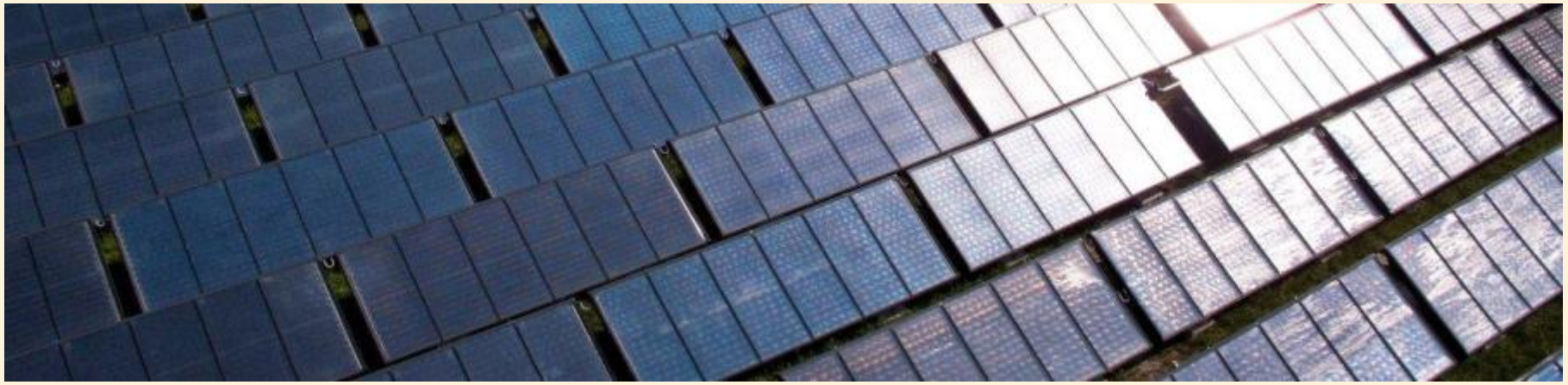
SOLID
solarinstallation+design

Solar Thermal Cooling in MW Scale

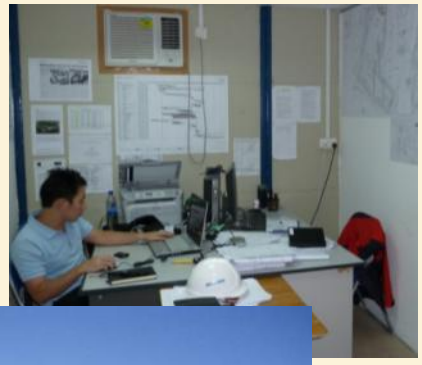
World's Most Powerful Solar Cooling Systems in Singapore and the USA



SOLID Activities

Large solar thermal systems

- Project development
- Design & engineering
- Construction
- Operation & maintenance
- Financing (ESCo)
- Research & development



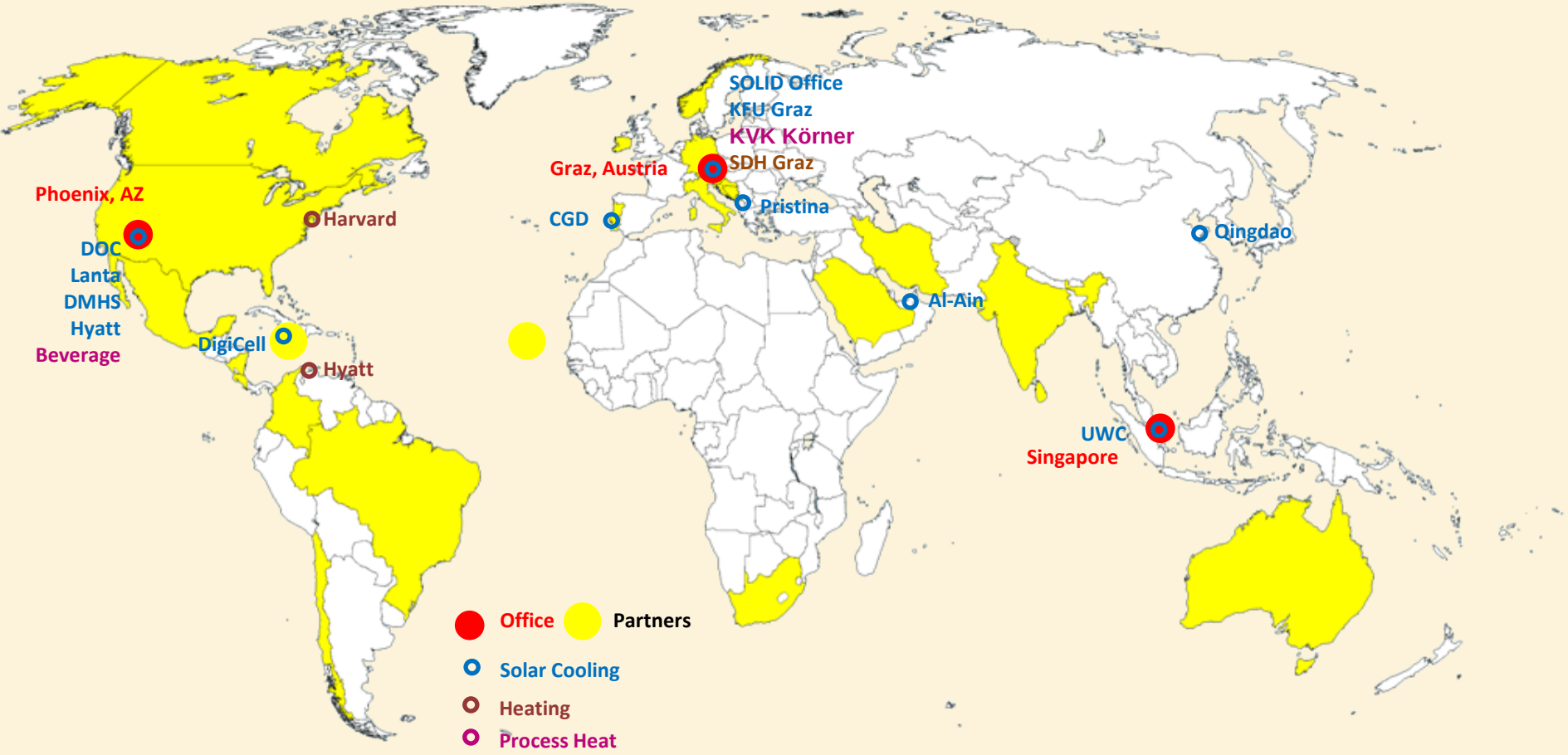
SOLID Group

Headquarter in Graz, Austria

Subsidiaries in USA & Singapore

Partners in many other countries

Recent reference plants around the world



EAR Tower Pristina, Kosovo

2 LiBr absorption machines, total capacity of 70 kW / 20 tons

Solar Panels: 226 m^2

4 m^3 storage tank

Operating since Feb. 2003

10 th operating season, 0% unforseen down time

Two large projects…

both built on ESCo agreements !

UWC SEA - EAST Tampines, Singapore

Campus area:
76,000m²/ 820,000ft²

Students: approx. 2700

Solar Panels:
3900 m²/2.73 MW_{therm}

Chiller size:
1500kW/420 tons

Storage:
For Cooling 60 m³
For Hot Water 7 m³

World's most powerful Solar Cooling System today

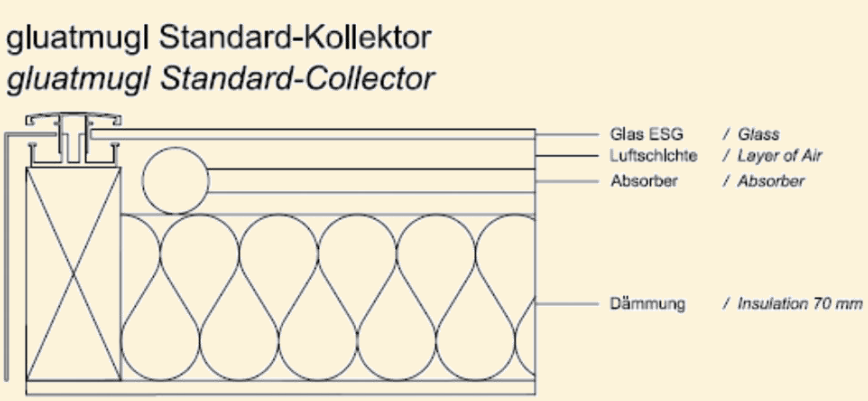
UWC – Collector areas

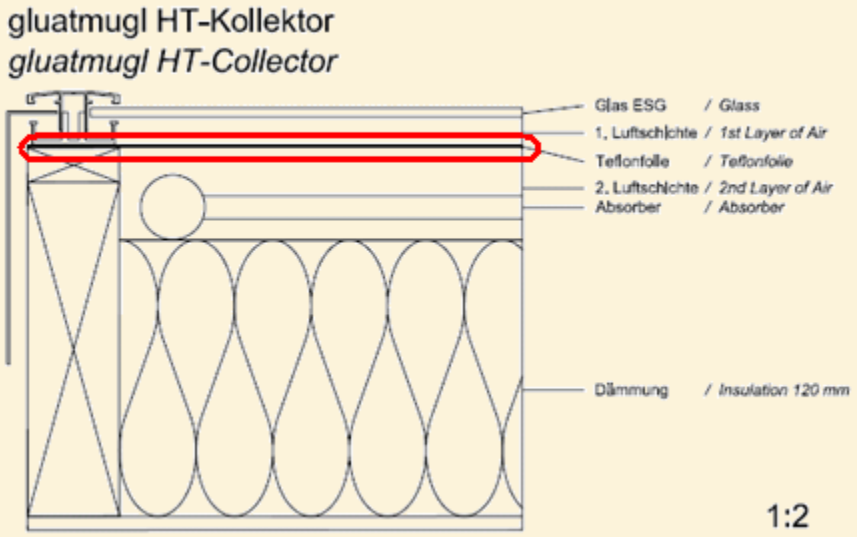
3900 m² gluatmugl HT

On 4 buildings

Solar Thermal Collector

Standard flat plate < > HT -collector





HT – collector has 2 air chambers, separated by a Teflon® foil

→ better insulation

→ higher performance at high temperatures

UWC - Chiller

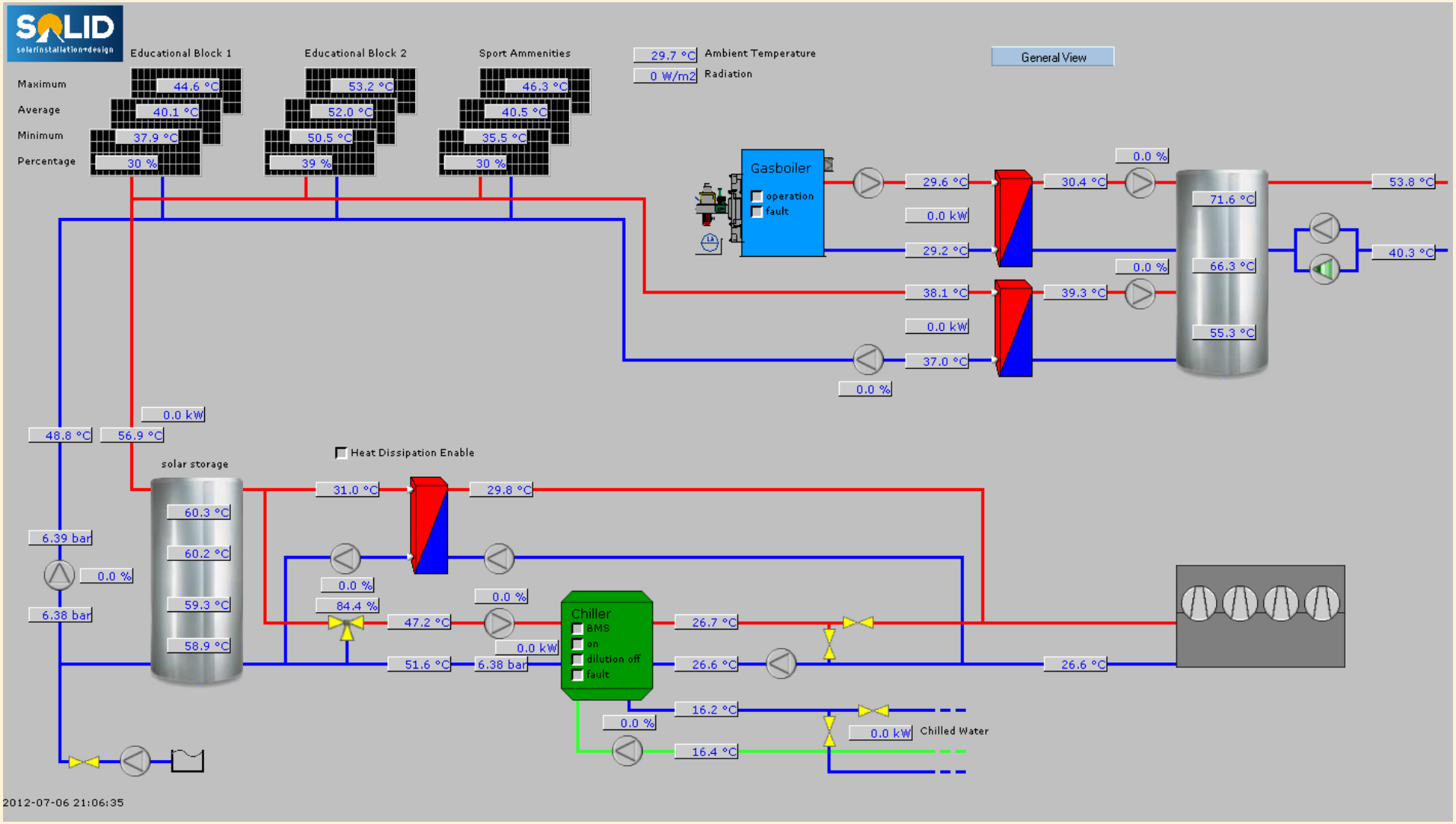
LiBr absorption chiller
1575 kW

UWC – Storage tank

2 *

30 m3 tank

UWCSEA-EAST Tampines, Singapore



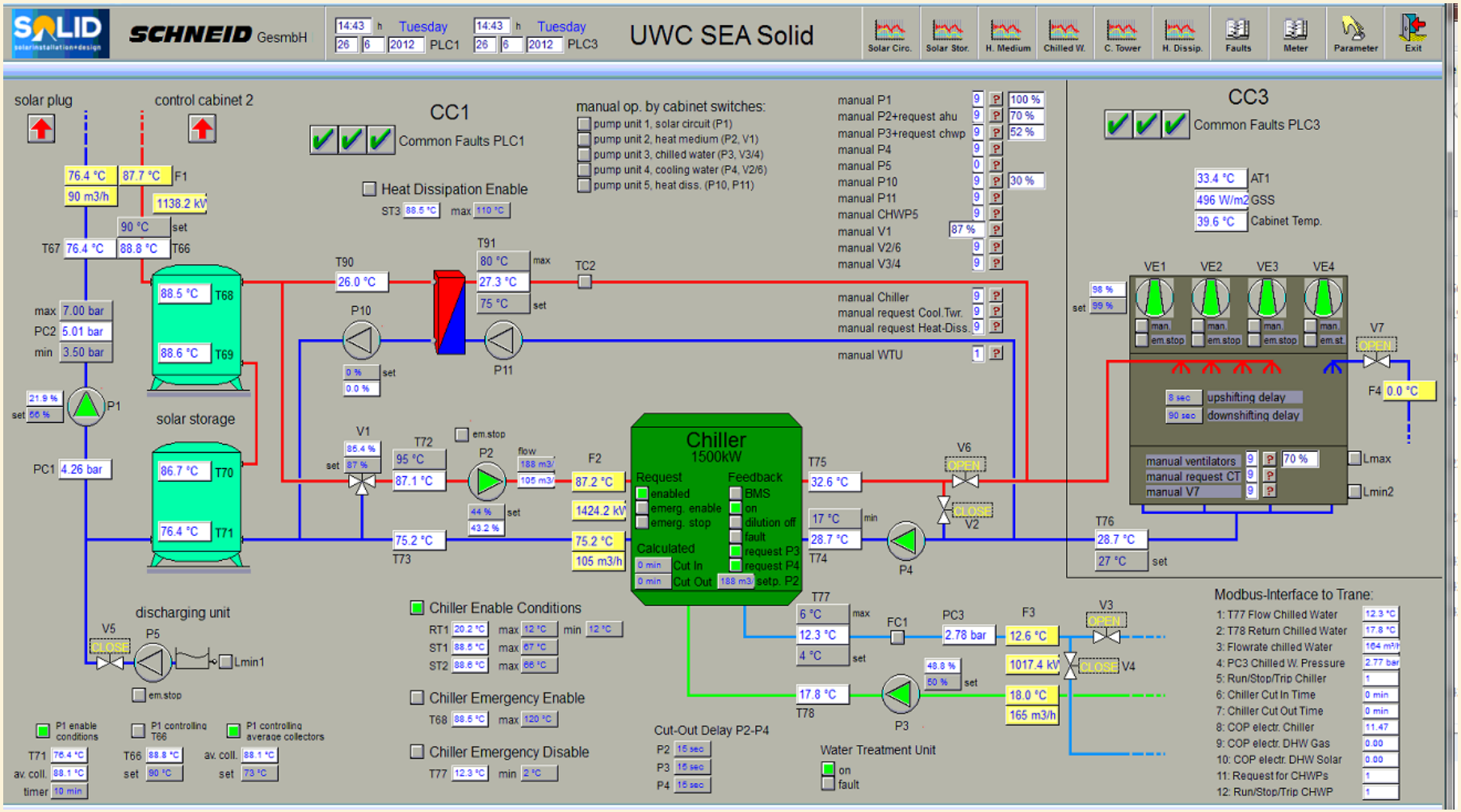
Experiences of UWC construction

- Key Equipment out of trusted sources
- Local Supply pipeing, steel work, tanks, …
- Be careful on technology transfer issues !!!
- Solar standards versus local standards and norms
- Singnificant time and effort and local presence needed to get it done properly

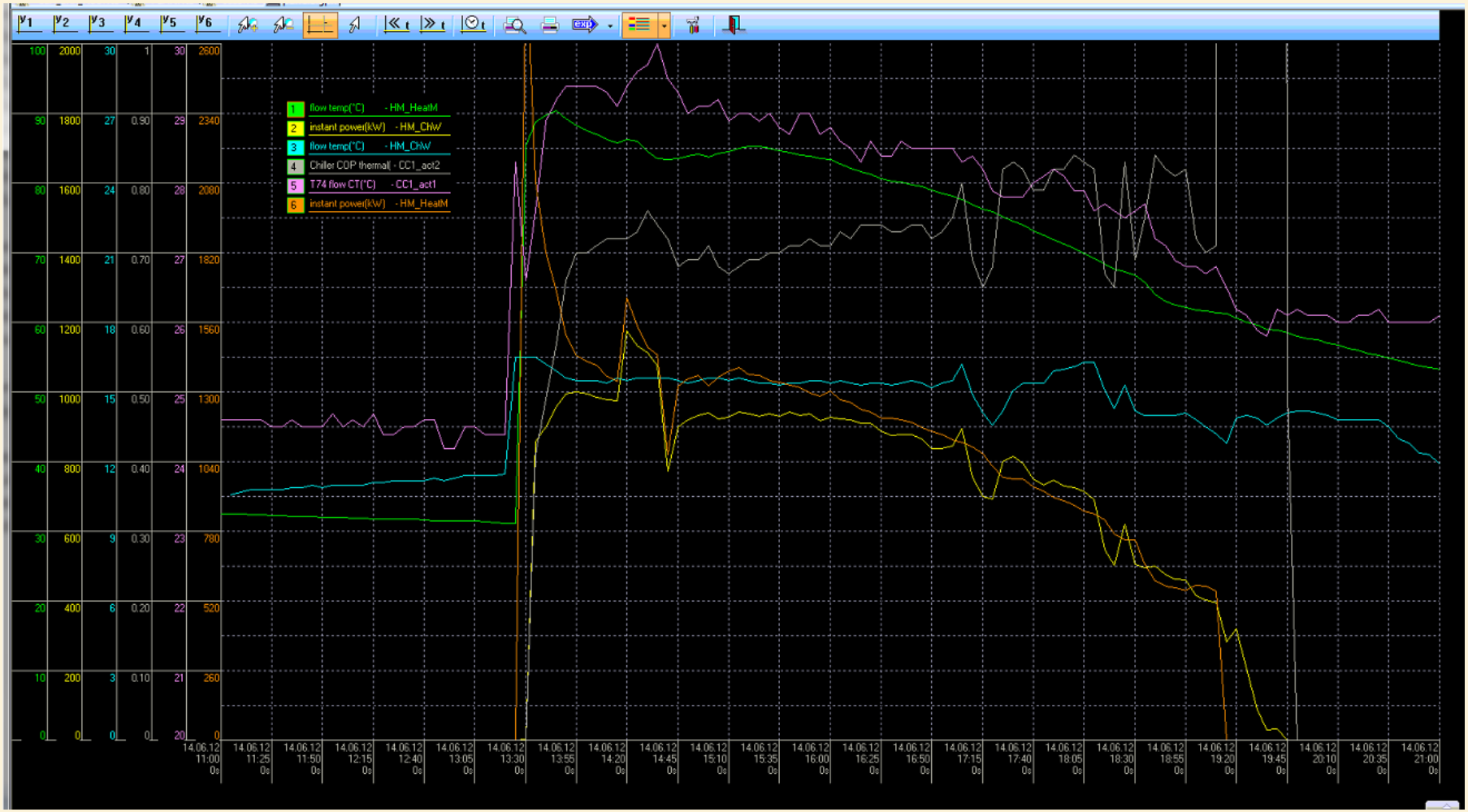
Experiences of UWC operation

- Bad climate year
- Electric COP 6-13 …but dont kill part load operation only to optimize this!
- Clear vision how to improve electric COP even more
- Interesting load profiles with south and west facing colletors
- Ongoing optimisation process…huge improvements
- chiller operates down to 60°C
- Be careful in losses in pipeing (gravidity, valves, expansion joints)

Experiences of UWC Part Load



Experiences of UWC operation

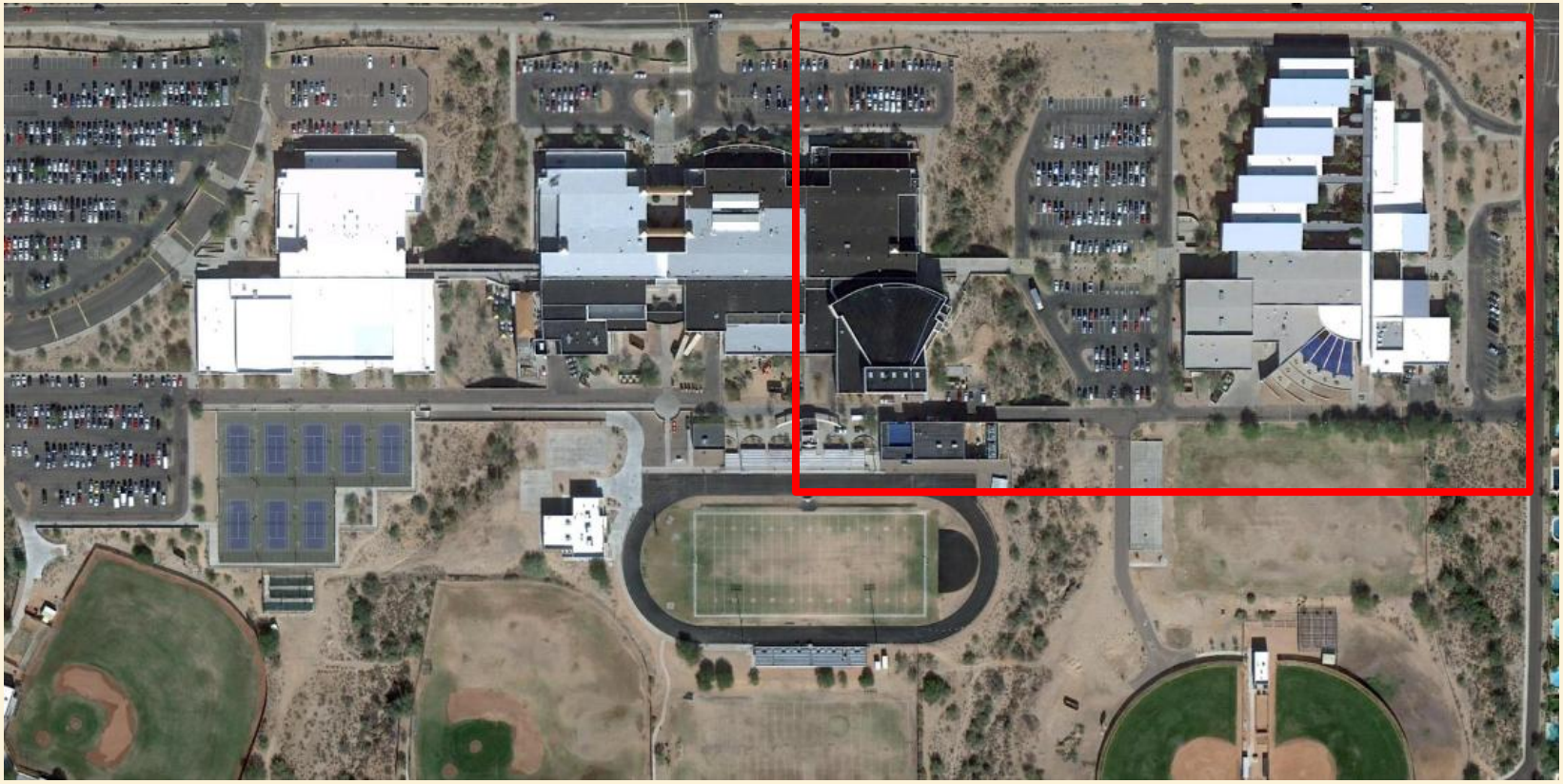


Desert Mountain High School, USA

Scottsdale, Arizona, USA

Cooling, Heating and DHW for Middle School and High school

500 tons /1750 kW_{th} of Cooling, 50,000 ft^2 collector area



DMHS –Covered Parking

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Thanks for your attention

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Further presentations:

- Poster E02 Solar Process Heat
- Financing of large scale Solar Thermal Systems (WED- 1C)
- Evaluation of the prototype IP Solar (WED 1A)