SolabCool
and
Thermo Chemical Energy Storage

De Beijer RTB B.V.

eit Knowledge & Innovation Community
KIC InnoEnergy

tkienergo

SolabCool
The best comfort with pure energy

Introduction De Beijer RTB:

Profile:

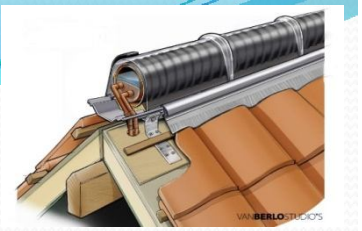
- Engineering company with 30 years of experience in renewable energy solutions and products.
- Many international cooperation's with institutes and universities.
- Various renewable energy products successfully launched to the market in the past.

Main activity:

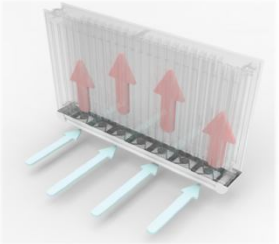
De Beijer RTB is mainly active in the field of Solar, thermo-chemical-energy storage and thermo-chemical conversion technology.

Main projects:

Development, cost-effective pre-production method for **SolabCool** and **ClimateBooster**. Market introduction. Development and the pre-production **SunRidge** and **Thermo-chemical energy storage**



SunRidge



CimateBooster

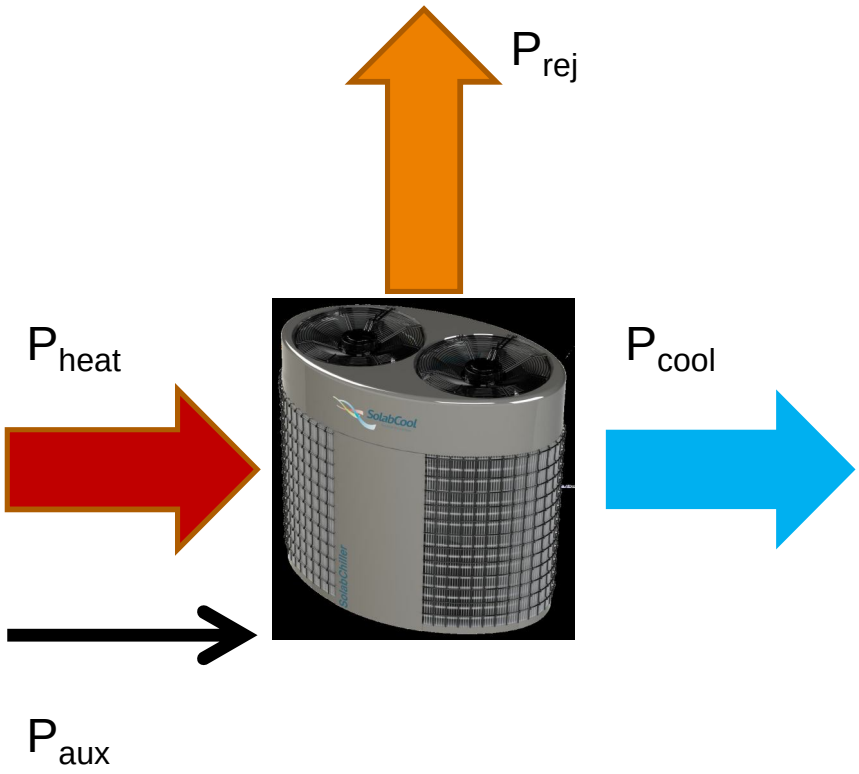
SolabCool

Thermo –chemical energy storage

De Beijer RTB Development Projects

- **NL:**
  - TKI - Tessel
  - TKI - Compas
  - TKI – C.C.O.
- **EIT:KIC**
  - Sun-ridge
  - Energo
- **EU**
  - FP 7 (MERITS)
  - H 2020
    - SpinES
    - SCS4Flex

Nominal energy flows Solabcool



- Nominal performance at nominal conditions
- Seasonal performance in actual building/ actual climate

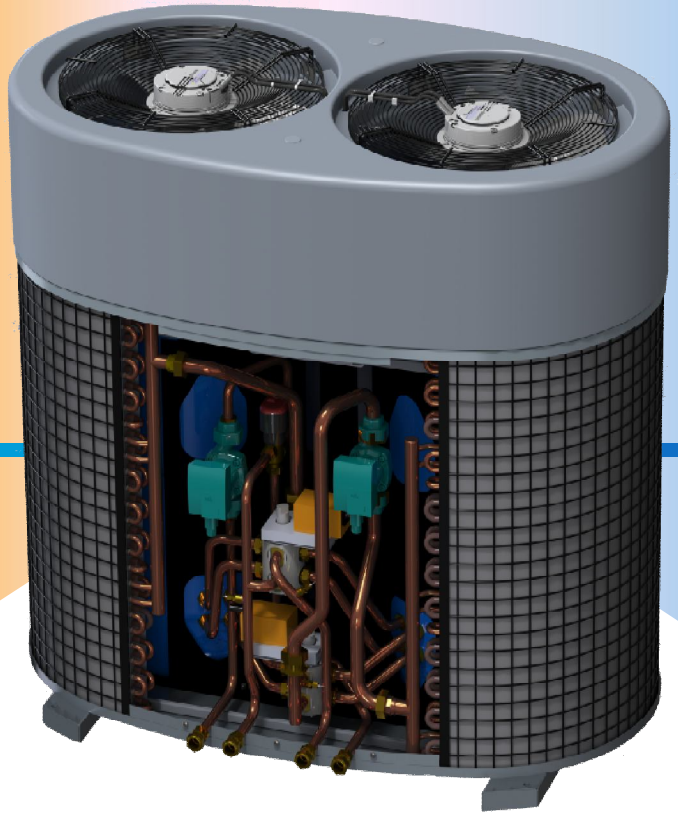
$$COP = \frac{P_{cool}}{\frac{P_{heat}}{\eta_{heat}} + \frac{P_{aux}}{\eta_{aux}}}$$

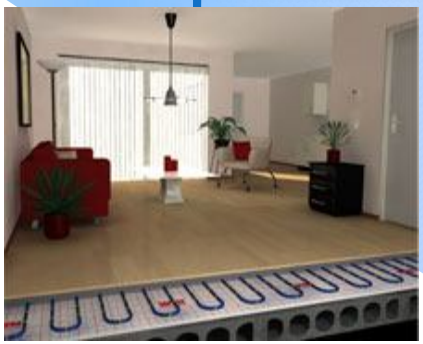
Heat-driven cooling

Zonne-energie

Warmtenet

Warmtekracht-koppeling





SolabCool

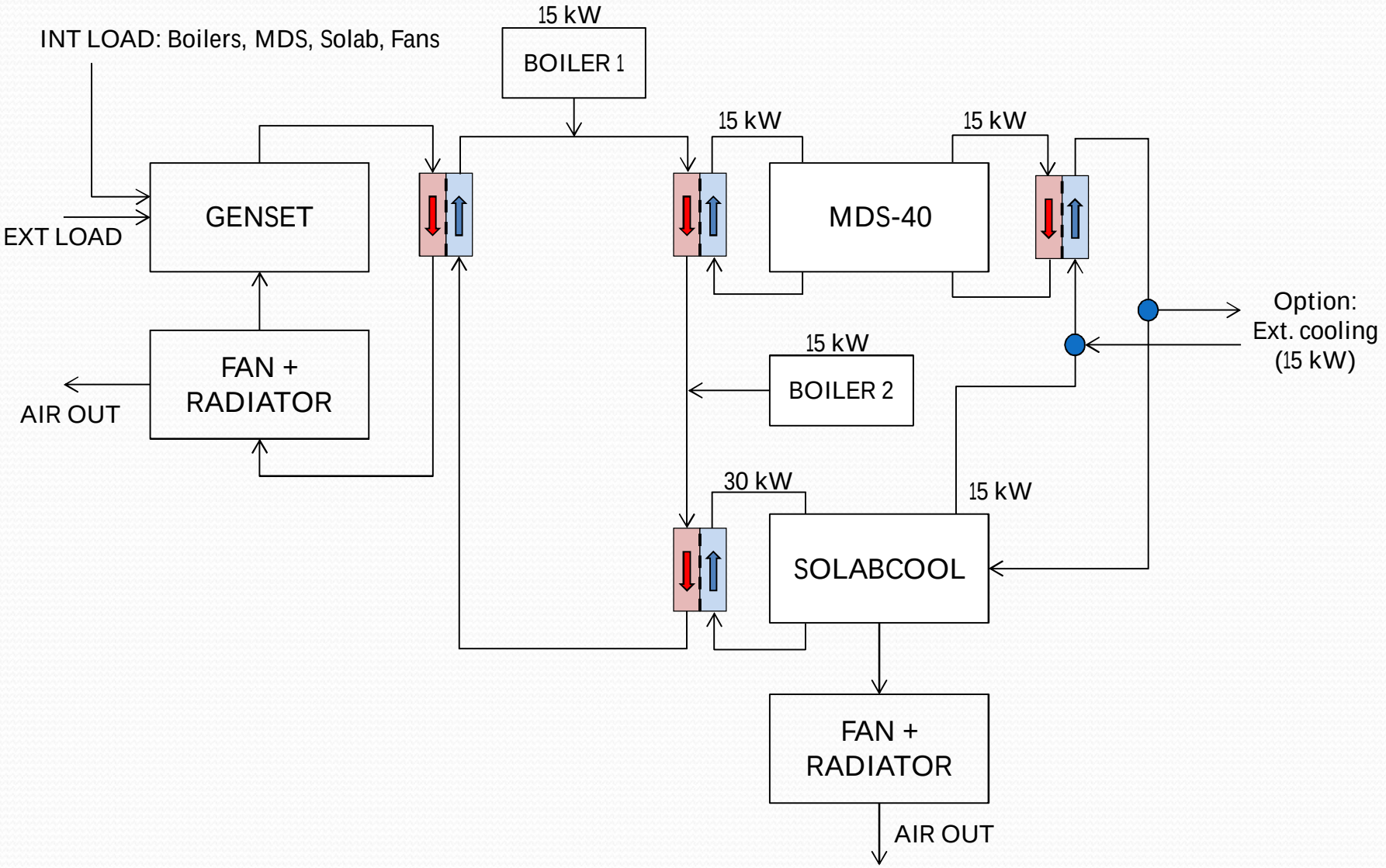
The best comfort with pure energy

Solab Module

Maximum cooling power range

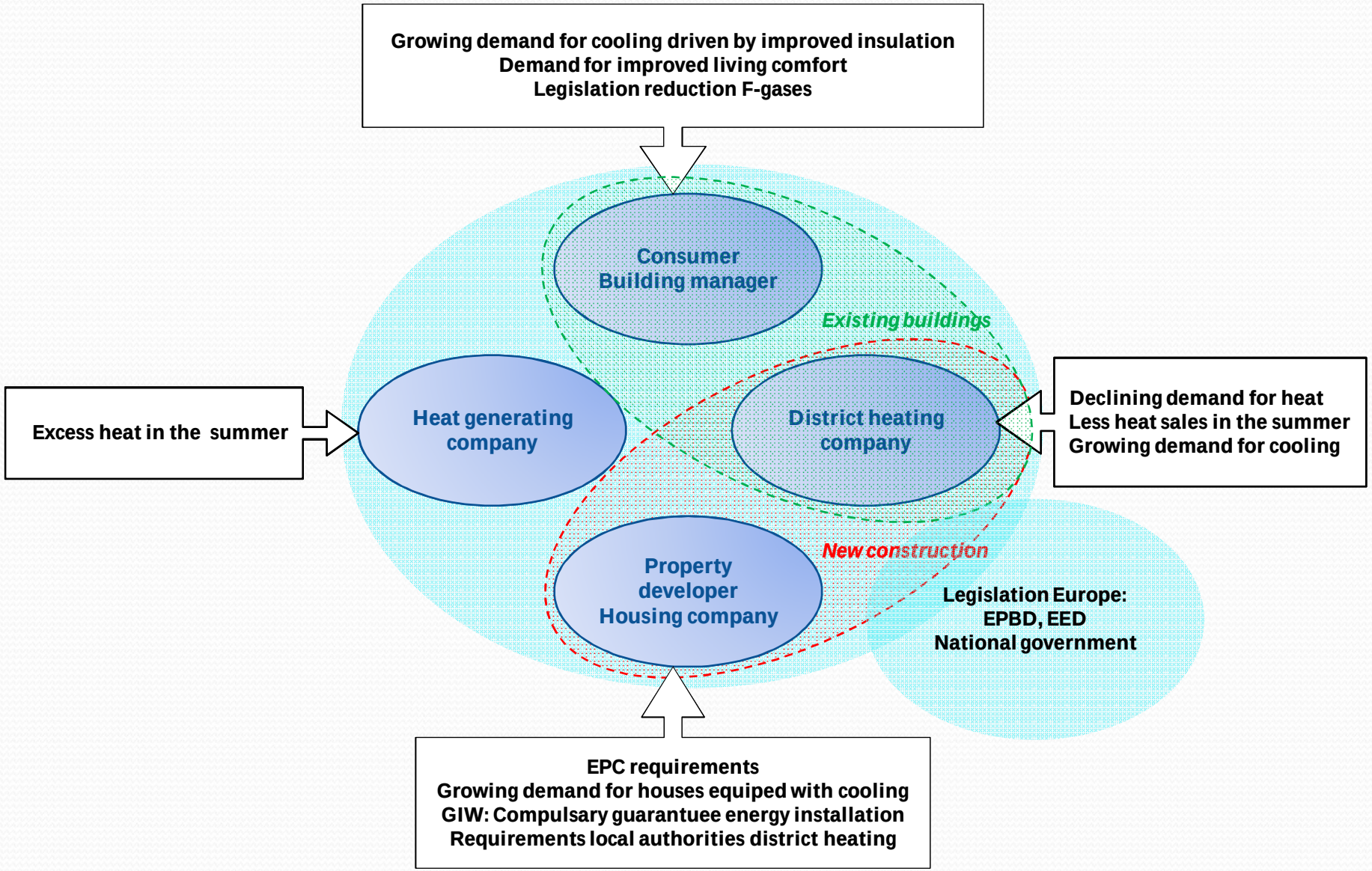
CHP /water /cooling aplication

Process layout



Confidential information. Do not distribute.

Key players and marketdrivers

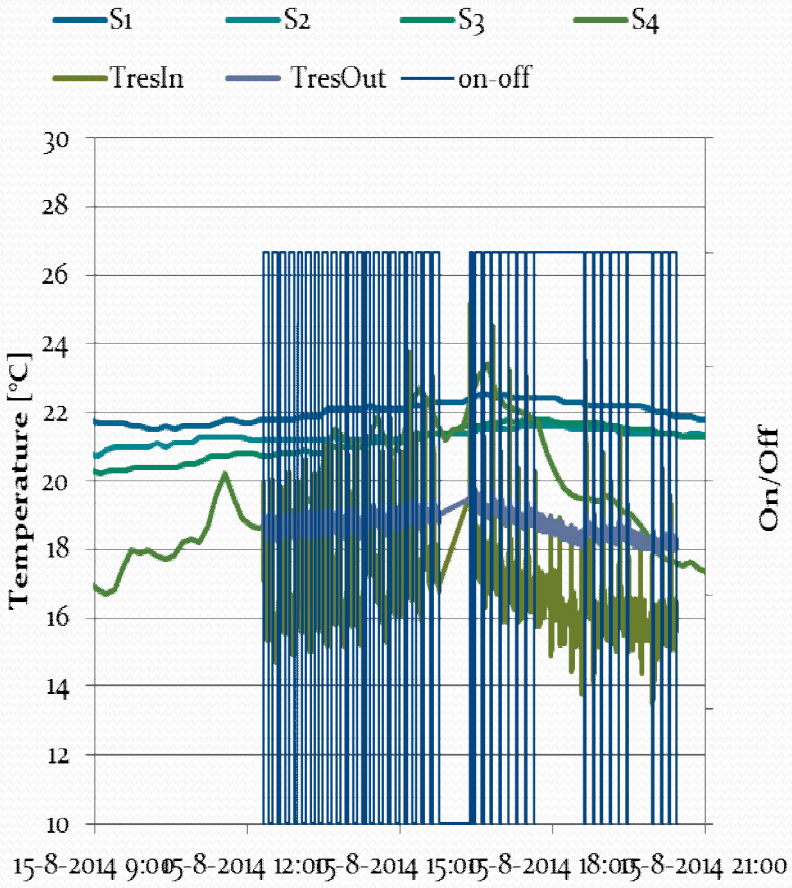


SolabCool
Sorption technology

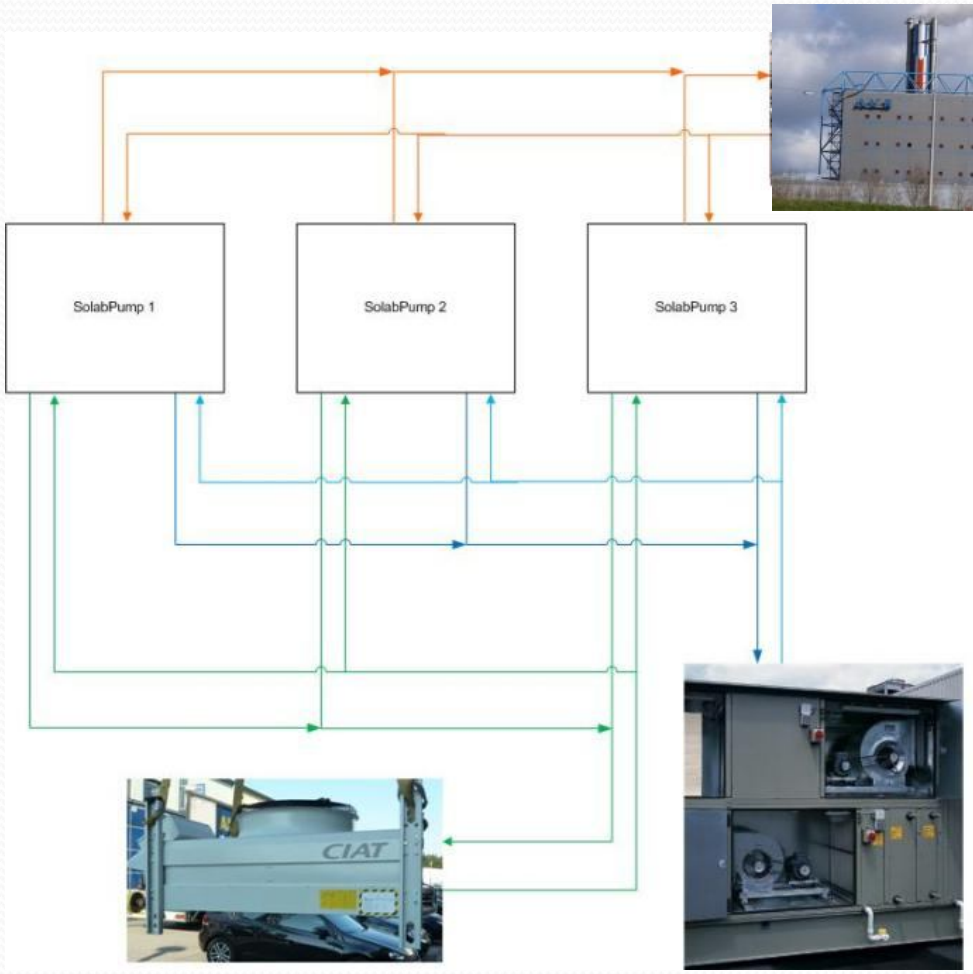
Residential

System demonstration residential

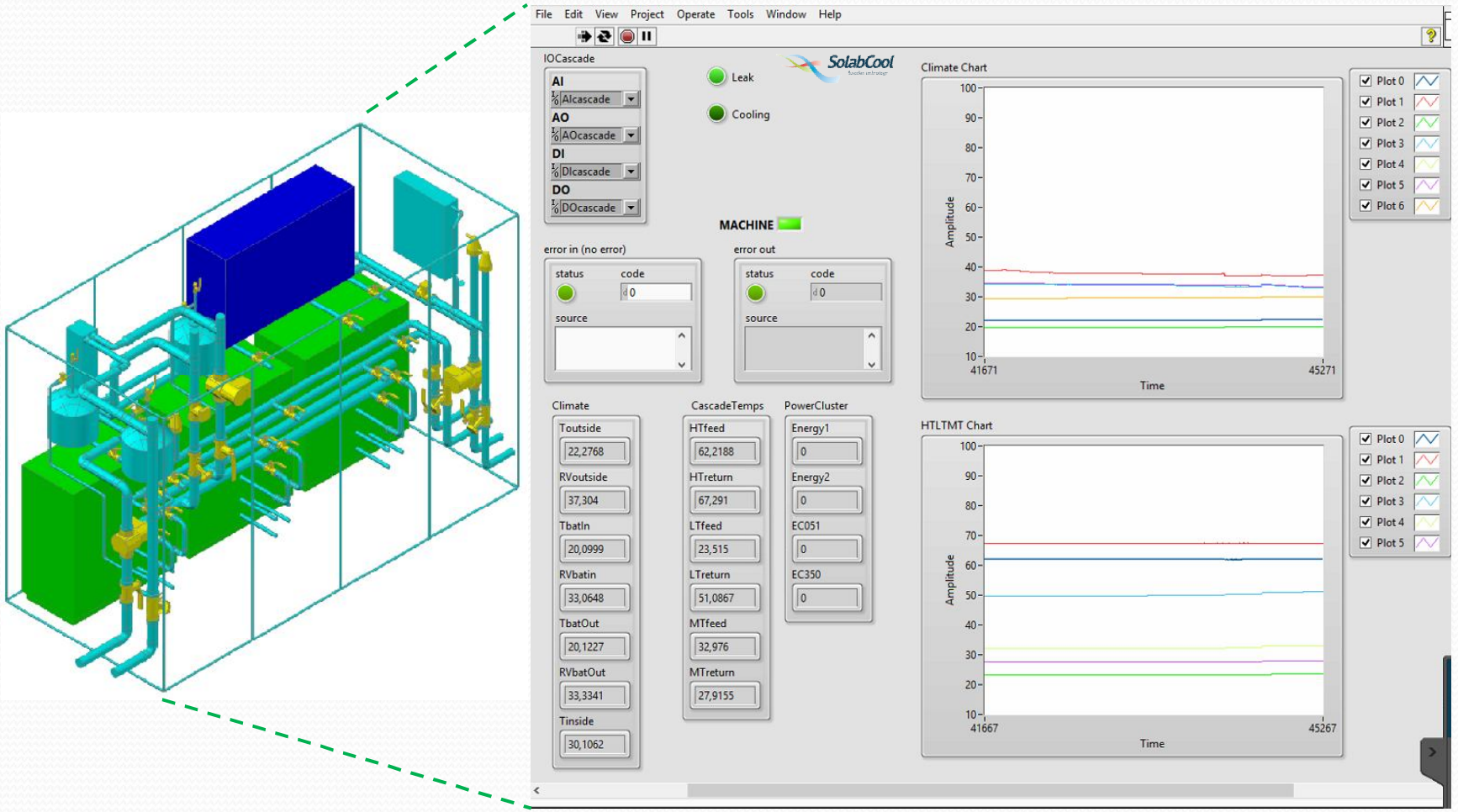
14-aug		15-8-2014
1x start		multiple starts
68,8	SWin	67,6
62,8	SWout	62,0
14,2	TresIn	16,6
17,3	TresOut	18,7
22,3	MTin	27,6
26,7	MTout	32,0
5719	P_SW	5019
3310	P_Cooling	2265
313	P_electric	287
0,58	COP_thermal	0,45
10,55	COP_electrical	7,88



Cooling office building incineration plant AVR

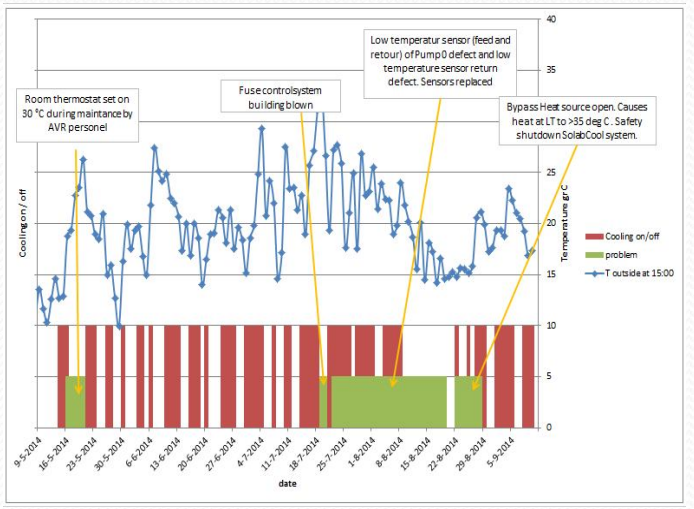


Solab Cascade monitoring



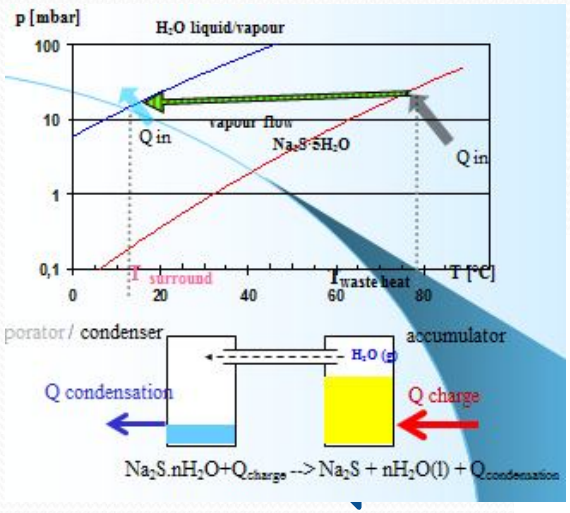
System demonstration small office

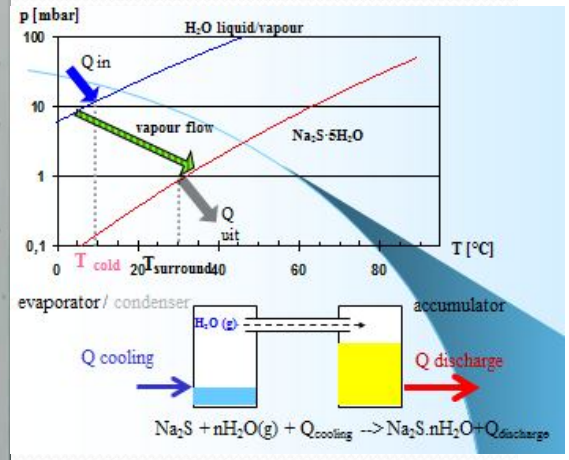
- System operational
  - HVAC unit not capable to handle cooling output
  - Lower temperature to SolabPumps
  - System performance as expected for these temperatures

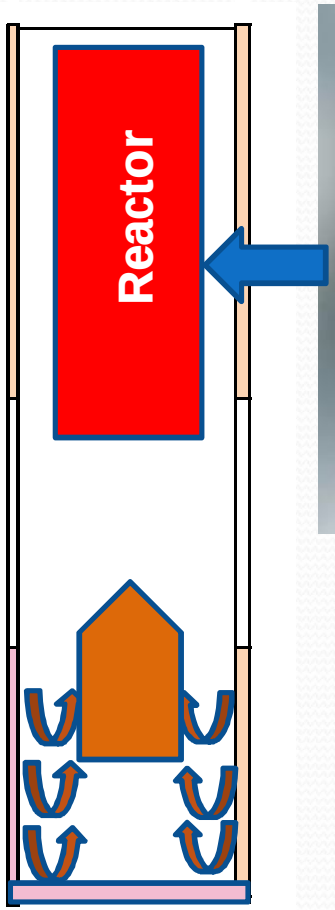


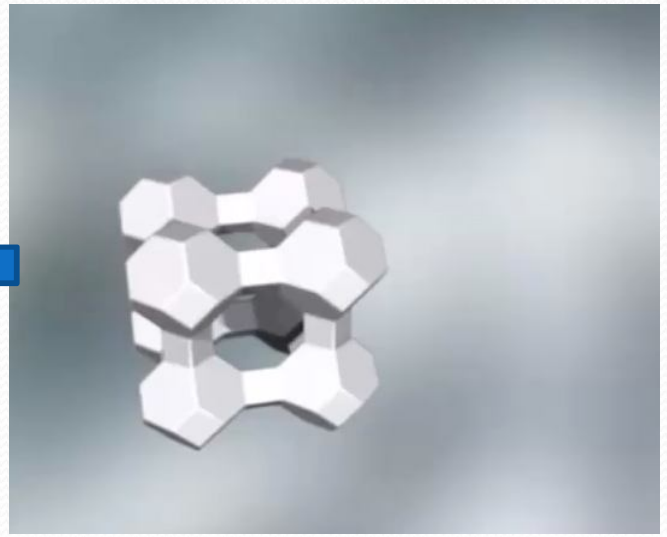
Data	Cooling time (sec)	Avg Pcool (Watt)	Avg P heat (Watt)	COP	Start stops
24 June	4257	2945	5652	0,52	7
25 June	7448	3221	6290	0,54	12
26 June	8393	3197	6130	0,51	6
27 June	17250	3130	5990	0,55	4
1 July	18288	3526	5735	0,61	1
2 July	2624	3588	7244	0,49 [1]	2
3 July	21564	3203	5332	0,60	1
4 July	8936	3031	5083	0,59	1

Energy conversion by TCM







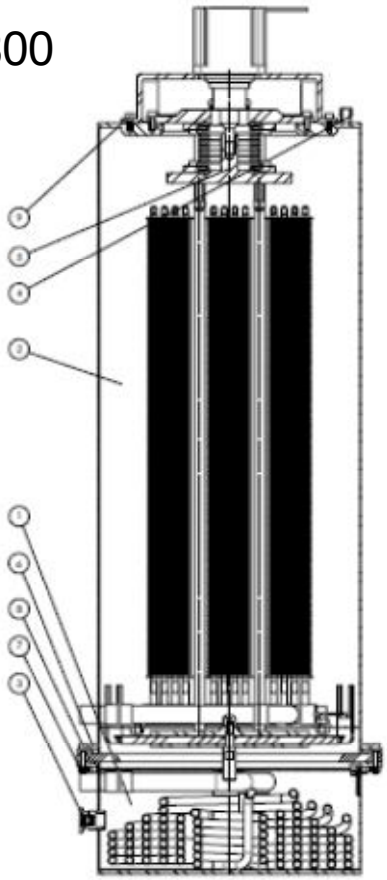


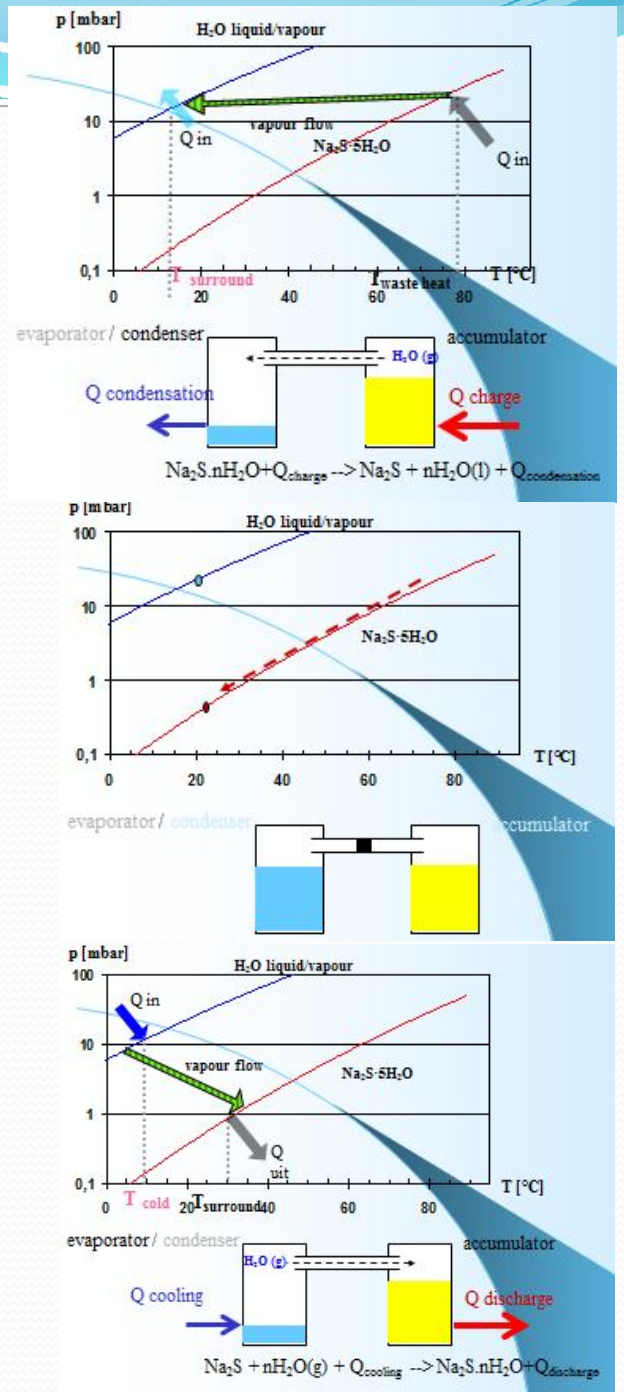
Energy density of the materials

	Storage options				
	Hot water	Phase change materials	Thermochemical	Electical Batteries	Chemical Looping
Storage density	< 0.2 GJ/m^3 (dT= 50°C)	< 0.3 GJ/m^3	~ 1 GJ/m^3	~ 1 GJ/m^3	~ 3 GJ/m^3
Storage duration	Day	day-year	day-year	minites-months	day-year
Storage	Thermal	Thermal	Thermal	Electrical	Electrical > thermal
Cycling efficiency	~ 70%	~ 90%	~ 90%	75%	70%

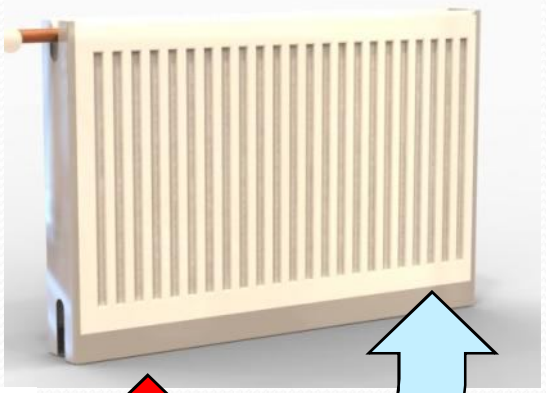
Thermochemical Storage

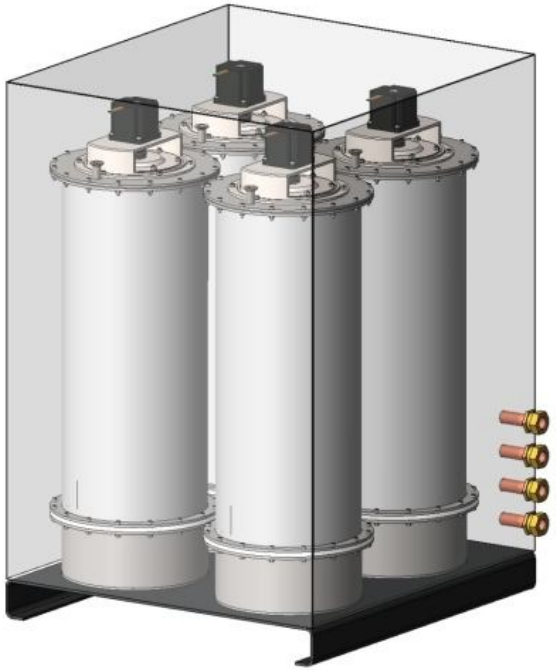
Module Capacity 8 kWh
Power 5kW
Dimensions 850x300





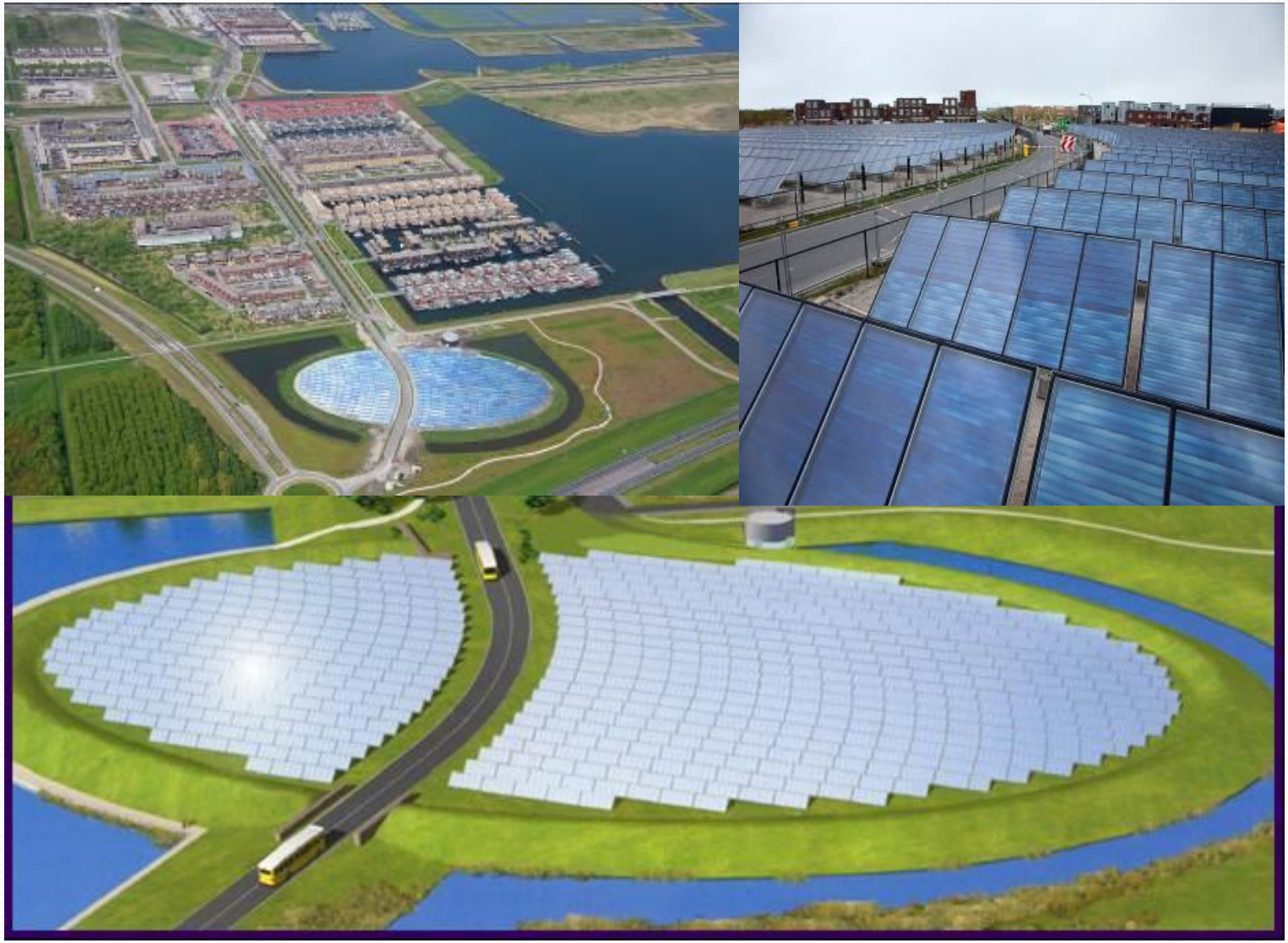
Solar/Heat /Cold storage distribution system





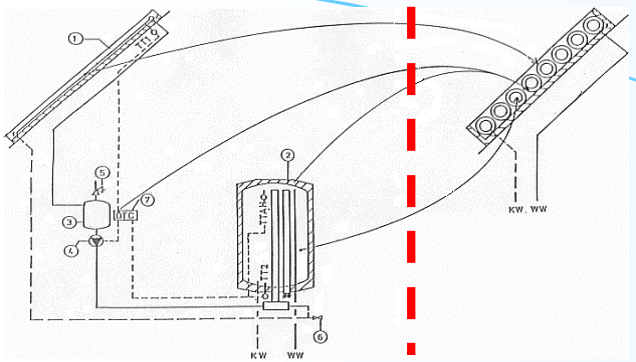
- Thermodynamics
- Product development
- Innovation

Solar island District heating 'Almere'

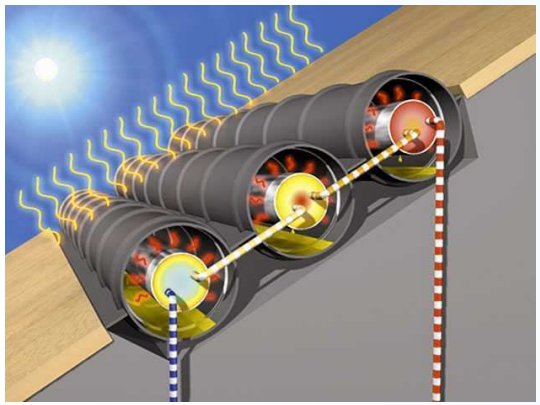


Flat Plate Collectors 7000 m² Production 10,000 GJ/y at 75 C

Integration



Components Integration



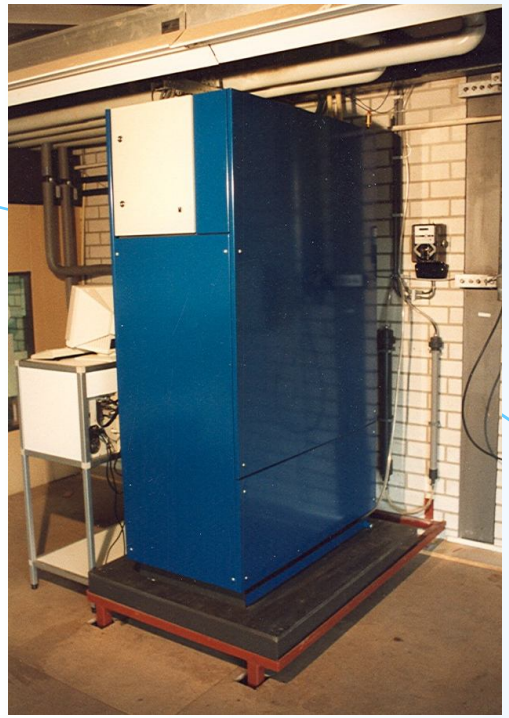
Ridge Collector

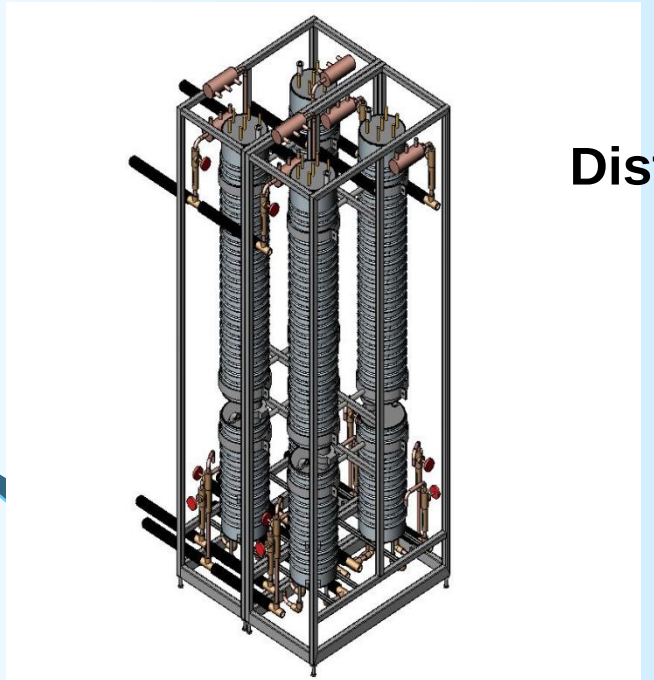
Electrical Heat Pumps

Geotherm

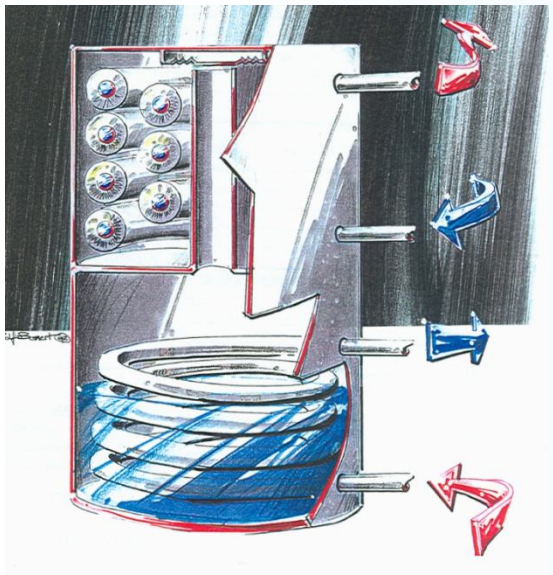
Energion ®

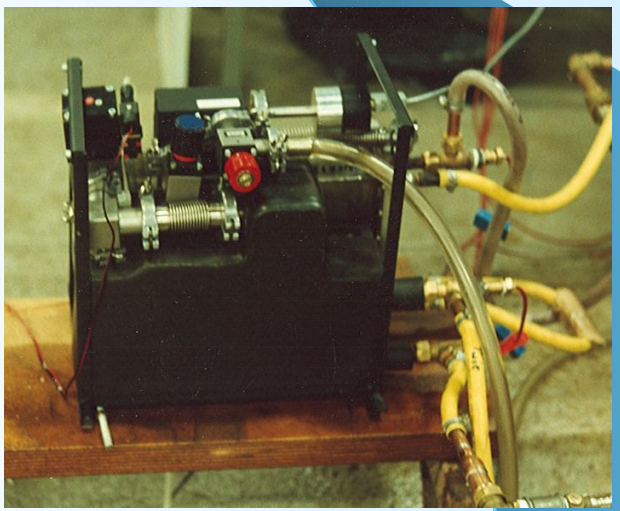
SWEAT®





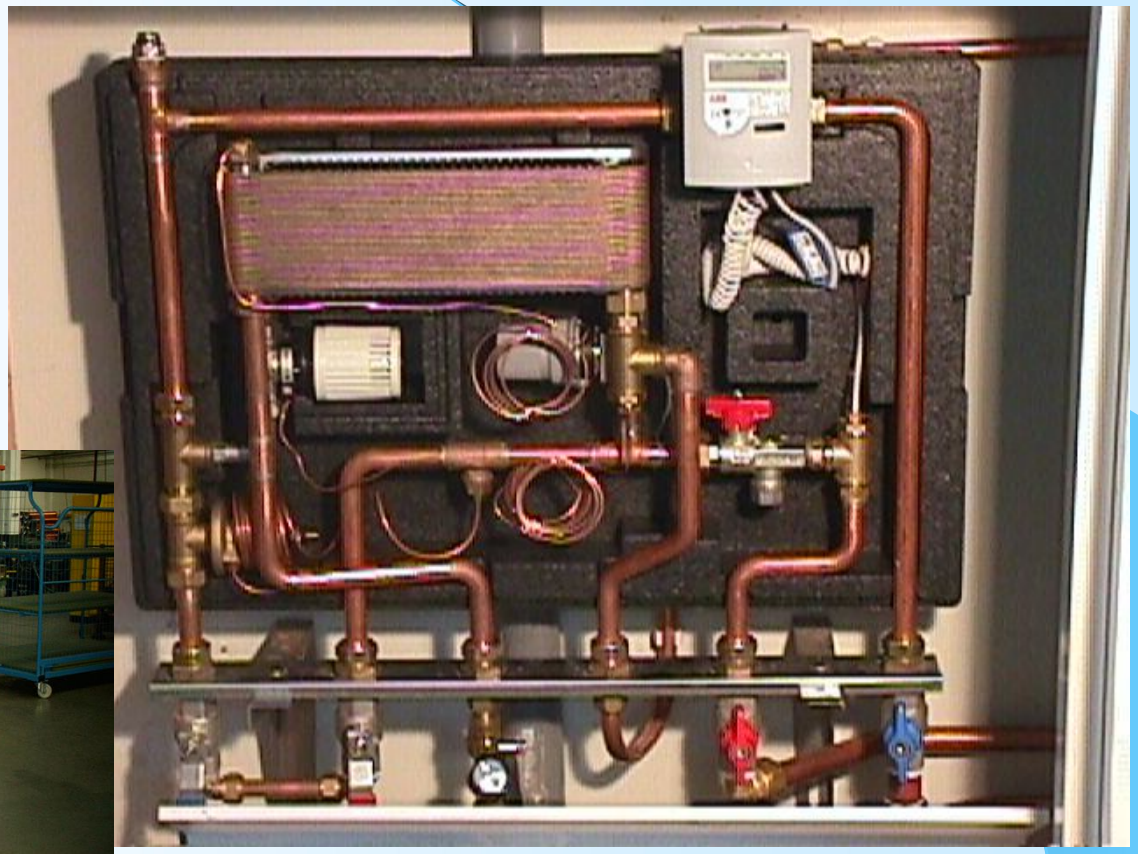
District heating



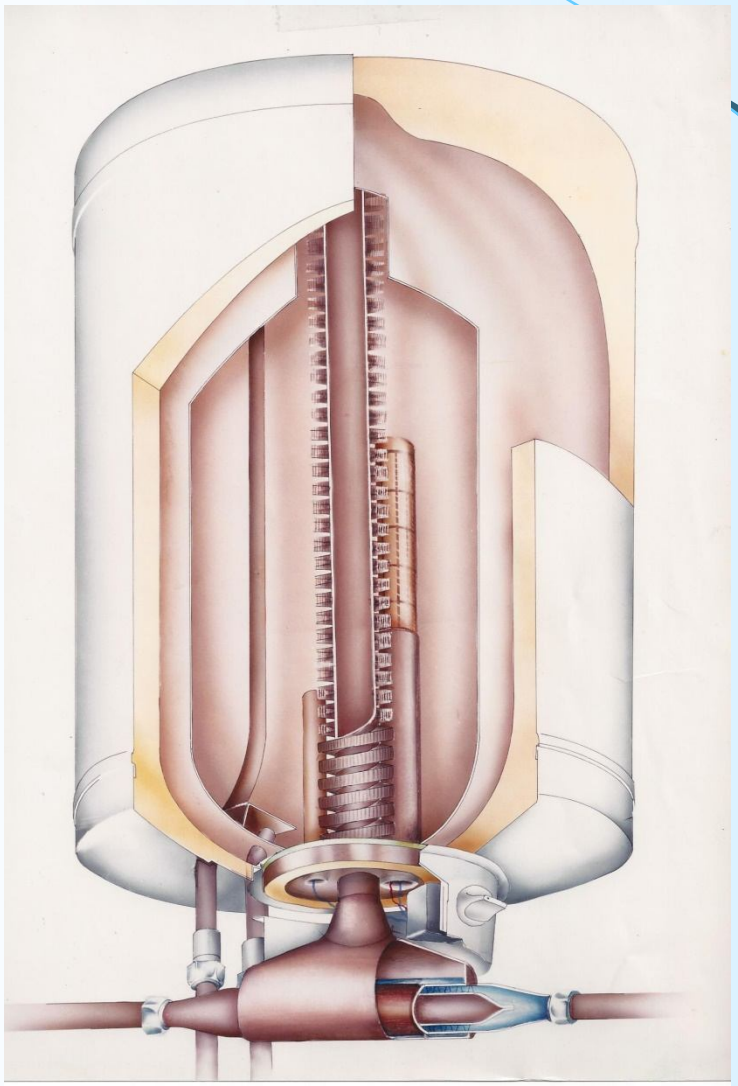


Automotive airco

District Heating Units

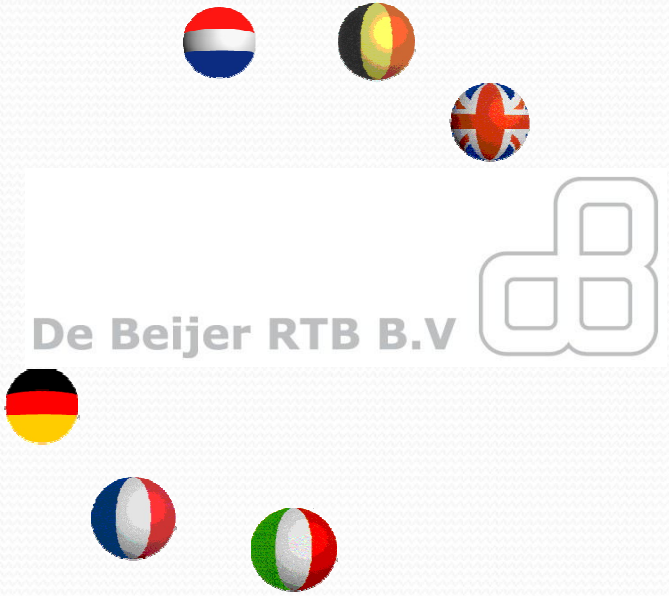


Heatpipe for refurnishing electrical boilers ➡ Solarboiler



Company 'Principles'

- ***Flexibility***
- ***Reliability***
- ***Innovation***
- ***Spirit***
- ***FUN***



It's our Competence that makes the difference