

IEA SHC Task Meeting

Task 53

21st and 22nd of September 2015, EURAC, Bolzano, Italy

Solar PV Cooling

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Agenda

■ Content

- System
- System States and Control
- Climatic Conditions in the Lab
- Set in operation - first measurement results
- Outlook

System

■ Hydraulic schematic

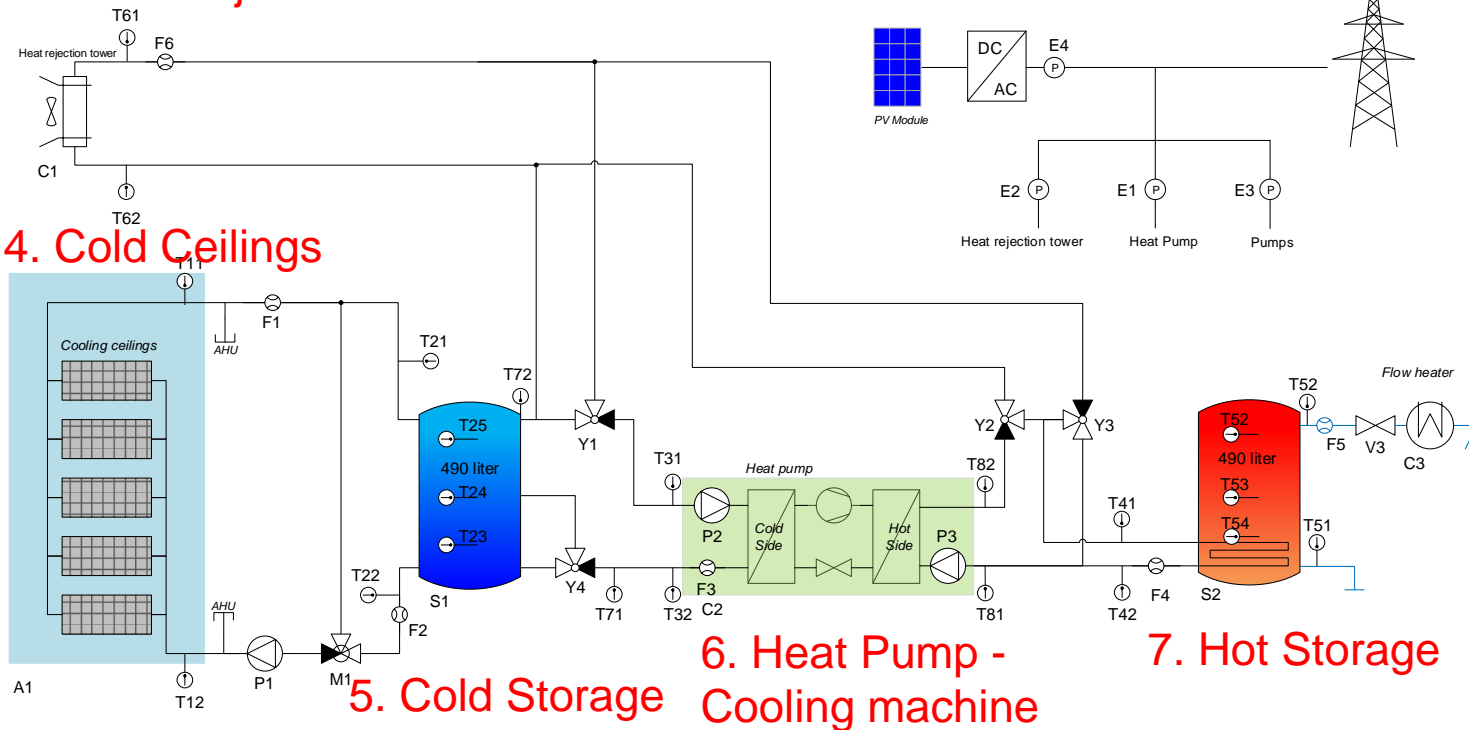


1. Measurement Equipment and Data Acquisition

2. Heat Rejection Unit

3. PV Modules and Inverter

4. Cold Ceilings



5. Cold Storage
6. Heat Pump - Cooling machine
7. Hot Storage

System

■ Main Components



PV modules (Meyer Burger) – south oriented



Cooling machine (HP; ait / Nibe) & storage tanks.

System

■ Main Components



Cold ceilings (Zehnder) installed in the Lab.

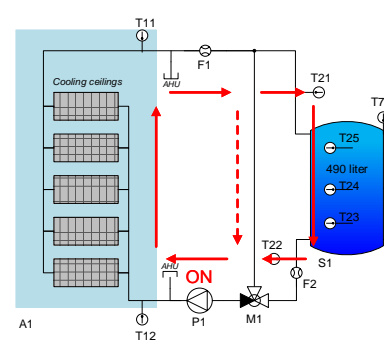


Outdoor unit

System states

Room Cooling Circuit

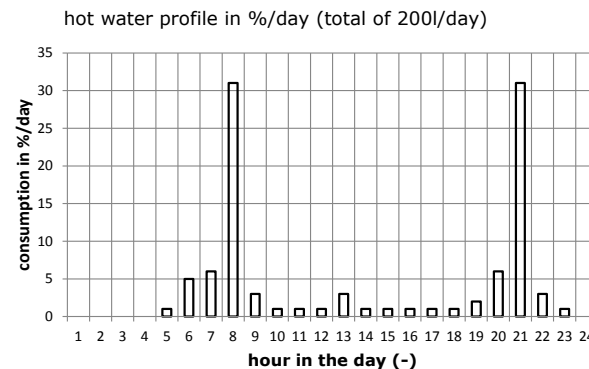
1. Start Room Cooling.
2. Stop Room Cooling.
- Etc.



Cold Preparation

1. Charging the cold storage, heat recovery to preheat DWH.
2. Charging the cold storage, heat rejection to the ambient.
3. System Stop.
- Etc.

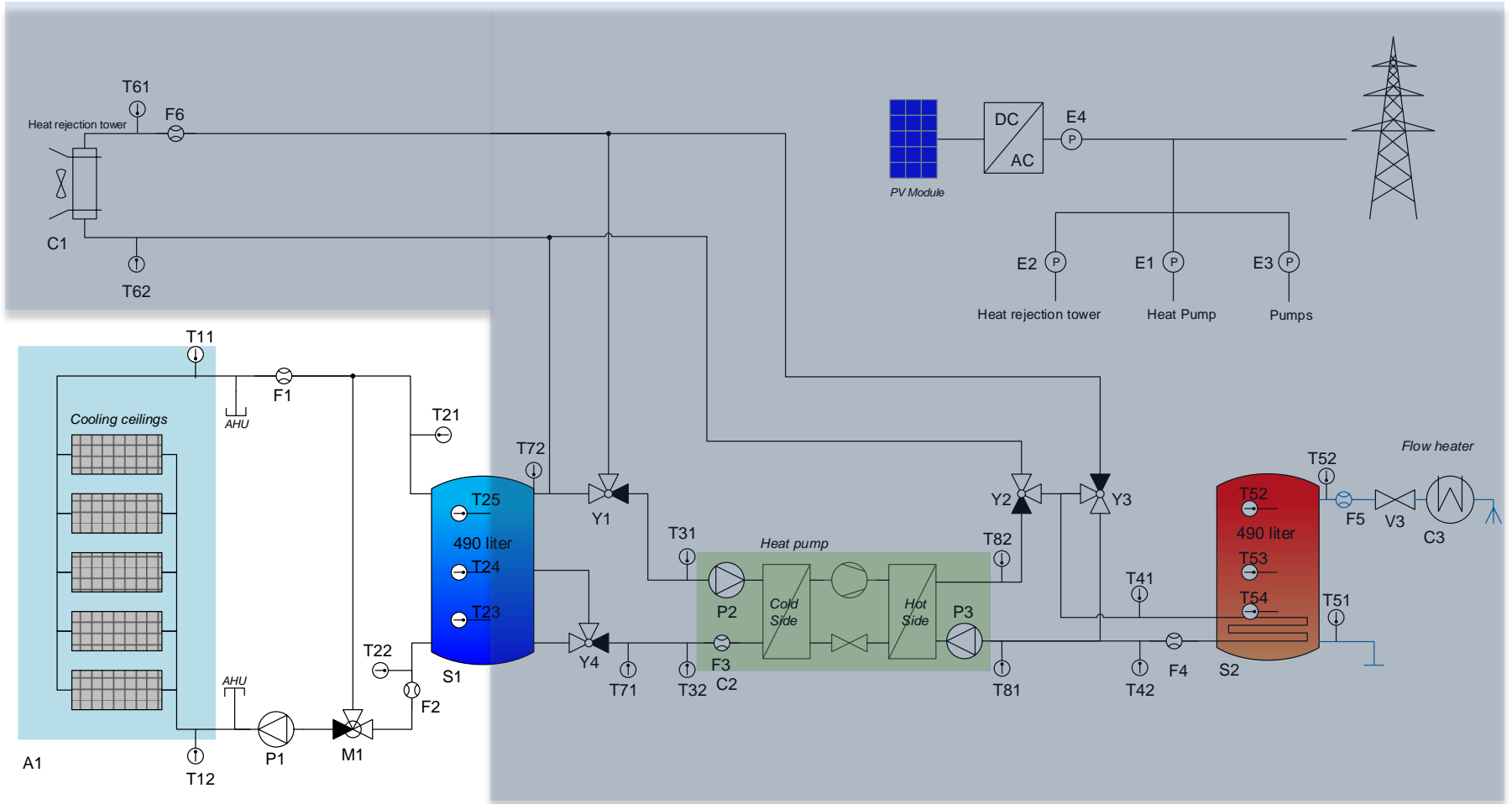
Domestic Hot Water (DHW) profile



System states

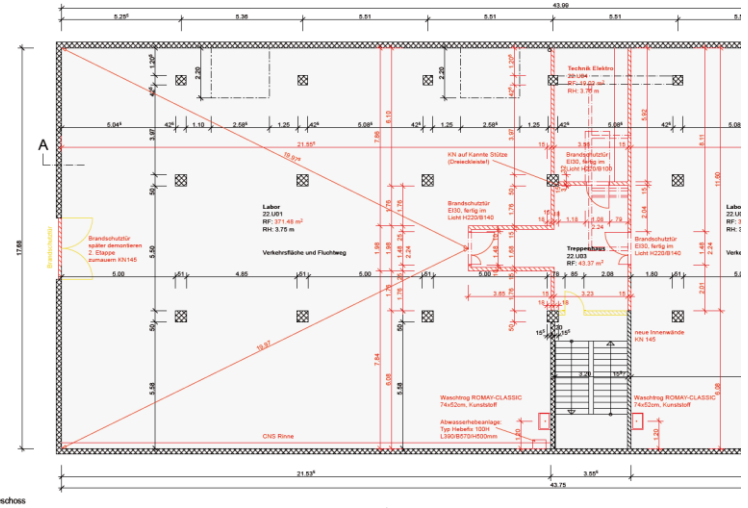
■ Stop Room Cooling (example)

Room Temperature > 23°C

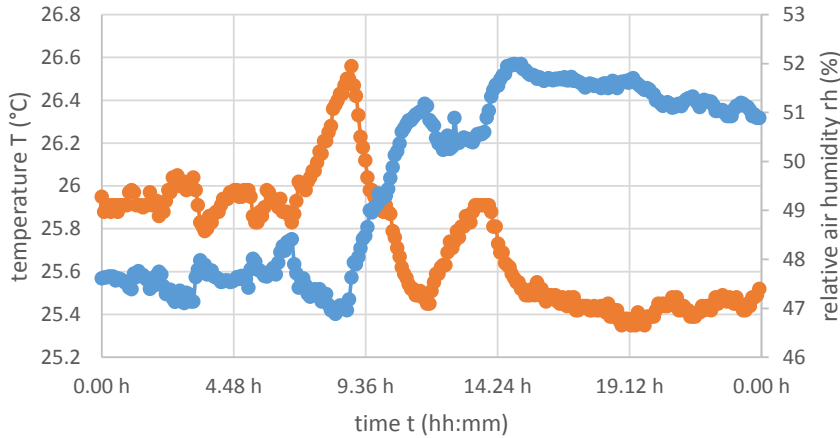


climatic conditions

Room temperature

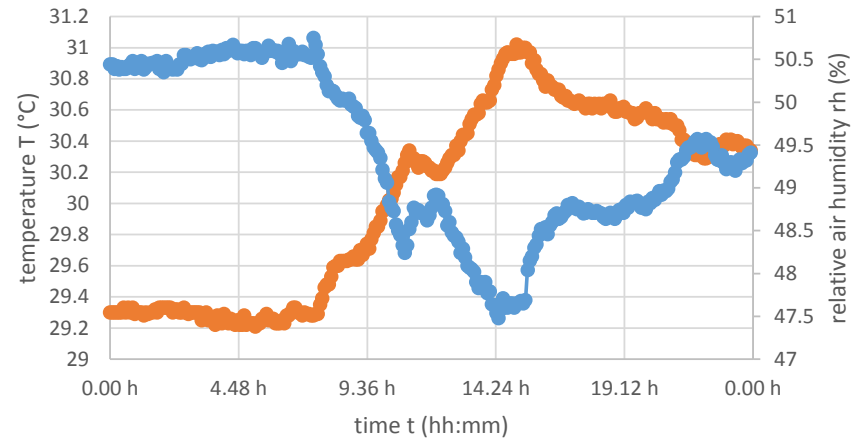


Laboratory EW 6: 05.06.2015



—●— air temperature T (°C) —●— relative air humidity rh (%)

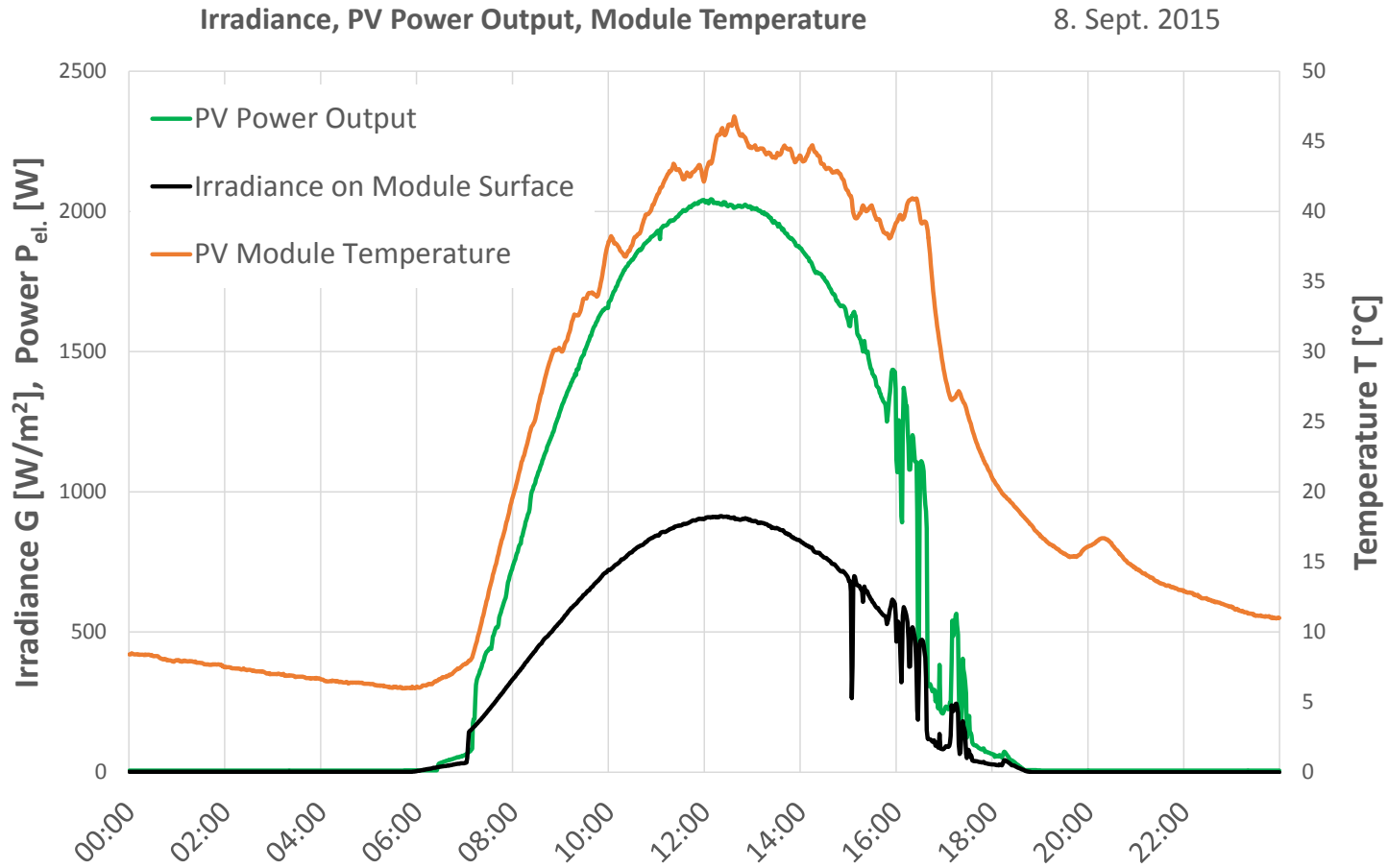
Laboratory EW 6: 20.07.2015



—●— air temperature T (°C) —●— relative air humidity rh (%)

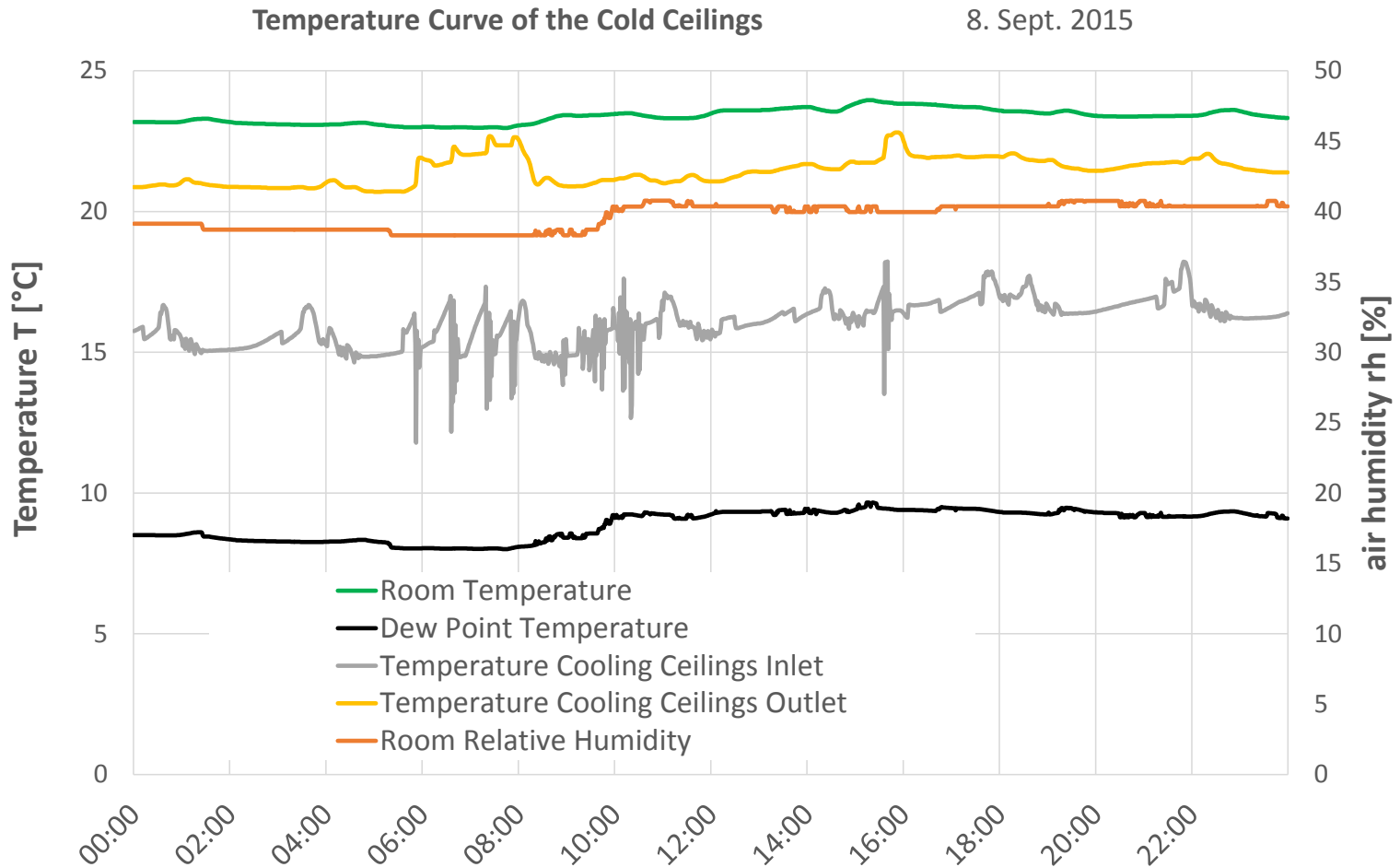
Measurement results

PV modules



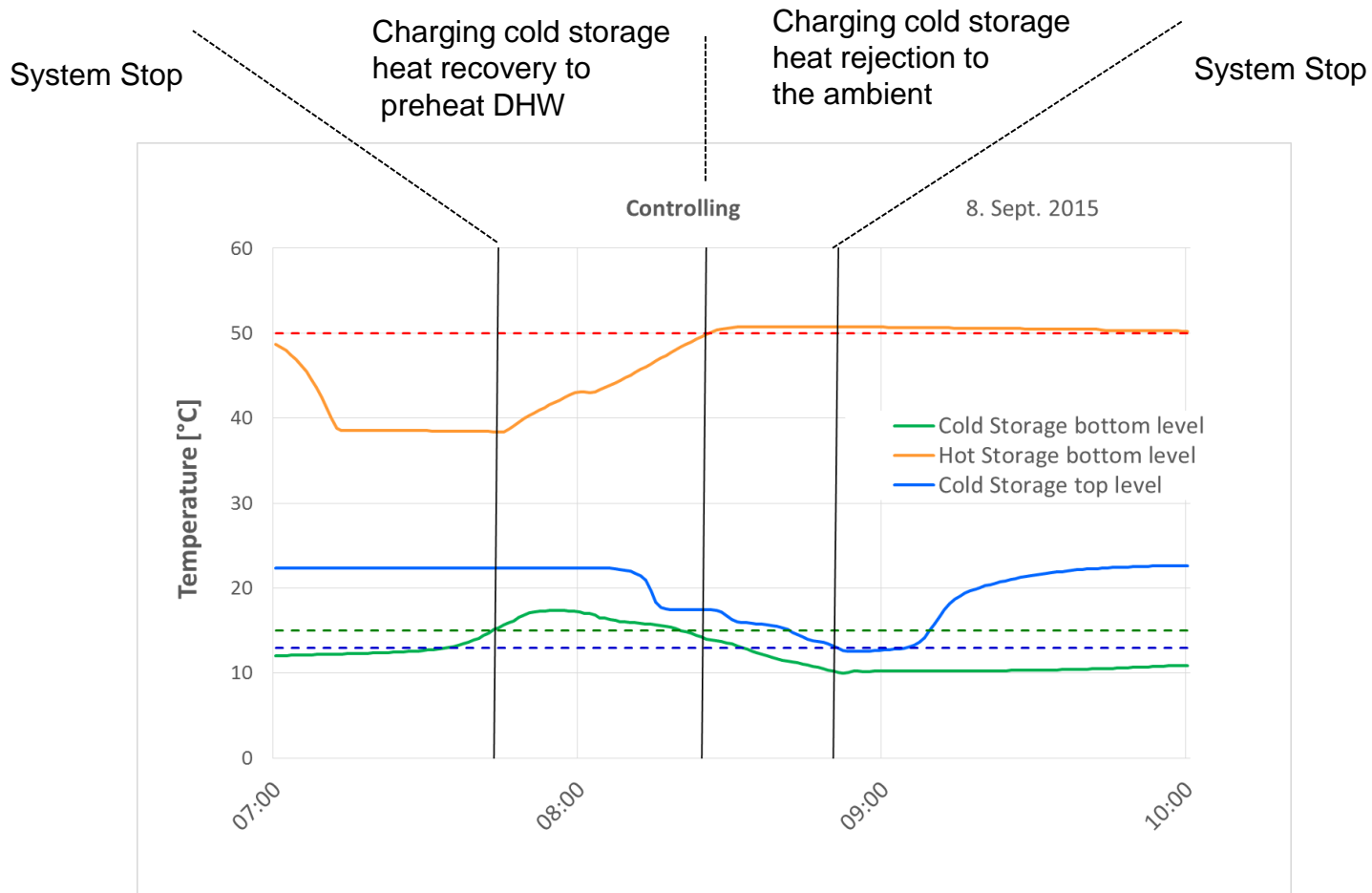
Measurement results

■ Cold ceilings



Measurement results

■ System control



Measurement results

■ Outlook

1. Implementation of additional system operation states
 - Free cooling
 - Preparation of DHW in winter time
 - Defrosting
2. Development of additional control strategies
3. Find out the relevant parameters for scaling up the system

■ Partners



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alpha innotec

