

Solar heating/cooling system

IUT civil engineering dept, Saint Pierre – La Réunion

Contractor: University of La Réunion

Delegate contractor: LPBS laboratory

Funding: ANR

Targeted building

IUT civil engineering department

- ✓ About 180 m² cooled
- ✓ Location: Saint-Pierre at La Réunion, tropical climate
- ✓ Part of the University of La Réunion (Large educational purpose)
- ✓ Tropical climate → only cooling needs (no heating)



Solar heating/cooling installation

Equipment to be installed

- ✓ Solar collectors: Schüco flat plate collectors (SchücoSol U.5 DG); 90 m²
- ✓ Absorption: 30 kW capacity
- ✓ Heat rejection: Open wet cooling tower 80 kW
- ✓ Storage: hot tank 1500L and cold tank 1000L



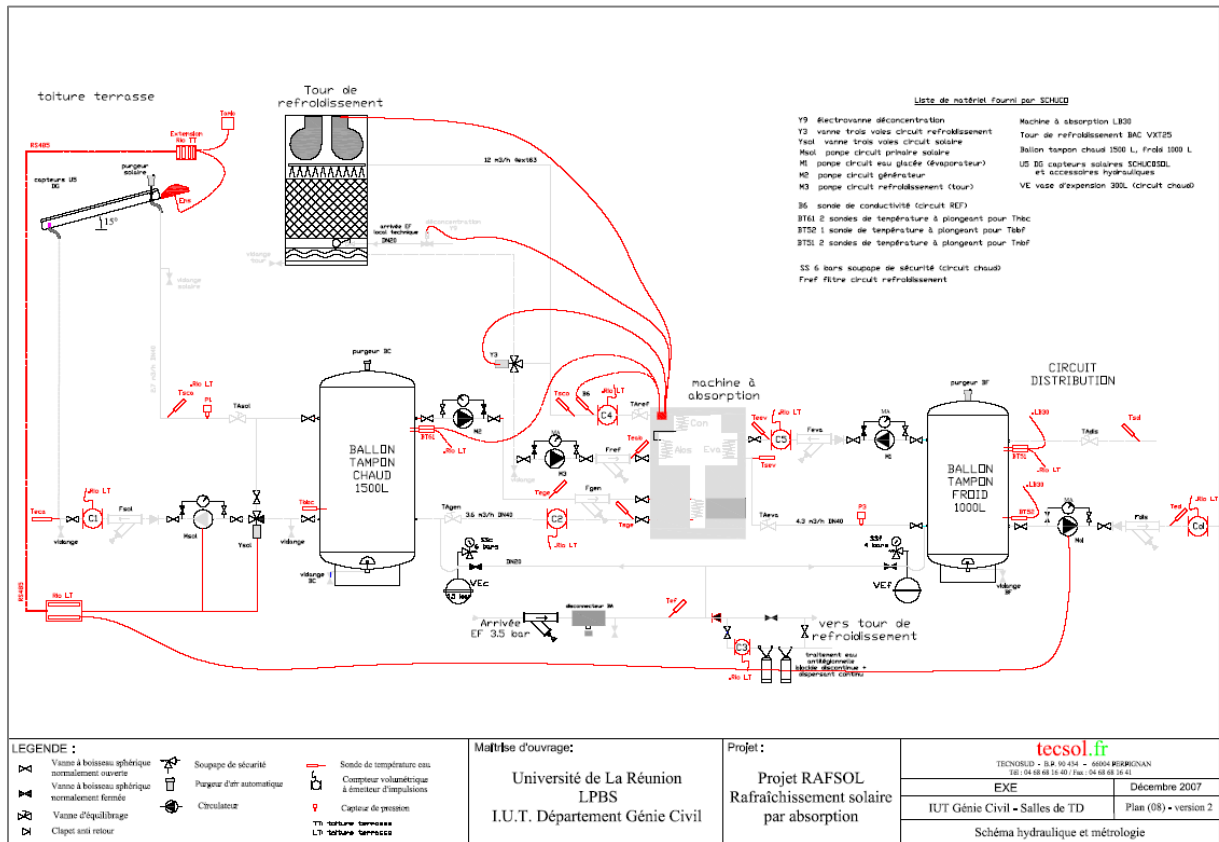
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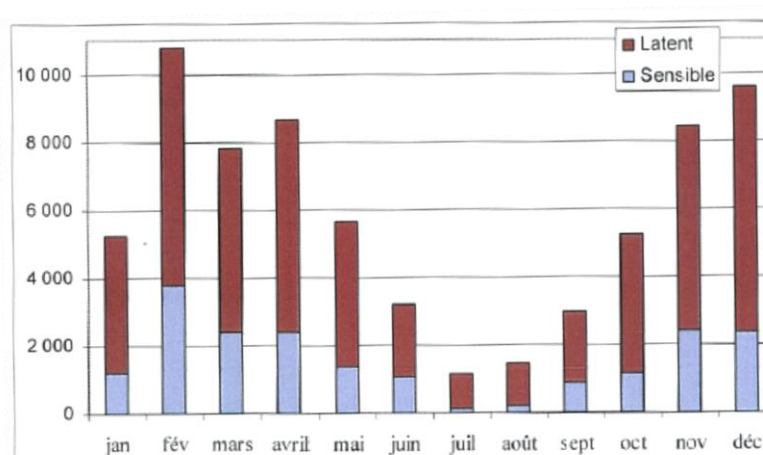
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Installation scheme



Thermal load and solar production

Cooling load



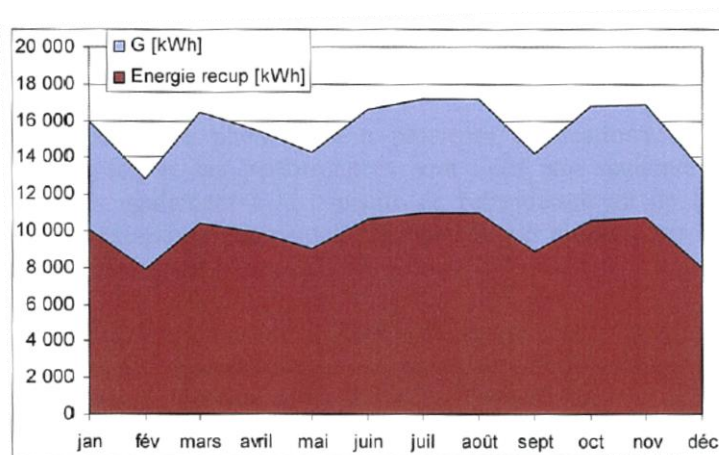
(blue: sensible heat; red: latent heat)

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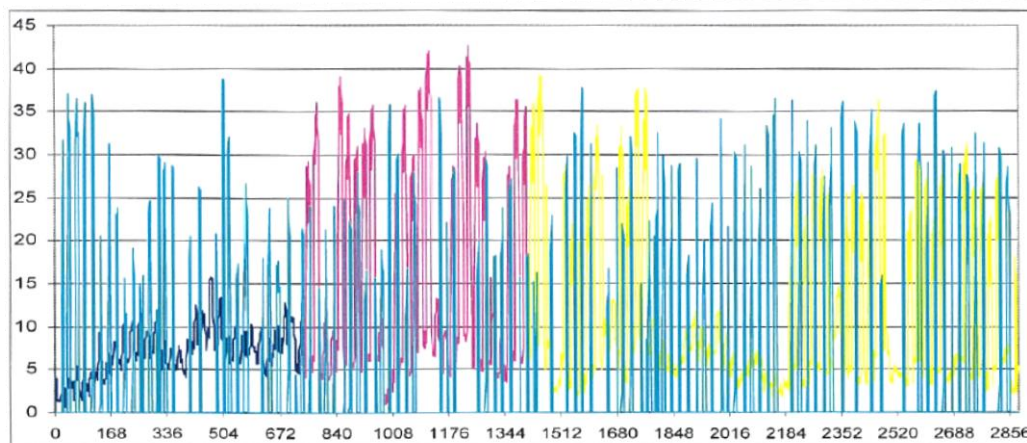
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Solar energy collected



(blue: solar radiation; red: solar energy collected)

Overall thermal balance



(clear blue: hourly energy production; blue, red and yellow: hourly cooling load)

Economic balance

Investment estimation

Object	Estimated costs (€)
Solar Collectors (500 € / m ²)	62 300
Solar equipment(storage tank included)	5 000
Absorption	35 000
Cooling tower	6 000
Piping	41 000
Testing and settings	8 000
Electricity and control	10 000
Monitoring equipment	13 000
TOTAL 1	180 300
Collector structure	10 000
Engineering and 2 year monitoring	25 000
TOTAL 2	35 000
TOTAL	215 300
Distribution costs	
Chilled water network	20 000
Mechanical ventilation (extraction)	7 200
Terminal unit (fan coil)	8 000
TOTAL 3	35 200

Extra cost estimation

The solar installation replacing a conventional installation will lead to an extra cost estimated to 187300€.

Grant and project viability

Saved money for primary energy: 1090€/year so 21 800 € by 20 years.

Total operating and maintenance costs: 4 095€/year

Maximum grant from ADEME (French energy agency) + Region: 80% of the project investment costs: 149 840 €

Environmental balance

The solar heating/cooling installation will prevent the exhaust of 7416 kg of CO₂ every year. This is equivalent to 5 cars traveling 10750 km every year.