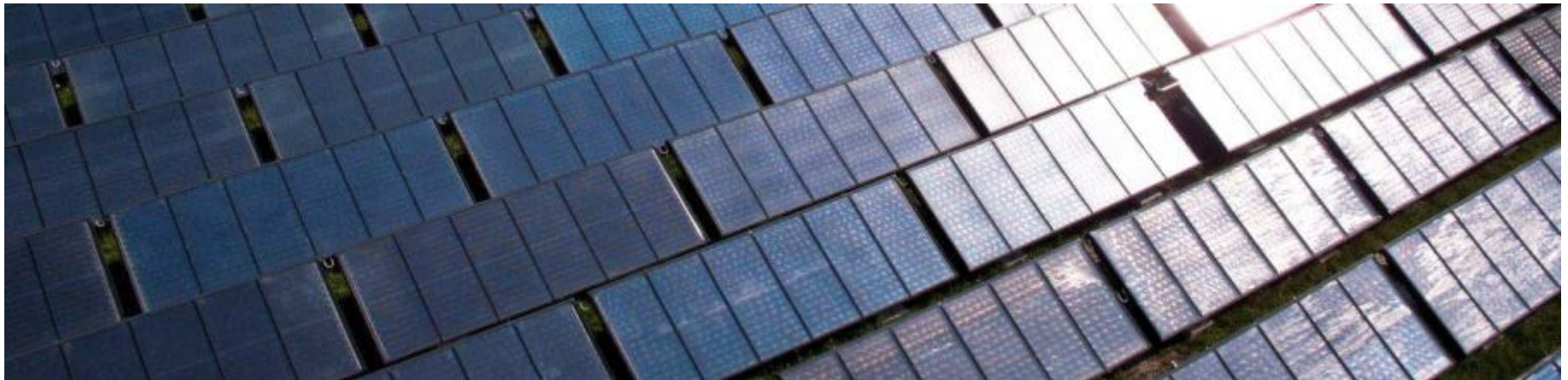


# Solar Thermal Heating & Cooling and Buildings

Experiences, Chances, Hurdles

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Christian Holter  
S.O.L.I.D. GmbH

## Large solar thermal systems (>500m<sup>2</sup>)

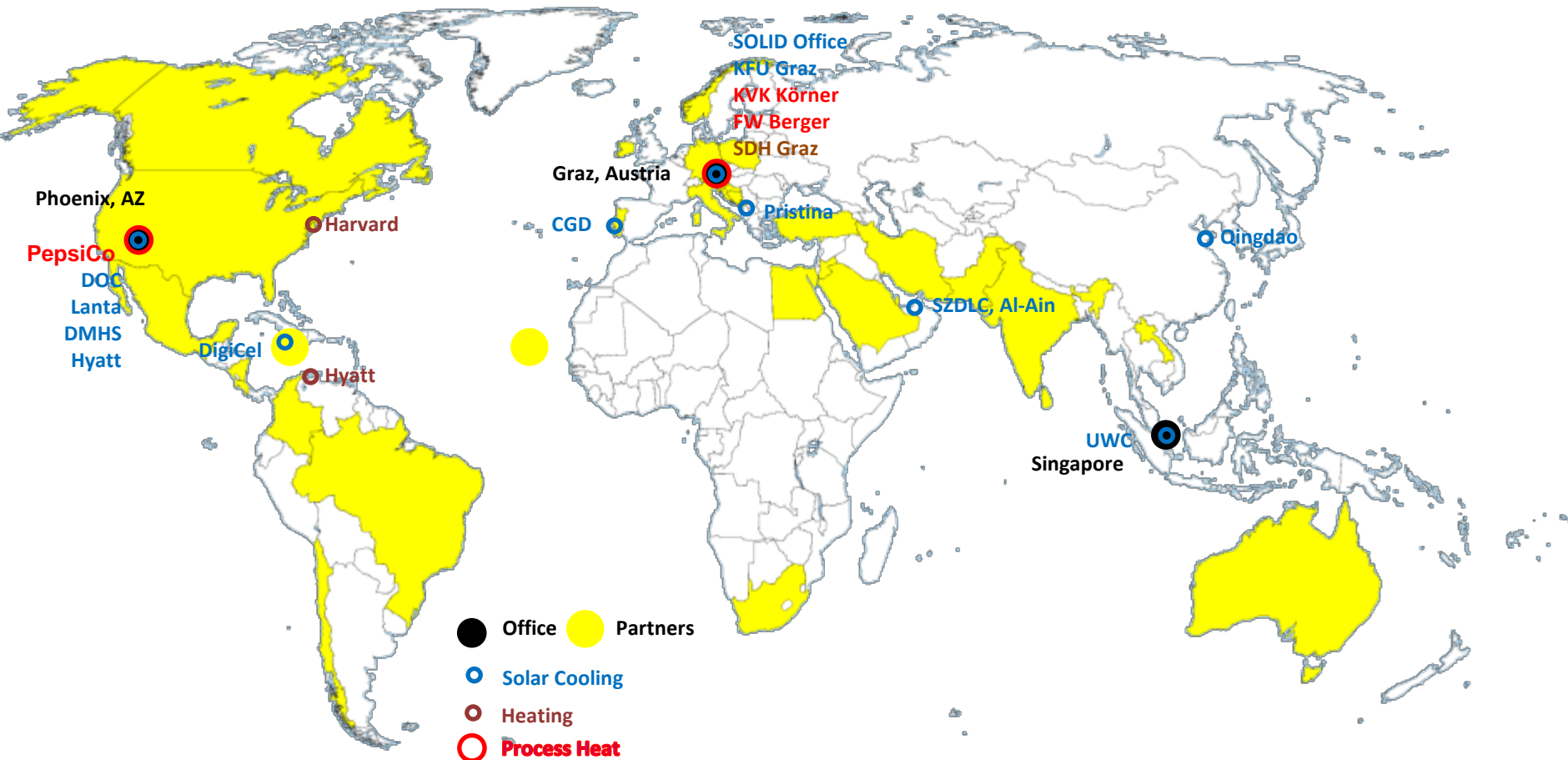
- Project Development
- Reasonable approved concepts
- Master engineering- system KH
- Construction supervision
- Operation and Maintenance
- Project Financing (ESCo)
- Research & development
- Consulting, Training



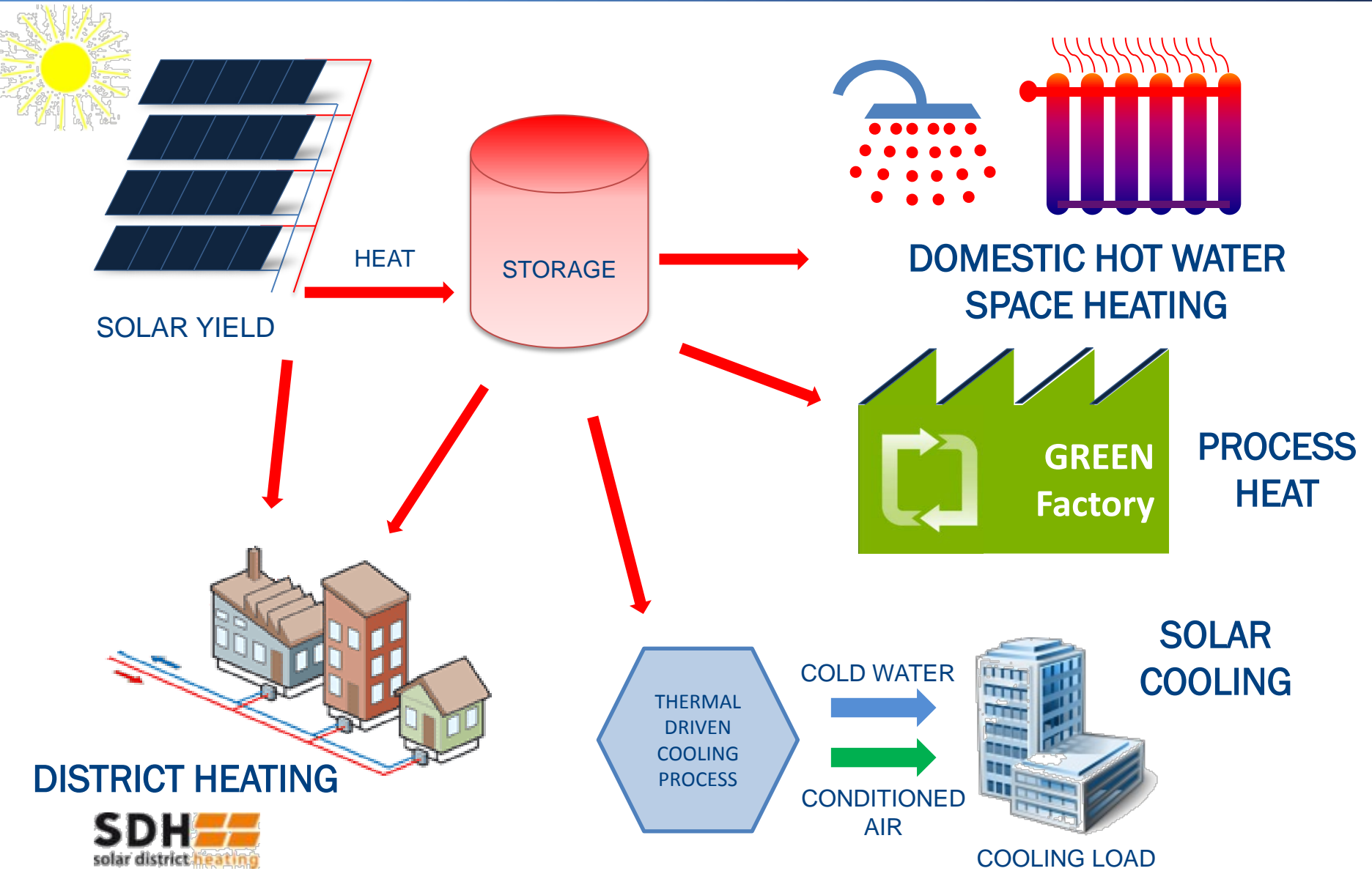
# S.O.L.I.D. Group

Headquarter in Graz, Austria  
Subsidiaries in USA & Singapore

Partners in many other countries  
Recent reference plants around the world

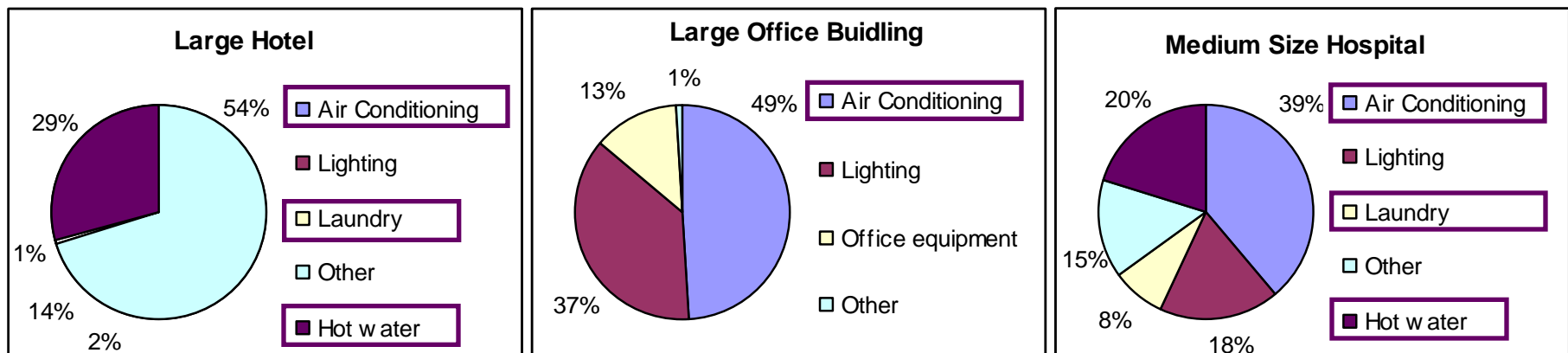


# Technical Solutions by SOLID



# Background

- Peak Demand on cooling meets solar Peak
- Cooling creates expensive peak demand
  - Cooling is the biggest single user of electricity in buildings



# Why solar air conditioning ?

- Electric Energy Savings
  - Electric COP          Solar Cooling System incl. recooling          ~10-40
  - Electric COP          Compression Chiller Syst. incl. recooling          ~2-6
  - reduced electric consumption by 70-80%
- More stable energy expenses
- CFC Free Chillers – No Ozone Depleting Potential
- LEED certification - up to 10 additional points possible
- Quiet operation – no vibrations
- Reliable operations – no wear and tear on pistons or screws as there are no such stressed parts

# Office building - EAR Tower Pristina, Kosovo



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

Solar Panels: 226 m<sup>2</sup>

4 m<sup>3</sup> storage tank

Operating since Feb.  
2003

**13th operating season, 0% unforeseen down time**

# Solar cooling - Digicel, Kingston, Jamaica



Office space: 13,685 m<sup>2</sup>

Solar Panels:  
982 m<sup>2</sup> / 680 kW

Single stage LiBr chiller:  
600 kW

Hot storage: 2 x 5.5 m<sup>3</sup>

492 MWh cooling energy  
per year

In operation since 2012

Realised in partnership with  
RED, Jamaica



**Energy Globe Award 2014**



# Sheik Zayed Desert Learning Center (UAE/AI Ain)

Solar Cooling via  
concrete core activation  
of a desert museum

Cooling power: 400 kW  
Collector area: 1108 m<sup>2</sup>  
Expected Solar yield:  
825 kWh/m<sup>2</sup>/year

Commissioning: 2012



# UWC Tampines, Singapore



Solar Cooling & Hot Water  
for School Campus

Solar Panels:  
3900 m<sup>2</sup> / 2.73 MW

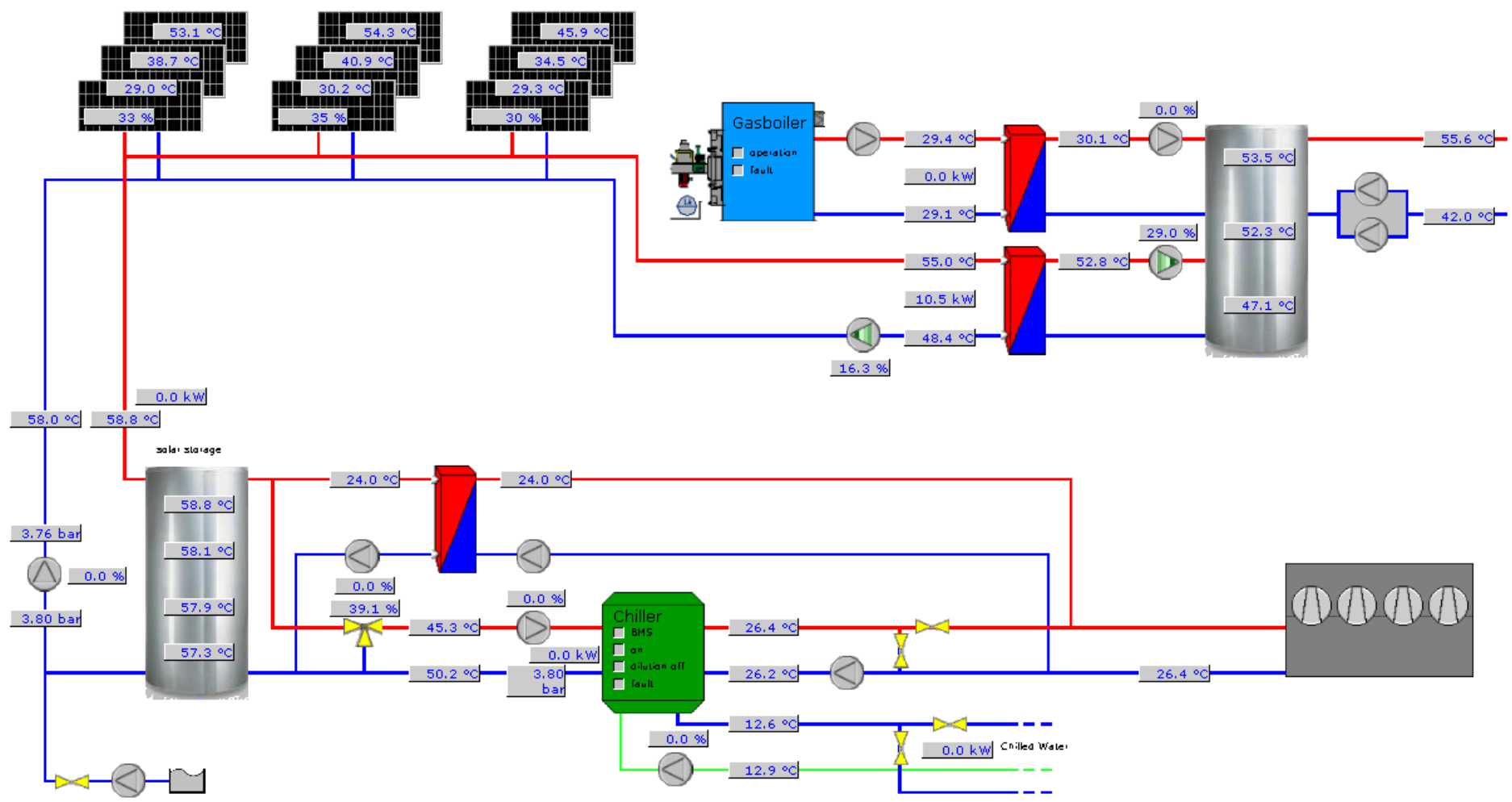
LiBr absorption chiller:  
1470 kW

Operation started: 2011

Enlargement actually  
under discussion

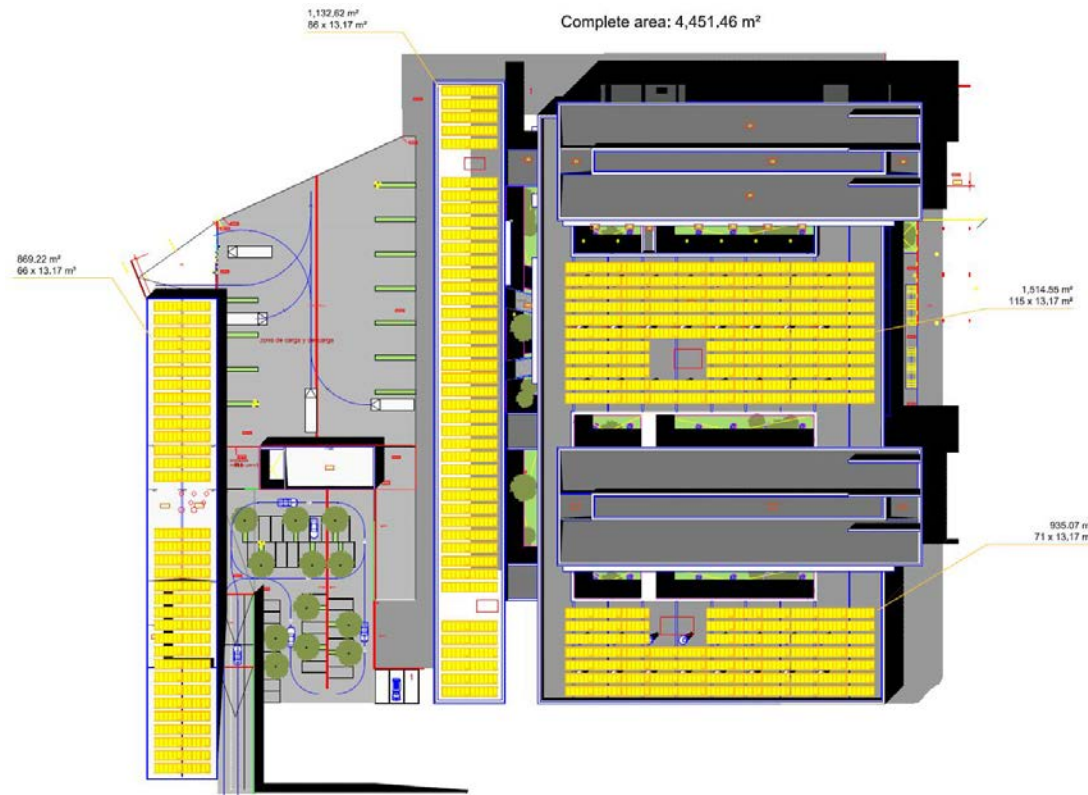
**World's most powerful  
Solar Cooling System  
until 2013**

# UWC Tampines, Singapore



Live visualization: <http://www.uwc.heizwerk.at/?email=frei&pw=frei>

# Managua Hospital, Nicaragua



## Almost completed

- Collector area: 4,450 m<sup>2</sup>
- Cooling load: ~1023 kW = 291 RT
- Peak heat power: 2600 kW
- Annual solar production: ~3 GWh heat
- Yearly energy savings:
  - 140 tons of gas,
  - 435 MWh electricity,
  - 500 kW of connected load

# IKEA; Singapur

- Solar Cooling System IKEA Singapur, Alexandra Road.
- Under construction now
- 2600 m<sup>2</sup> solar collectors
- 900 kW cooling

