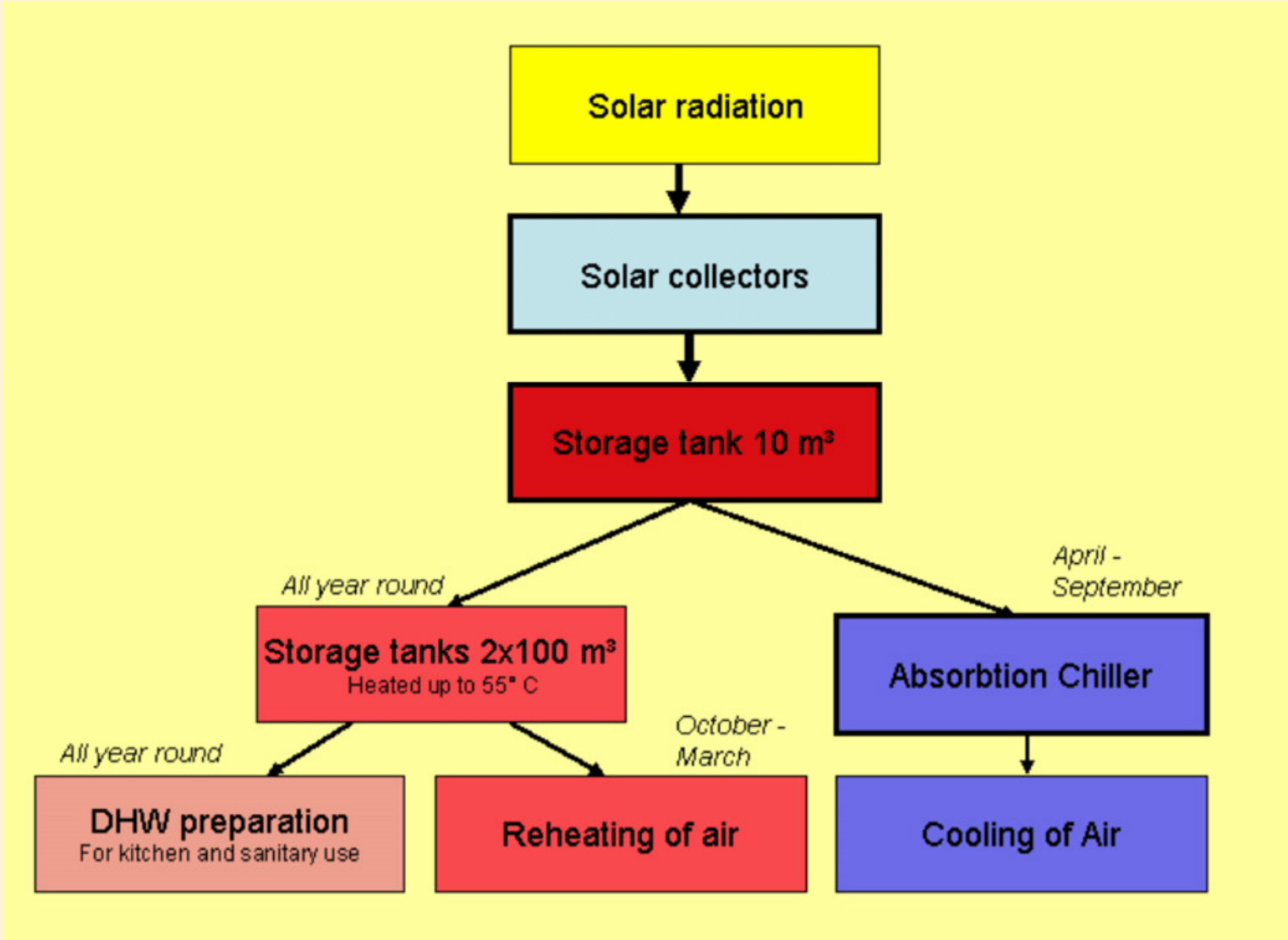
http://lisboa.heizwerk.at/

User: frei PWD: frei

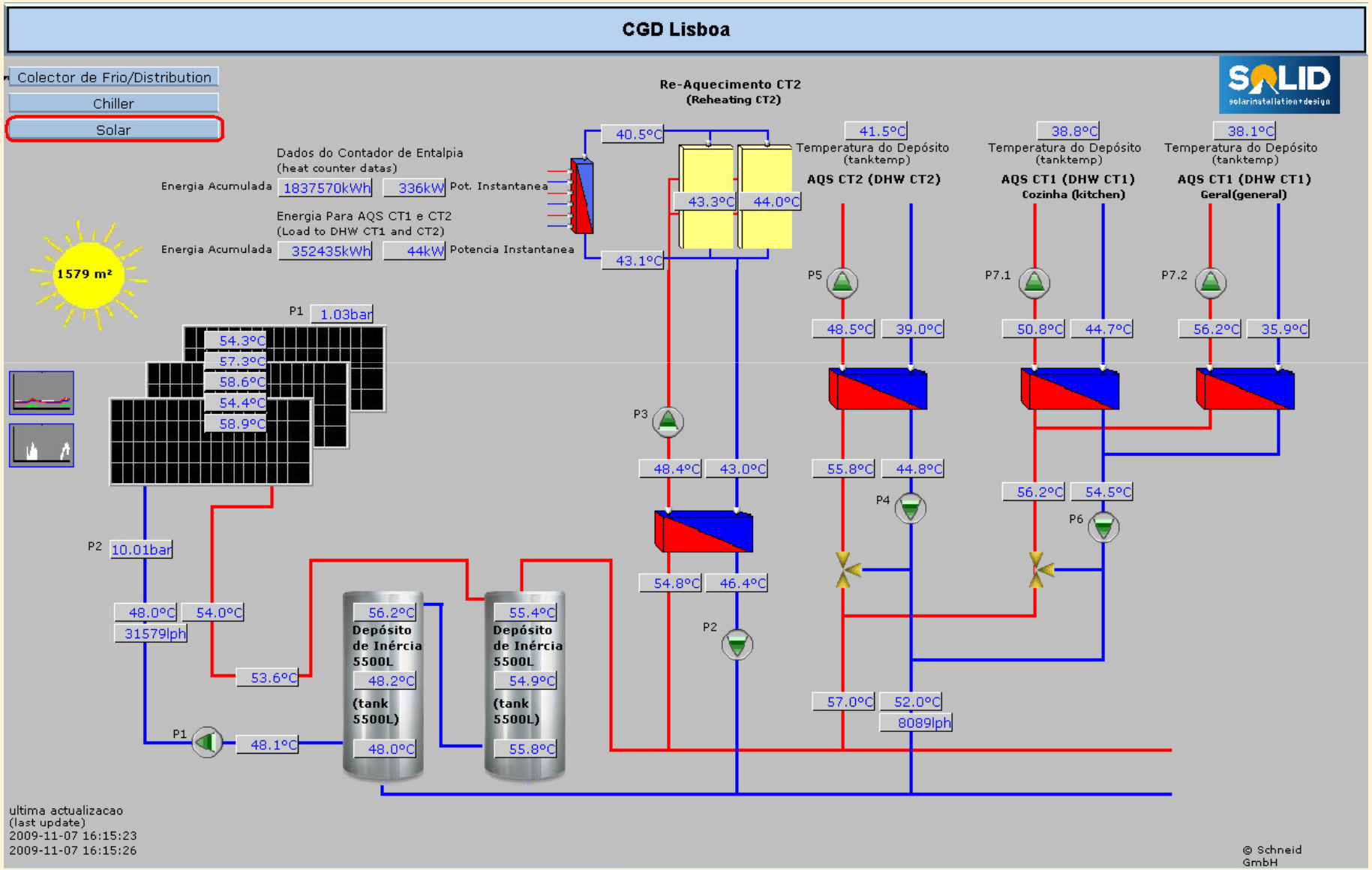
Lisbon: Overview



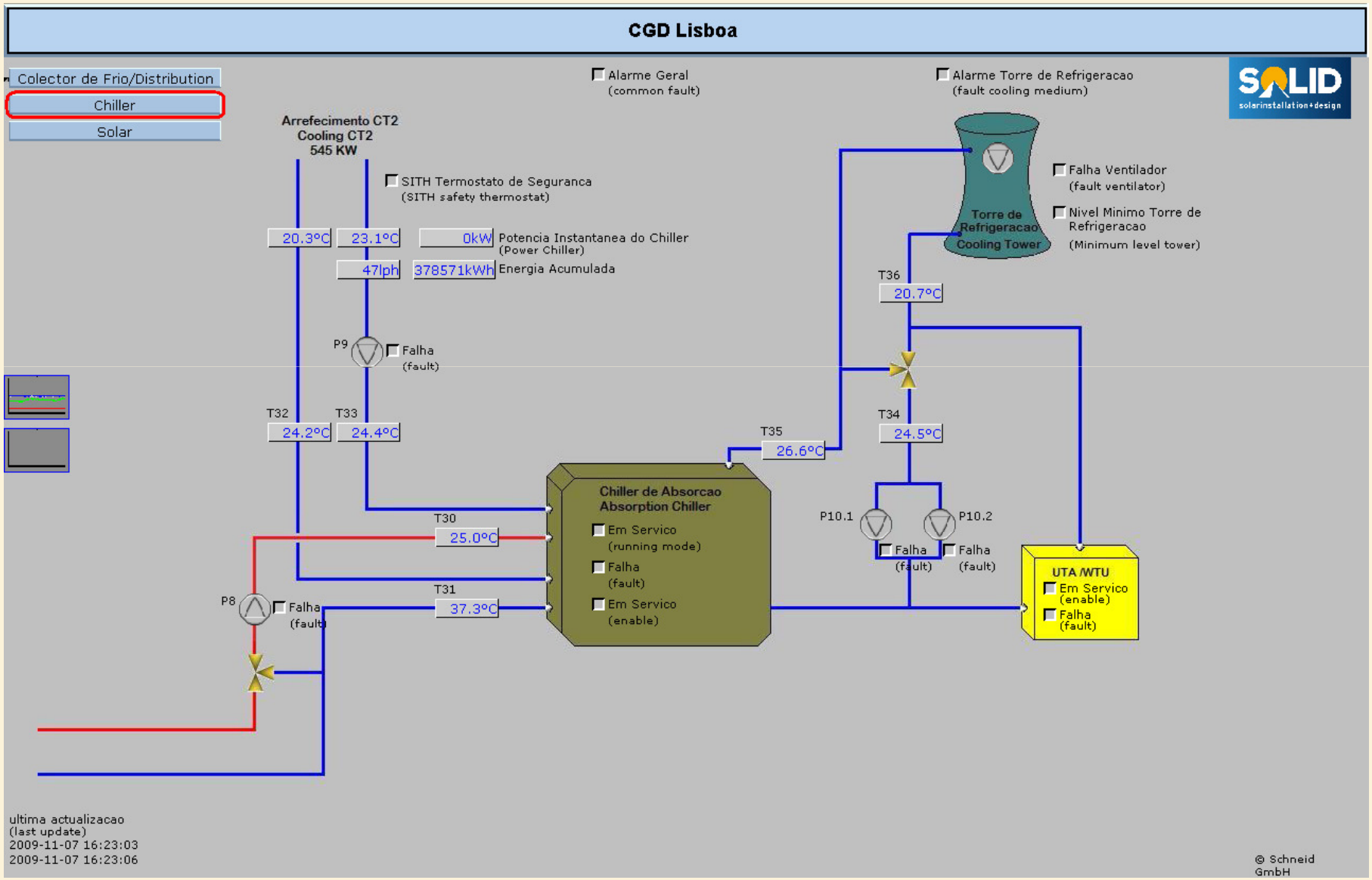
Lisbon: Energy flow



Lisbon: visualization heating



Lisbon: visualization cooling



International projects

EAR Tower Pristina (2002/2003), 8th operating season



2 thermal driven absorption cooling machines with a total load of 70 kW

226 m² solar collectors

4 m³ storage tank

back up for peak load: electric chiller 30 kW.

Austrian projects

Peitler Winery, 6th operating season



1 thermal driven ammonium absorption cooling machine

Temperatures down to 2°C in wine provided

100 m²/70 kW solar collectors

4 m³ storage tank

US projects



Desert Outdoor Center
Phoenix, AZ, (2006)

Solar Panels:
124 m^2 , 1340 ft^2
Cooling Power:
70 kW, 20 tons

First US installation by SOLID



US projects



Lanta Self Storage
Phoenix, AZ, (2008)

Solar Panels:
5500 ft², 500 m²

Cooling Power:
30 ton, 105 kW

China projects



Olympic Sailing Village China (2008)

Solar Hot Water for Sports Center and Olympic Village

Solar Air Conditioning for Logistic Building

Solar Panels: 1296 m²

Backup Energy Source: District heat

Asian Power award:

Best renewable plant of Asia 2006

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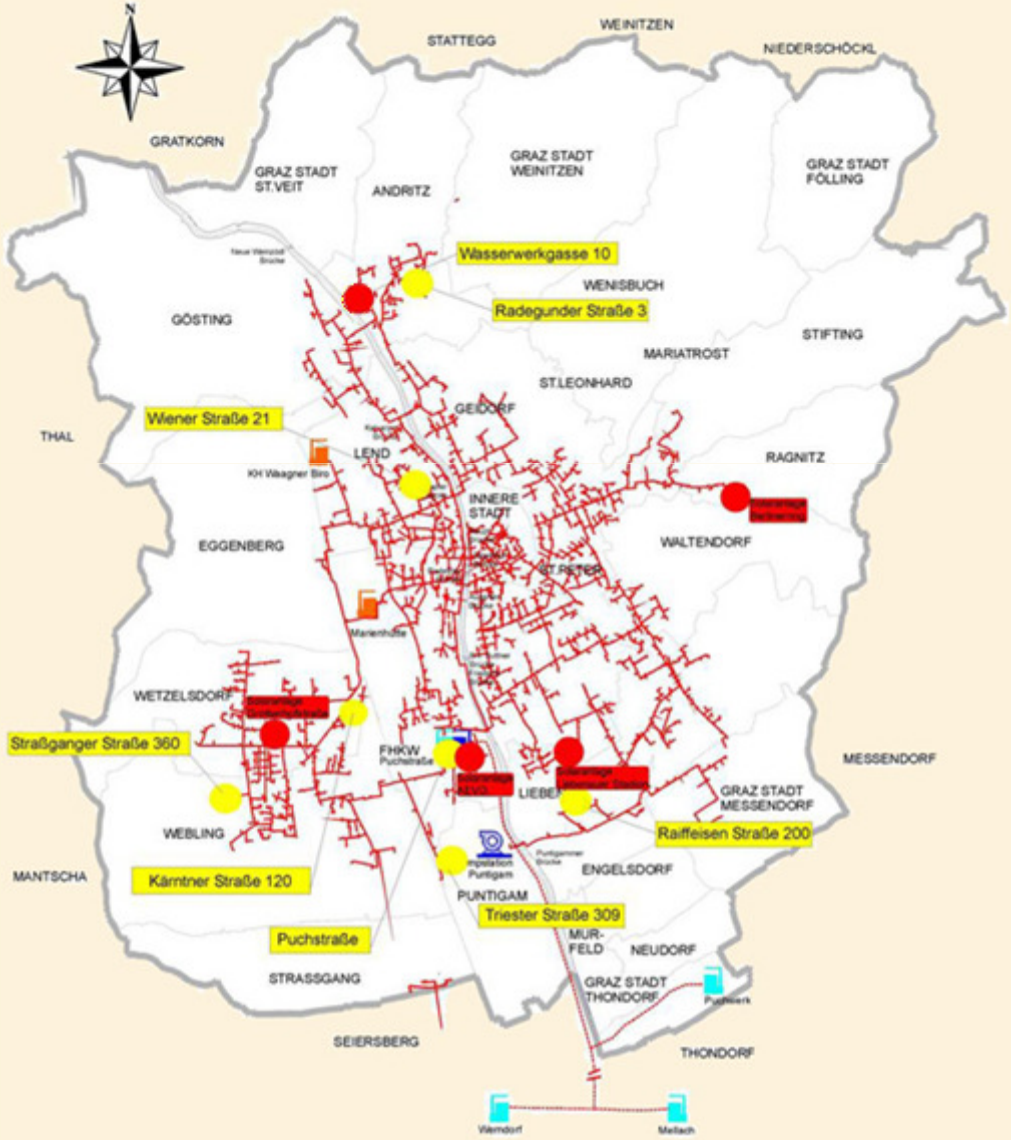
DISTRICT HEATING

District Heating Graz, Austria



5 plants connected with the district heating grid of the city

Solar Panels installed:
> 13,000 m²

Further projects planned

District Heating Graz, Austria

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Waterworks Andritz, **DHW+ Heating+ District Heating**



Solar Panels: 3855 m²

Storage: 65 m³

District Heating Graz, Austria

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AEVG Graz, District Heating



Solar Panels installed:
5.000 m²/ 3.5 MW

Solar Panels additionally planned: 2.000m²/1.4 MW

District Heating Graz, Austria

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Berliner Ring

Solar Panels:

2500 m²

27 Buildings/
Techn.Centrals

750 Flats
Panels on 6 roofs

District Heating Graz, Austria

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UPC-Arena, District Heating, first Austrian Solar ESCo



Solar Panels: 1407 m²

no storage

District Heating Gleinstaetten



Nahwaerme Gleinstaetten
Biomass + Solar

Solar Panels:

1300 m²

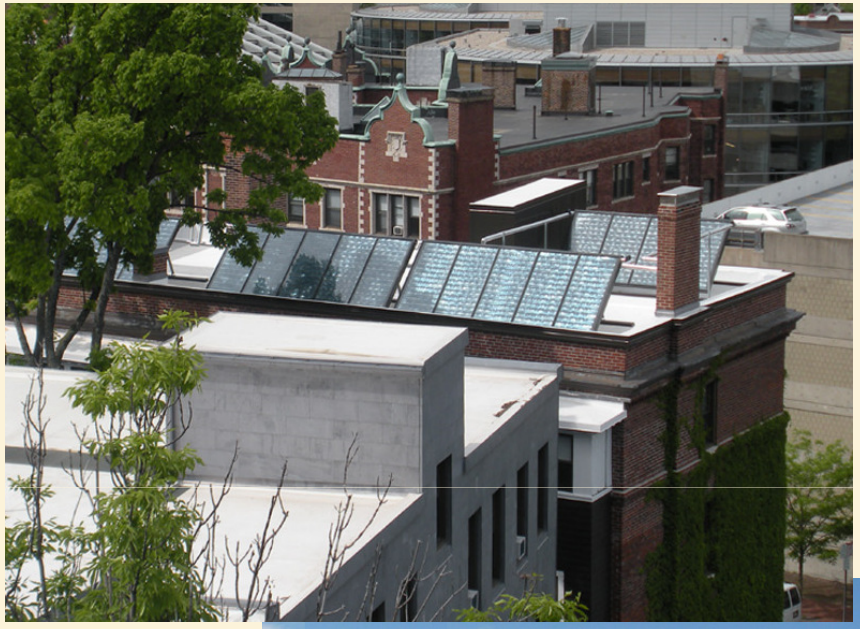
90m³ buffer tank

District heat and process heat for drying

Covering most of the summer load of the District heating grid

OTHER REFERENCES

US projects





Harvard University
Boston, MA, (2008)
Two systems,
DHW for students dorms

Total Solar Panels:
1550 ft², 144 m²

US projects



Gatorade (Pepsi Cola)
Phoenix , AZ, (2008)

Solar Hot Water for process heat in the soft drink industry.

One of the biggest Solar Process Heat installations on the American continent.

Solar Panels:
893 m² / 9,600 ft²

International projects

Banja Luka, Bosnia, **Public swimming pools**



Solar Panels: 1029 m^2 Storage: 30 m^3

SOLID Advantages

Technological arguments:

- Modularity as a principle.
  Successfully working all over the world.
- Control unit: Energy Cabin. Plug & play on a grand scale
- Industrial large-area collectors
- Proven success in large-area systems
- Experience in large scale Solar Cooling
- Tele-monitoring, commissioning and „fine-tuning“
- Experience in integrated systems
  Biomass and Solar Thermal as a base for renewable district heat
- Result guarantees
- „Sale of Energy“ contracts – ESCo-Model

R+D PROJECTS

R&D projects

Business models for Energy Service Contracting (ESCo), acquisition of clients and creation of ESCos for biomass and/or solar thermal in partner countries. S.O.L.I.D. disseminates knowledge about these innovative plants all over Europe.

www.biosolesco.org

Development of integrated heating and cooling plants of moderate power. i.e. concentrating solar collectors with fresnel technology are tested for solar cooling processes.

www.solera-project.eu

Evaluation and optimization of solar cooling processes in planning, construction and monitoring. Existing systems are monitored in operation and a tool for pre-dimensioning in the project planning phase.

www.iea-shc.org/task38/index.html

R&D projects

IP-Solar
an intelligent monitoring service

The project IP-Solar develops the scientific and technical basis for the prototype of a system for automatic evaluation, operational surveillance and optimization of solar thermal plants. A comprehensive diagnostic system detects system errors at an early stage and sends notifications to the plant operator.

www.ip-solar.com

SC - Monitor

Evaluation of energy efficiency and operating performance of solar cooling plants for buildings. Hereby optimization potentials for future plants are to be found. S.O.L.I.D. measures the cooling systems at CGD bank in Lisboa.

SDH
solar district heating

Market analysis in solar district heating and standard references for the integration of solar thermal into heating grids. Favourable conditions for market implementation in all over Europe are to be created.

www.solar-district-heating.eu

R&D projects

HIGHCOMBI

The HIGH-COMBI project aims at developing high solar fraction systems (above 80%) by an innovative combination of optimized solar heating, cooling and storage technologies.

www.highcombi.eu

Styrian Promise

Process optimization in selected industrial plants for use of renewable energies. S.O.L.I.D. develops a solar calculation tool for process heat and works on a solar business model for large scale solar plants. www.styrian-promise.at

InnoCOOL

Optimization of re-cooling systems in solar cooling processes. Legal aspects, availability of fresh water and hygiene are researched. Benefiting from its experience in the construction of complete cooling systems, S.O.L.I.D. evaluates the integration of different wet and dry cooling systems into absorption chiller machines.

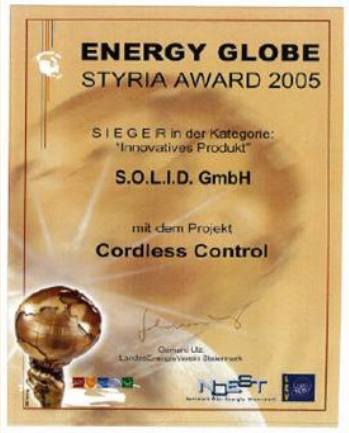
Awards

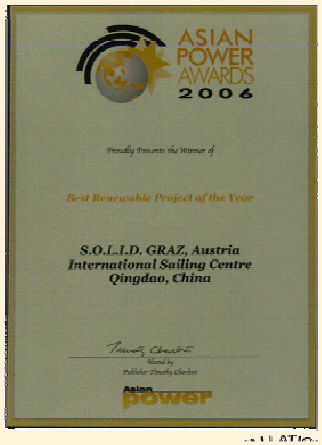

ÖGUT
URKUNDE
ÖGUT Umweltpreis 2006
S.O.L.I.D. Gesellschaft für Solarinstallation & Design m.b.H.
Solare Kühlung EAR Tower Pristina


FINALIST
FAST FORWARD AWARD 2003
Kategorie:
Kleinbetriebe
Unternehmen:
S.O.L.I.D Solarinstallation


REPUBLIK ÖSTERREICH
S.O.L.I.D. GmbH
Herrgottwiesgasse 188
8055 Graz
ÖSTERREICHISCHE UMWELTZEICHEN
FÜR PRODUKTE
VERLIEHEN


ÖGUT
URKUNDE
Unternehmensgruppe S.O.L.I.D. GmbH und nahwaerme.at
Arnold-Schwarzenegger Stadion, Graz
Auszeichnung in der Kategorie Contracting-Projekte
Energieprofi 2002


ENERGY GLOBE
STYRIA AWARD 2005
SIEGER in der Kategorie:
"Innovatives Produkt"
S.O.L.I.D. GmbH
mit dem Projekt
Cordless Control


ASIAN
POWER
AWARDS
2006
Best Renewable Project of the Year
S.O.L.I.D. GRAZ, Austria
International Sailing Centre
Qingdao, China


Gewinner
Fast Forward Award 2005
Der Steirische Technologiepreis
Kategorie:
Kleinbetriebe
S.O.L.I.D.
Gesellschaft für
Solarinstallationen
und Design mbH

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