1st InSun Workshop

„Exchange of experience made with the design and installation of solar process heat systems“

Rapperswill/Switzerland, 4th of March 2013

[FP7/2007-2011] ENER/FP7/296009/InSun

Overview – References of SOLID

Name	Collector array, m^2	Status
Körner KVK Wies	**86**	**In operation since 2007**
Wine producer Peitler	100	In operation since 2003
Gatorade, Phase 1	**893**	**In operation since 2008**
Gatorade, Phase 2	**2600**	**In operation since 2010**
Gatorade, Phase 3	**3797**	**In operation since February 2012**
Stonyfield dairy	3118	Engineering study
CB Chicken Slaughtery	1050	Engineering study
Meat factory Berger	**1067**	**Commissioning in May 2013**

Solar Thermal Collectors

- ökoTech – Flat plate collectors
  - Manufacturing Department of S.O.L.I.D.
  - Collectors are built to order
  - Specializes in large scale thermal collectors manufacturing – up to 18m^2
- Advantages
  - Higher energy output
    - Flow of fluid is designed to suit application
  - Easier and faster installation
  - Less connections and pipings
    - Lower flow indicates smaller pumps

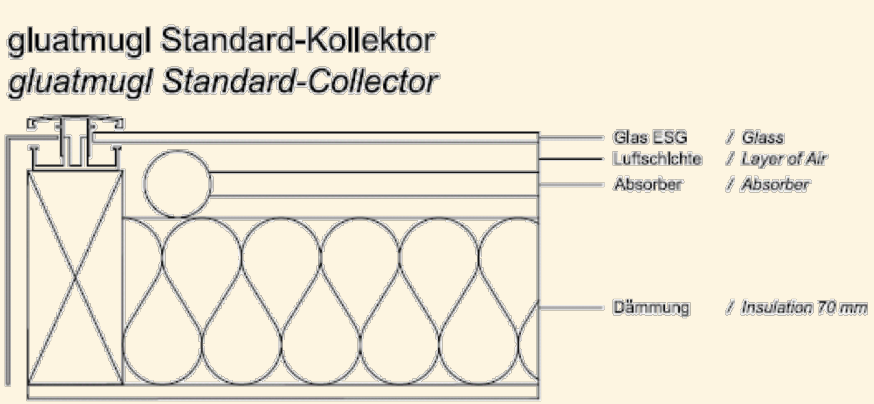
Collector types

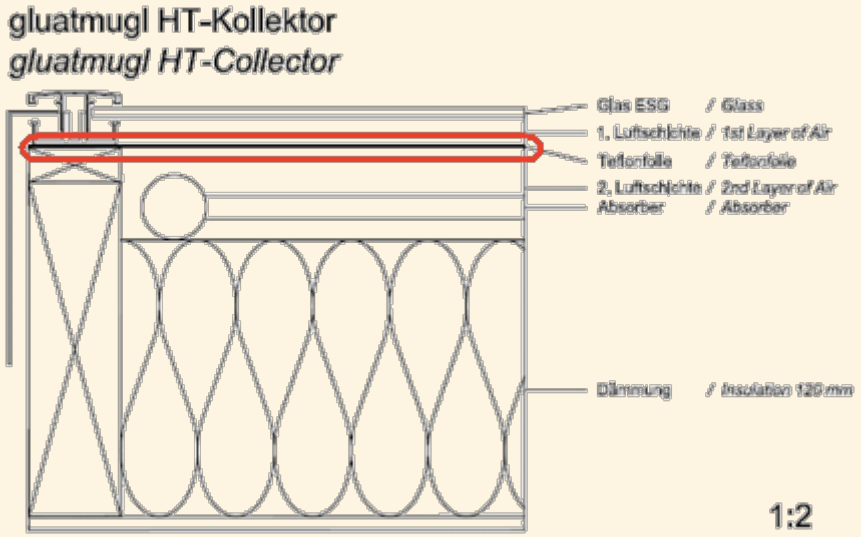
- SOLID's collectors gluatmugl + gluatmugl HT perform excellently for the targeted temperature range

- Flat plate collectors
  - benefit from diffuse radiation
  - excellent performance per m^2
  - no movable parts
  - no maintenance
  - lower system cost / m^2 or kW

Solar Thermal Collector

Standard flat plate < > HT -collector





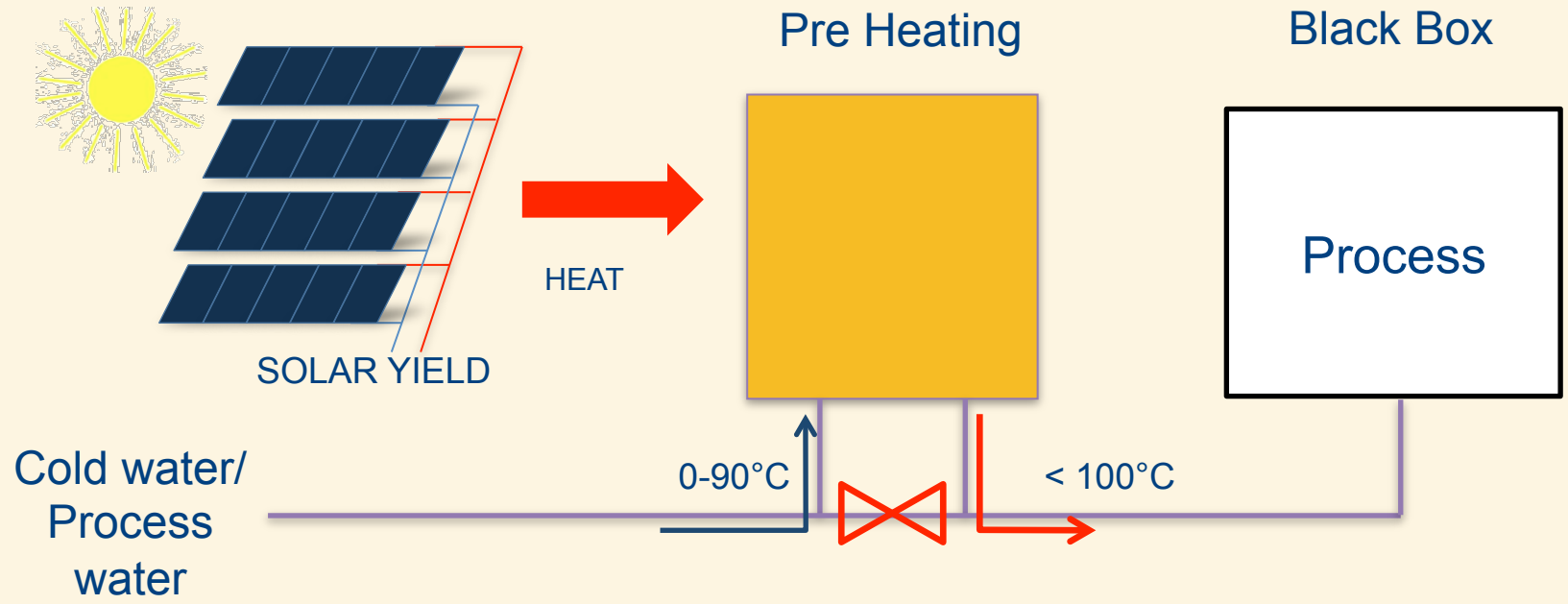
HT – collector has 2 air chambers, separated by a Teflon® foil

→ better insulation

→ higher performance at high temperatures up to 110 °C

Preheating is the easiest solution

- Heat up to 100 °C
- Either directly to the individual process or within a network of heat exchangers
- Constant pre-heating at temperatures below e.g. 60 °C delivers the best techno-economic results



Meat factory Berger, Austria

Key data

- 1067 m² high temperature solar panels
- 60 m³ storage tank

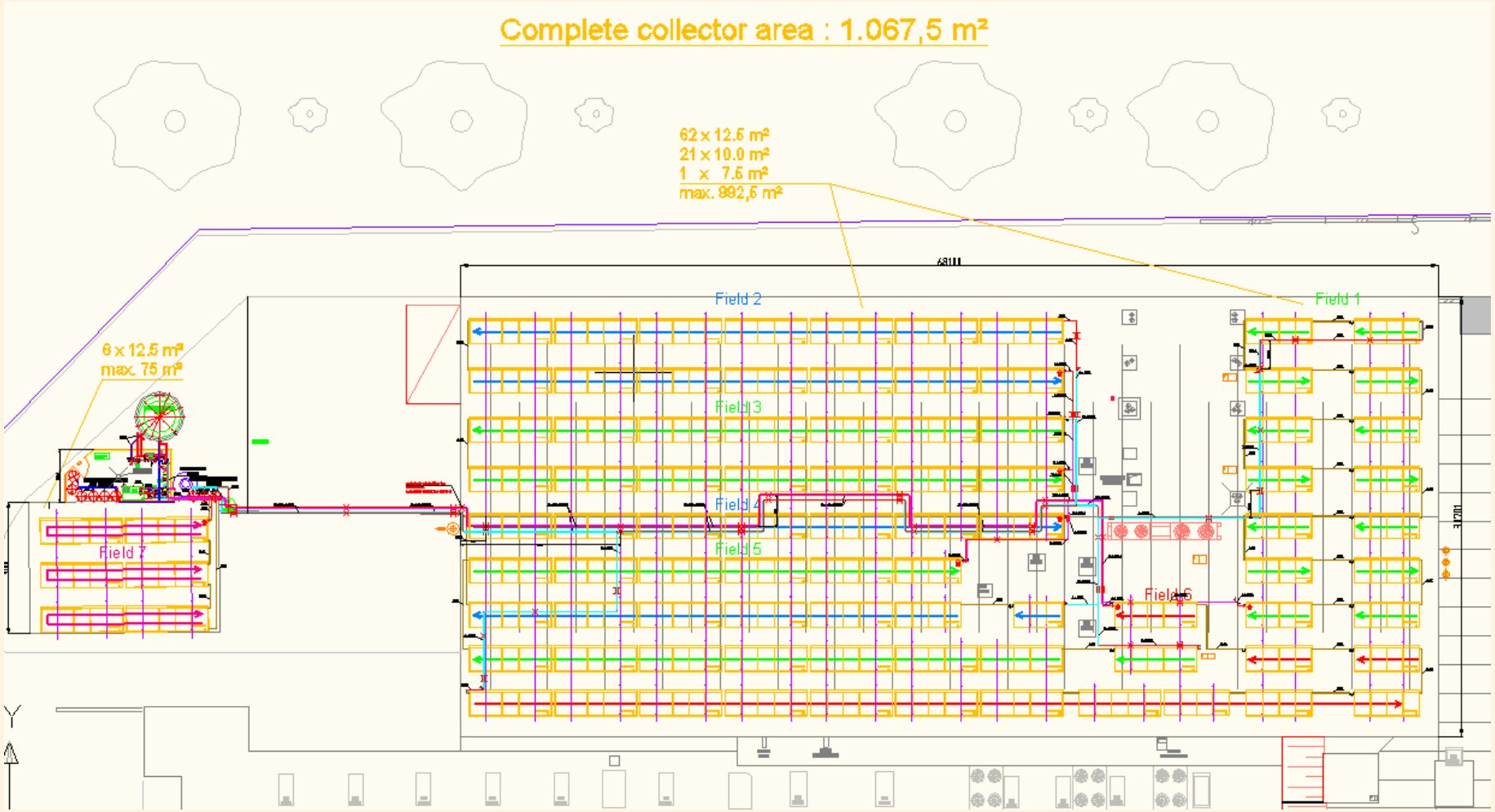
Hot water preheating for dehumidification of maturation chambers

- 7 m³/h hot water demand
- 240 kW plate heat exchanger
- Usage of waste heat until 40°C
- Solar heating up to 70°

Preheating feed water for steam production (ham cooking)

- 2,7 m³/h hot water demand
- 200 kW plate heat exchanger
- Usage of waste heat until 28°C
- Solar heating up to 93°

Meat factory Berger, Austria



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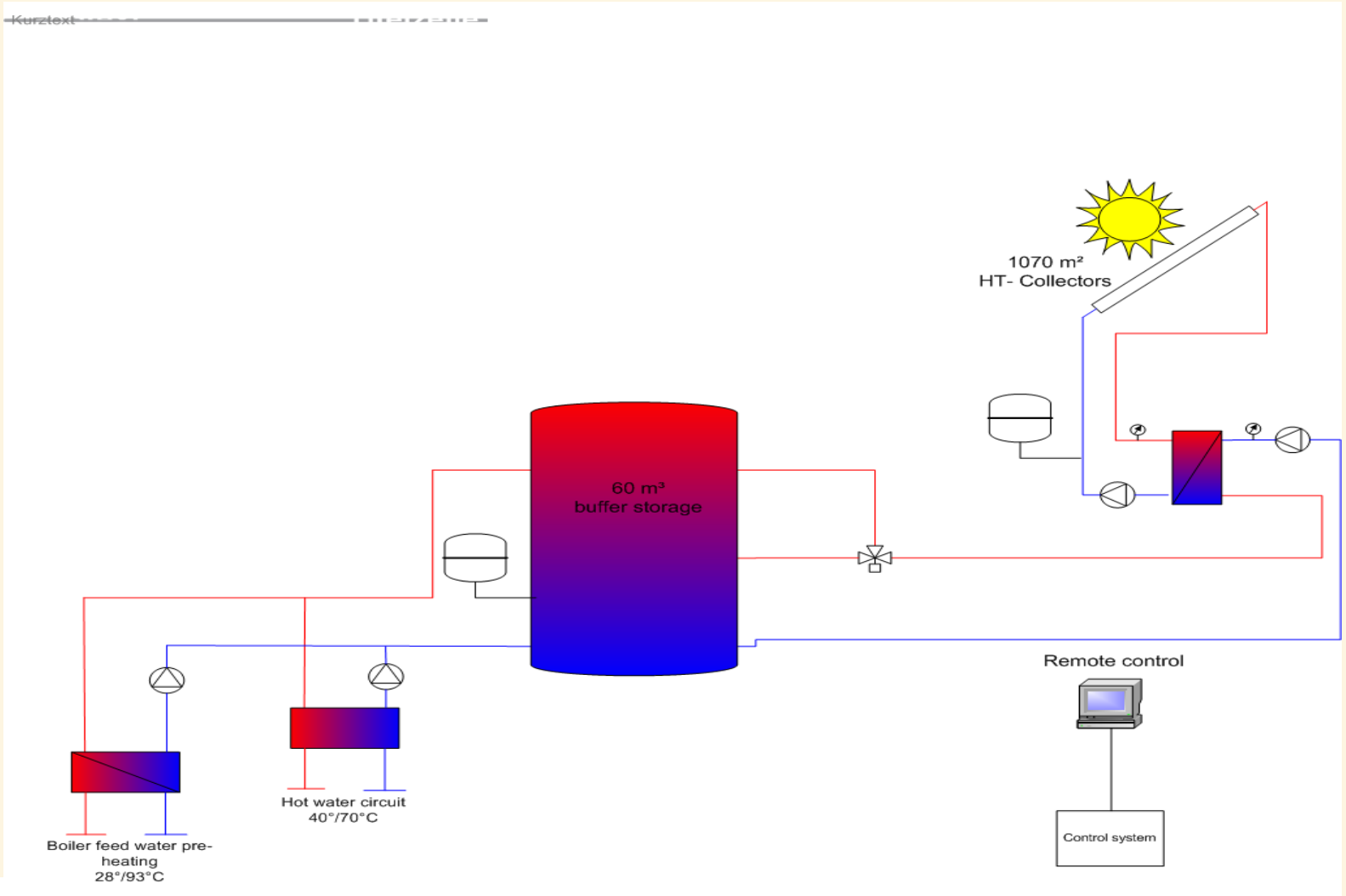
Meat factory Berger, Austria



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Gatorade (Pepsi Cola) Phoenix , AZ

Preheating production water for the soft drinks before the reverse osmosis plant.

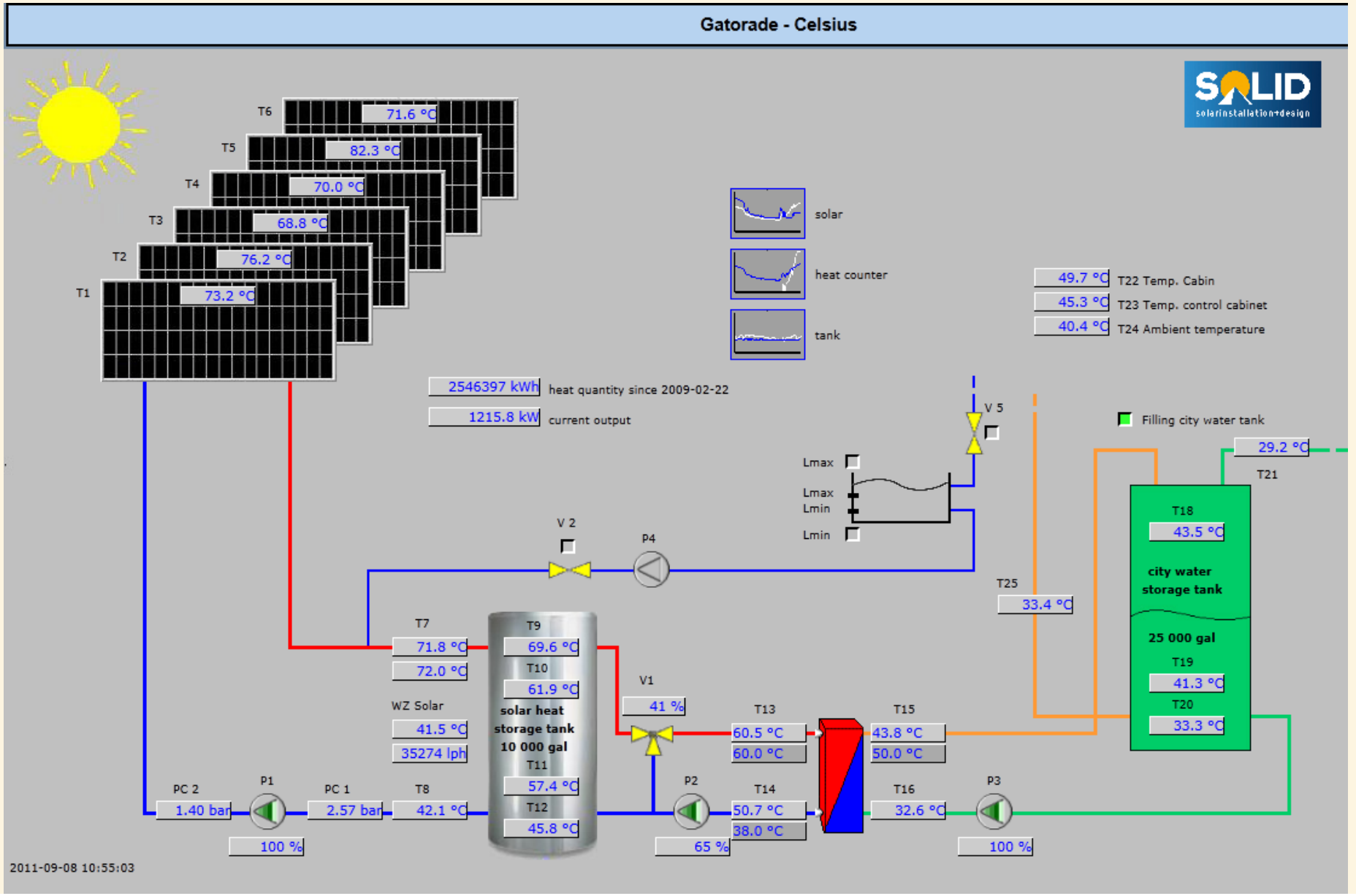
Storage: 114 m^3

2008: 893 m^2

2010: upgrade to 2600 m^2

2012: upgrade to 3797 m^2

Gatorade (Pepsi Cola) Phoenix , AZ



Conclusions / Experiences

- Industry buildings → structural problems because of weak buildings and roofs; specific solutions for substructure has to be elaborated
- Structural engineers have less knowledge in solar thermal plants
- SOLID focuses on preheating systems below 100 °C → simple hydraulic and control strategy, high solar yields
- High overall system efficiency because of low solar fraction
- No stagnation problems so far → heat demand much higher than solar yield

Conclusions / Experiences

- Manual refilling of heat medium instead of automatic refilling
- Huge effort for authority submission → no standard documents
- **Economic viability is more likely if:**
  - Low temperature process heat is required throughout the year
  - No waste heat from other processes can be used
  - High energy prices
  - Dedicated funding schemes are available
- ESCO model could be an option

Thank you!

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