

Erfahrungsbericht über verschiedene Anlagenkonzepte



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SOLID Group - What we do

Large scale solar plants:

- district heating nets
- hospitals, dorms,
- Resorts and hotels
- process heat Industry
- Swimming pools & sporting facilities
- Solar cooling

Existing References:

- 200 large plants
- 14 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

Successful Projects



District Heating

District Heating Projects

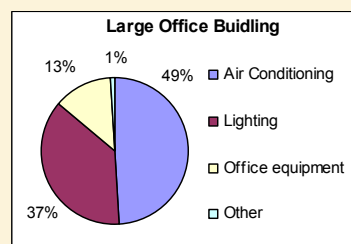
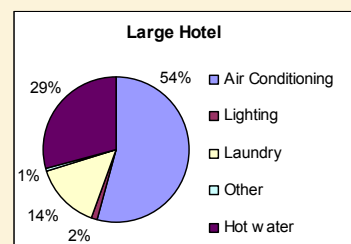


Selected SOLID references

- Sweden
Orust
- Germany
Crailsheim, Binsfeld, ...
- Austria:
Graz (6 MW under operation),
Eibiswald, Gleinstetten,
Urbersdorf, Bildein, Kroatisch
Minihof,
- Totally more than 50 plants
with > 50 MW since 1995

Solar Cooling

- The buildings sector accounts for 42% of global electricity consumption (IEA 2007)
- Steadily increasing electricity price
- Air-Conditioning (AC) represents the biggest single energy/power consumer in public and commercial sectors
- AC key driver of electric peak power demand growth → negative impact on grid load factor, electricity price and environment



Long track of experience



Location/Project	Cooling Machine	Constr.	Cooling Power	Collector Area
Pristina – EAR Tower	2 Pcs. LiBr-Chiller	2002/3	70 kW	226 m ²
Leutschach – Wine Cooling	Ammonia, Custom-made (Podesser)	2003	15 kW	100 m ²
Graz – Büro, Test Plant	Ammonia, Custom-made (Kunze)	2003	2 kW	8 m ²
Stadtwerke, Crailsheim	1 Pcs.. LiBr-Chiller	2004	15 kW	Energy from boiler
Brüssel – Renewable Energy House	1 Pcs.. LiBr-Chiller	2005/7	35 kW	60 m ²
Phönix – Desert Outdoor Center	1 Pcs.. LiBr-Chiller	2006	70 kW	168 m ²
Qingdao – Olympic Village	2 Pcs.. LiBr-Chiller	2006	512 kW	631 m ²
Tampa – Estellas Restaurant	1 Pcs. LiBr-Chiller	2007	70 kW	210 m ²
Lisbon- CGD	1 Pcs. LiBr-Chiller	2008	585 kW	1592 m ²
Phoenix-Lanta	1 Pcs. LiBr-Chiller	2008	130 kW	504 m ²
Gleisdorf- Service Center Municipality	1 Pcs. LiBr Chiller, and DEC	2008	35 kW 6000 m ² /h	260 m ²
Graz, office	1 Pcs. Li Br Chiller	2008	17.5 kW	58 m ²

Olympic Sailing Village



Olympic Sailing Village China 2008

Solar Hot Water for
Sports Center and
Olympic Village

Solar Air Conditioning
for Logistic Building

Olympic Sailing Village



- 4,000 m² / 43,000 ft² used area
- 900 kW peak load according to Chinese norm
- 500 kW chiller
- 631 m² / 6,800 ft² "GlutmuGl Advanced"
- System started up August 2006

Olympic Sailing Village



Asian Power award:

Best renewable plant of Asia 2006

CGD Bank Headquarter, Lisbon



100,000 m² Offices

5,000 people working in the building

11 floors above ground, 6 floors under ground

Bank building including employees hospital, theater, restaurants



CGD Bank Headquarter, Lisbon



Solar system for:

545 kW / 155 tons Cooling

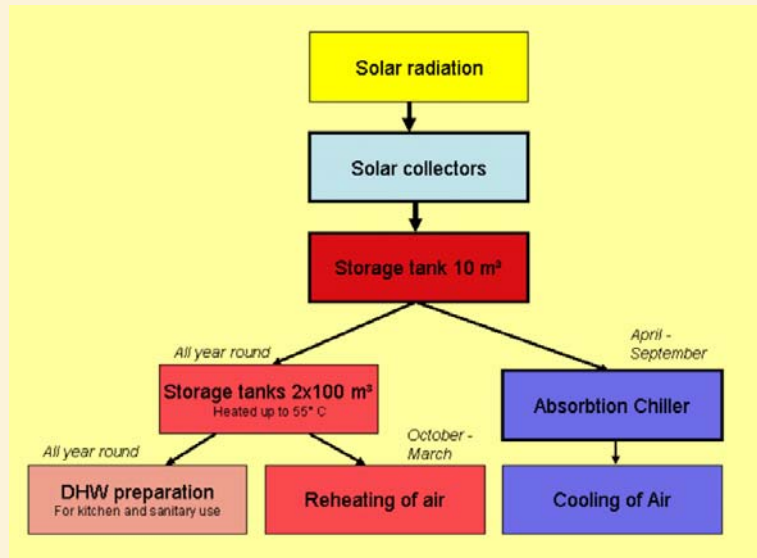
Reheating, Heating, DHW

Solar Panels:

1.580 m² / 17,000 ft²

In operation since February 2008

CGD Bank Headquarter, Lisbon

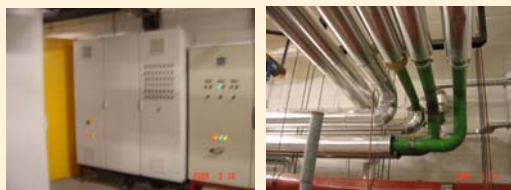


CGD Bank Headquarter, Lisbon

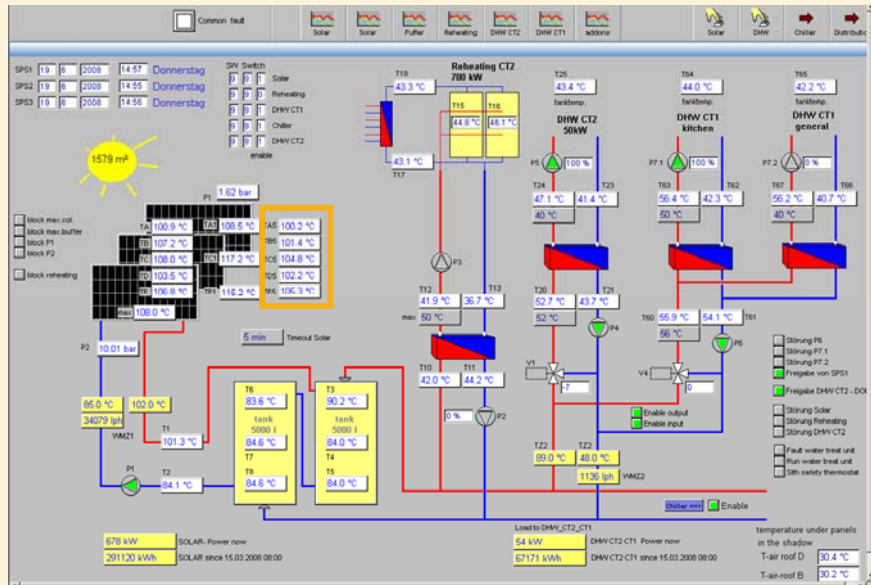


Variable speed control pumps added to:

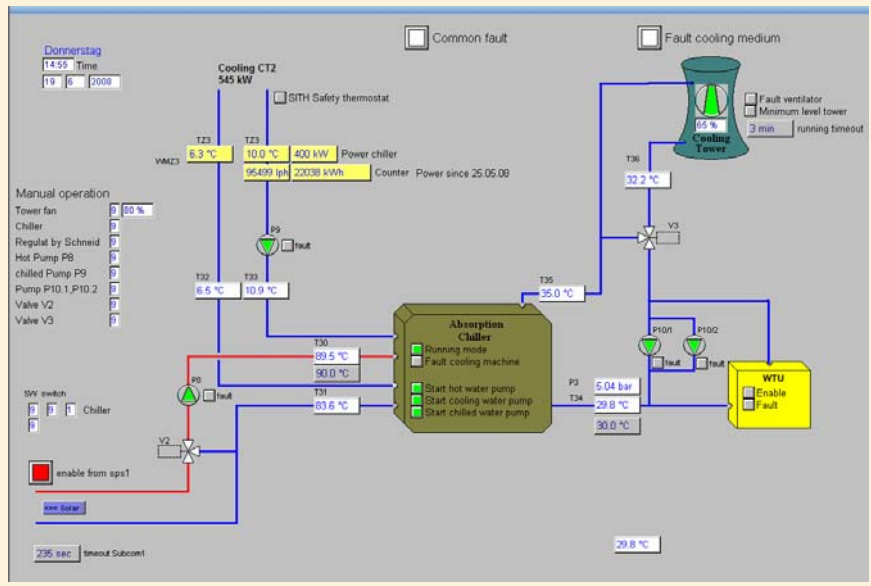
- save electricity
- create a delta T for the chiller



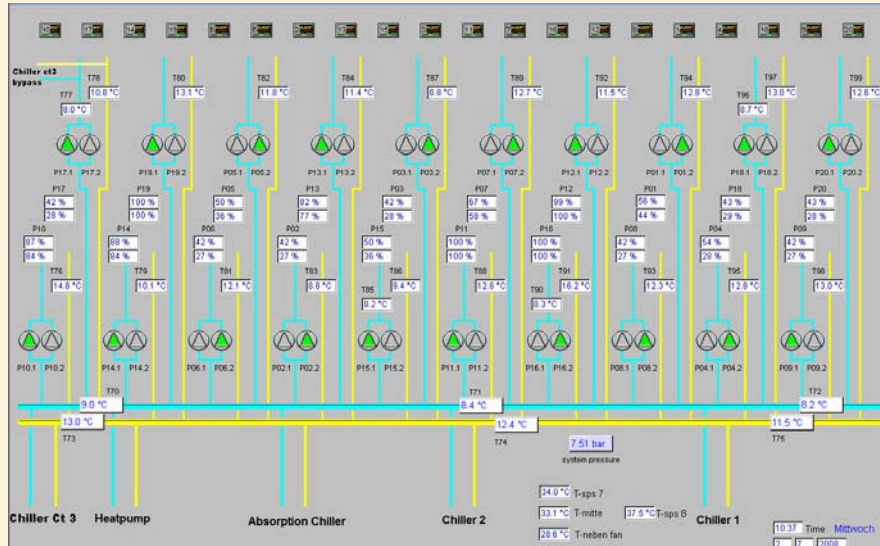
CGD Bank Headquarter, Lisbon



CGD Bank Headquarter, Lisbon



CGD Bank Headquarter, Lisbon



Lanta Self Storage, Phoenix, AZ



Solar Panels: 500 m² / 5,400 ft²
 Cooling Power: 105 kW / 30 tons

Desert Outdoor Center



Desert Outdoor Center Phoenix Arizona

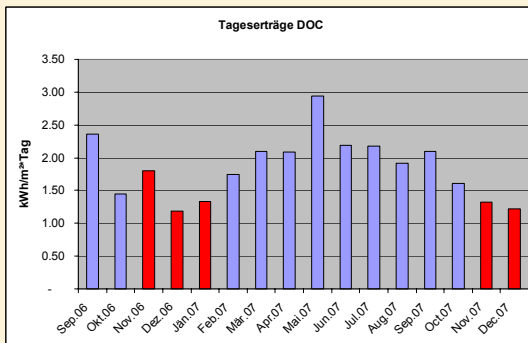
Solar Panels:
1300 ft²

Cooling Power:
70 kW

In operation since
April 2006

Project Partner
Arizona Power Service

Desert Outdoor Center



Solar gains
approx. 750 kWh/m²*y

3 months heating

8 months cooling

Operational problems:
None except CT



Operating projects



EAR Tower Pristina, 6th operating season



2 thermal driven
absorption cooling
machines with a total
load of 90 kW/ 20 tons

226 m²/2450ft²
160 kW solar collectors

4 m³/1050 gal storage
tank

back cooling unit 220 kW

back up for peak load:
electric chiller 30 kW.

Operating projects



Peitler Winery, 5th operating season



thermal driven
ammonium absorption
cooling machines

temperatures down to
2°C/35° F in wine
provided

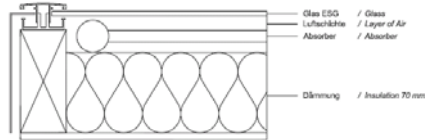
100 m²/70 kW solar
collectors

4 m³/1050 gal storage tank

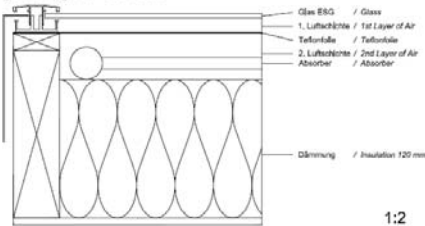
Solar Panels

Comparison of gluatmugl Solar Collectors

gluatmugl Standard-Kollektor
gluatmugl Standard-Collector

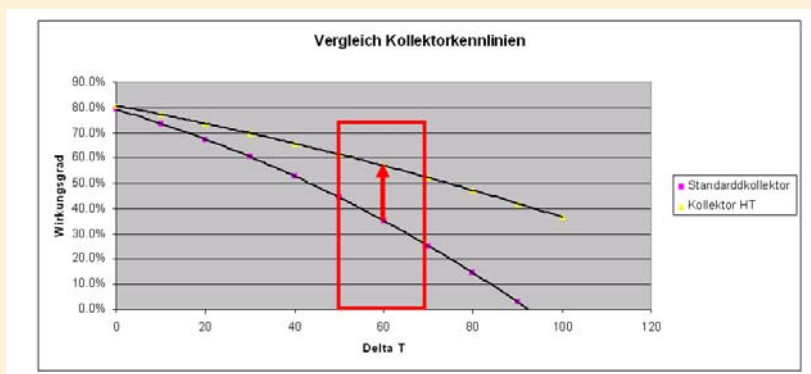


gluatmugl HT-Kollektor
gluatmugl HT-Collector



1:2

Comparison Solar Panels



Eta 0 80,6 %
 a1 2.580 W/K*m²
 a2 0.009 W/K²*m²
 (Arsenal test: 2.04.00518.10, March 2008)

- Advantages:**
- Better space usage
 - Price / output ratio

General experiences



Long lifetime of absorption chillers.
This one is > 70 years old !

Anlagenkonzept Mitteleuropa



EUROPE'S
HEADQUARTERS
FOR RENEWABLE ENERGY



Integrierte Anlagenkonzepte

Heizen im Winter

Kühlen im Sommer

Interessante Anwendungen:

Office, Shopping Center,
Gesundheitssektor

Vielversprechende Fallstudien im
gewerblichen Bereich

Scale of economy

Komplexe Anlagentechnik

Horizons...



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