Hybrid Adsorption/Compression Chiller

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This Project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement N. 818329

Adsorption cooling advantages

Saves up to 80% electricity compared to classic cooling

Functions without synthetic refrigerants or toxic substances

Helps in establishing a sustainable infrastructure

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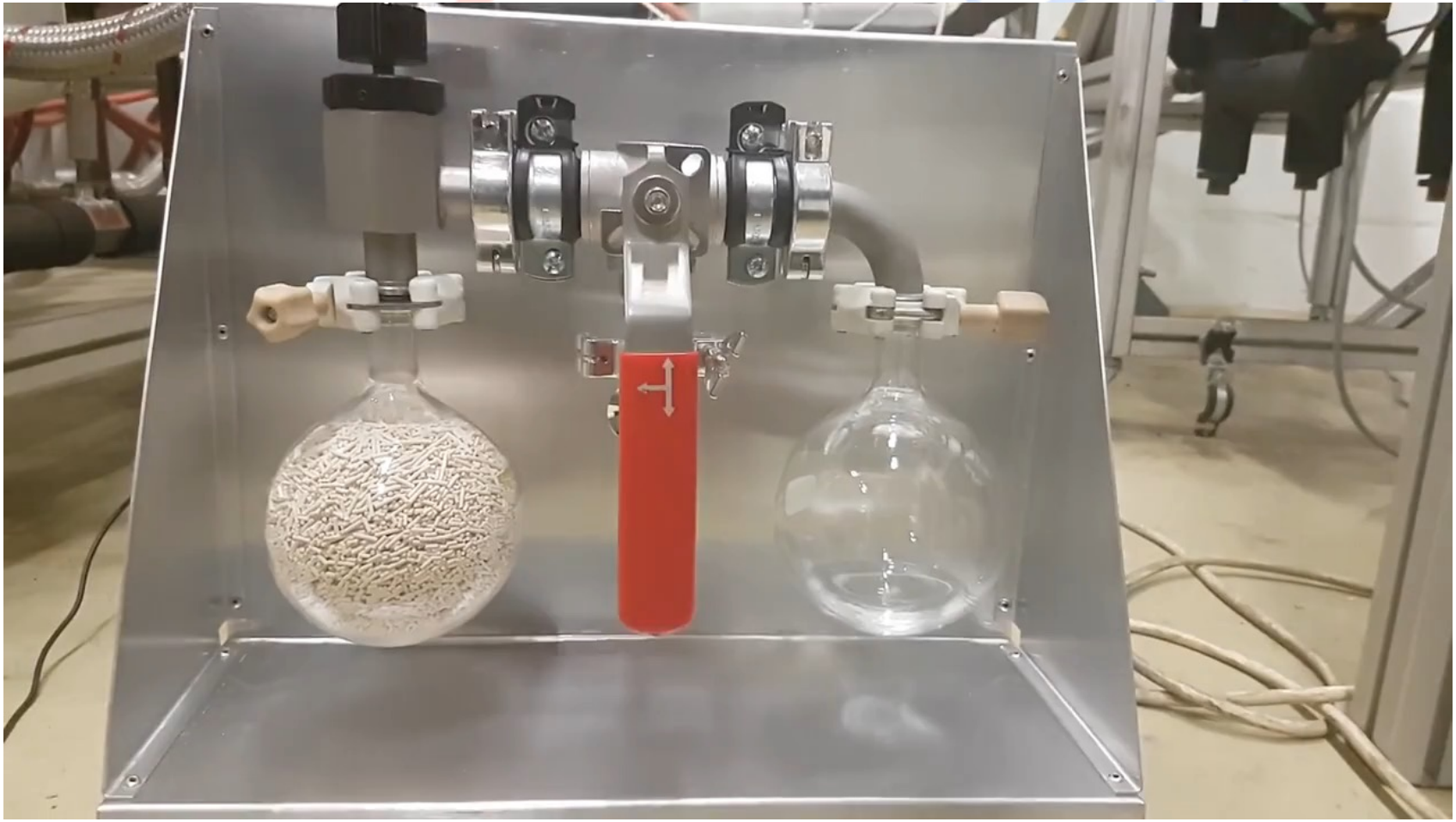
The principle of adsorption

water turns into vapor which gets adsorbed by the sorbent, causing evaporative cooling



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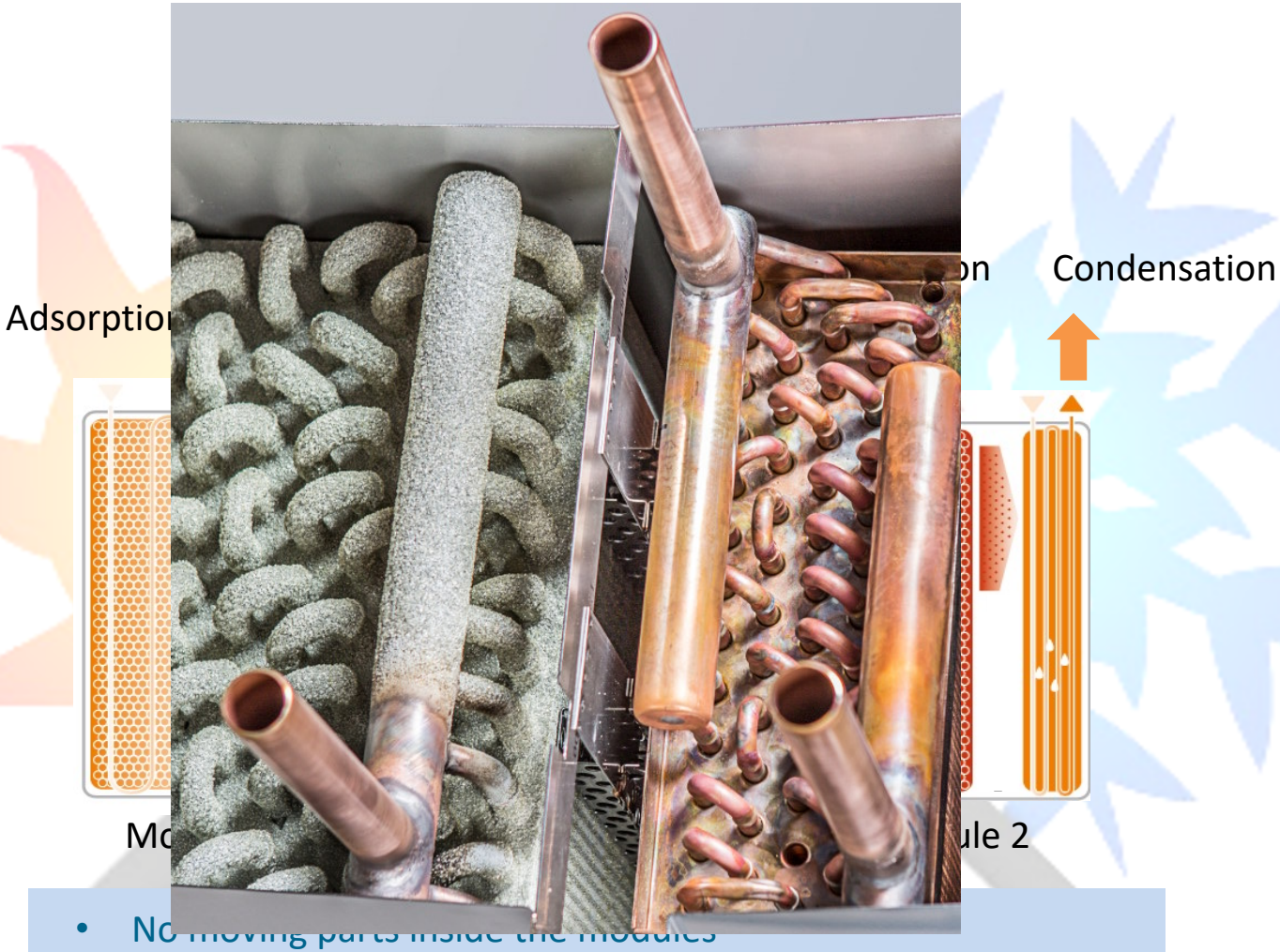
Adsorption chillers operation



- No moving parts inside the modules
- Water as refrigerant
- No toxic or climate damaging substances

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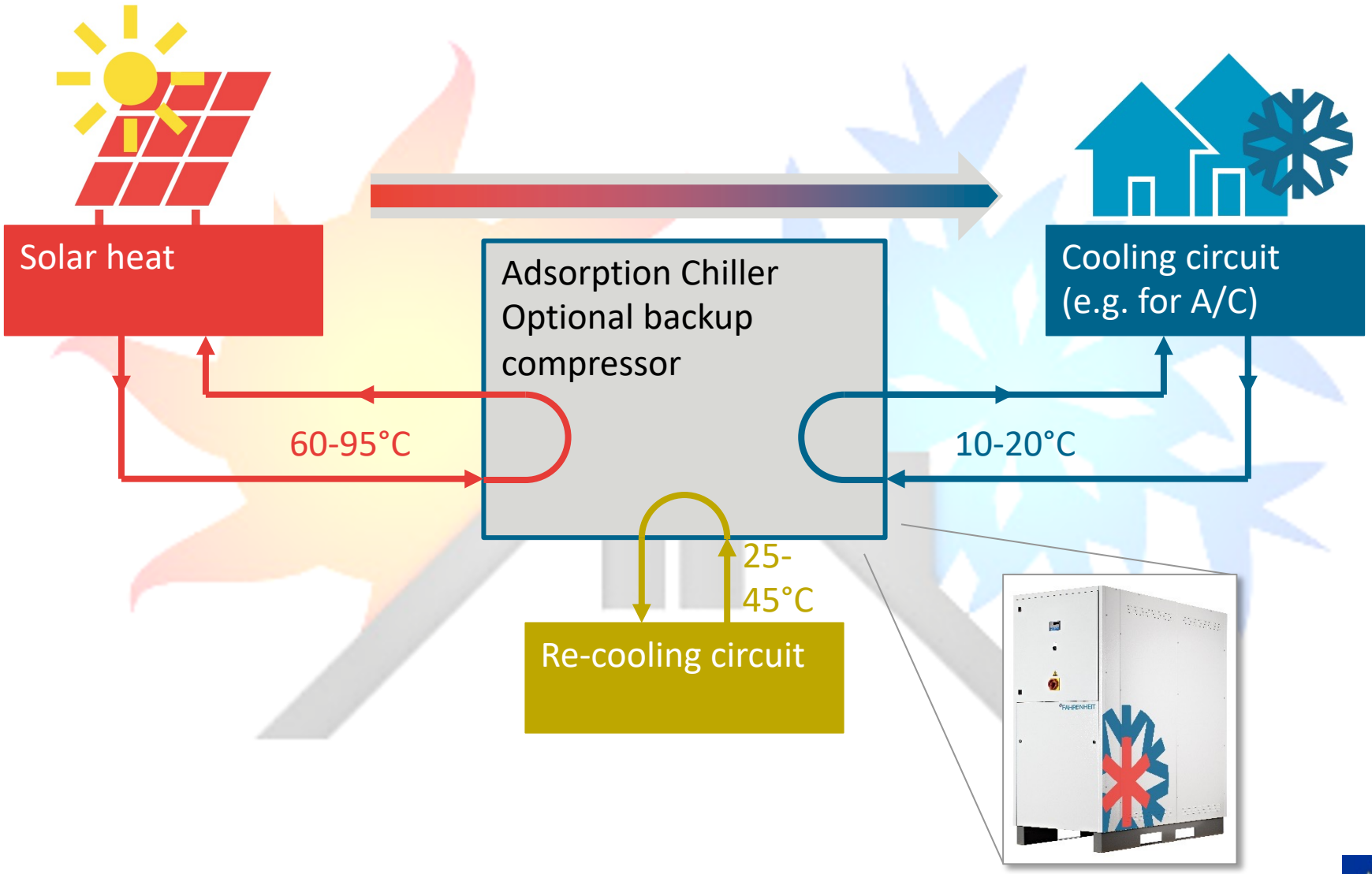
Turning solar heat into cold



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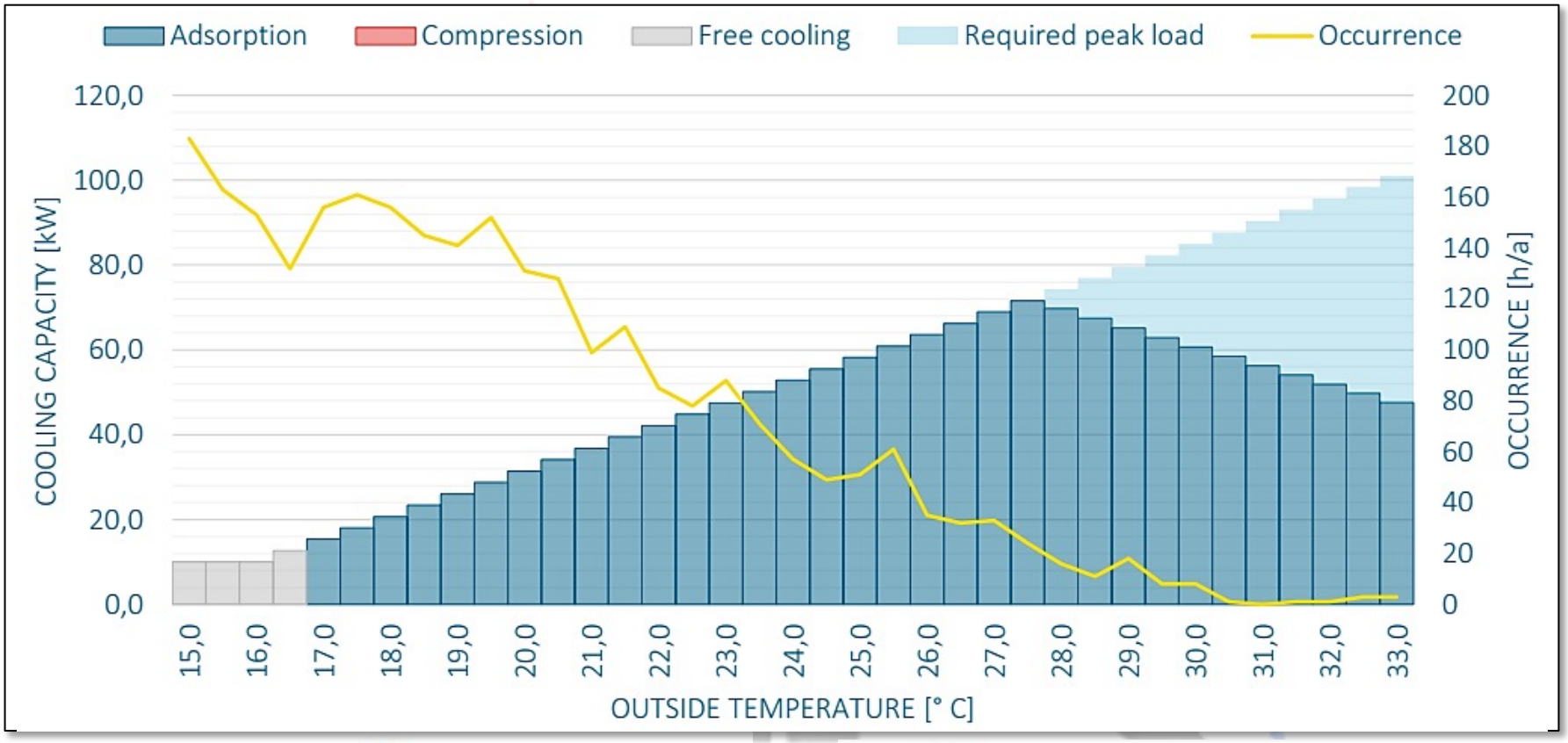
Base load coverage with adsorption

Annual cooling demand



Adsorption	76.423 kWh	(90,6%)
Kompression	0 kWh	(0,0%)
Spitzenlast	1.231 kWh	(1,5%)
freie Kühlung	6.664 kWh	(7,9%)

nur Adsorption	2.018 h	(73,6%)
nur Kompression	0 h	(0,0%)
Bivalent	94 h	(3,4%)
freie Kühlung	631 h	(23,0%)

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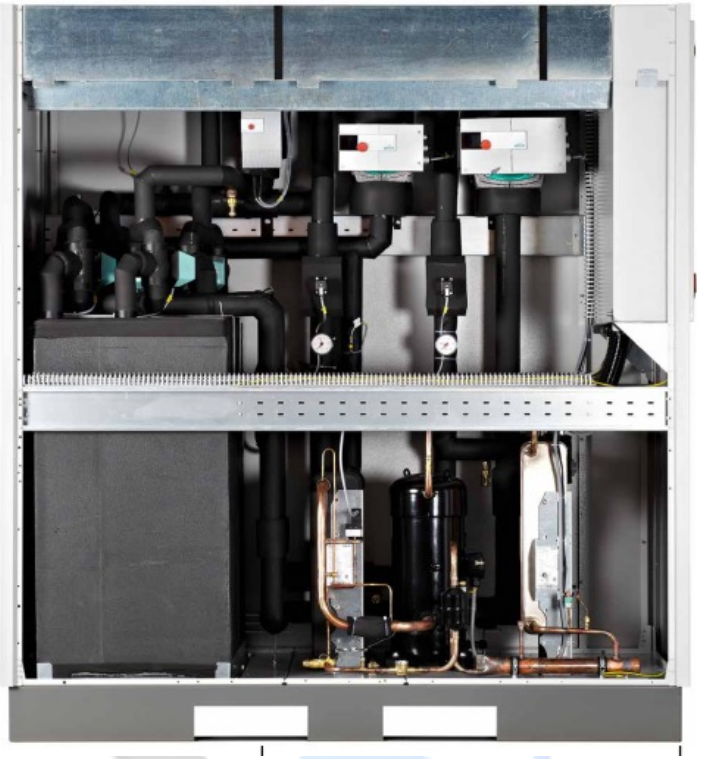
The Hybrid Chiller concept

A Hybrid Chiller has decisive advantages for air conditioning and cooling demands

- Peak load coverage
- Efficiency increase
- Reduction of the payback period
- Expansion of areas of applications and utilization limits
- Compression chiller acts as back up to the adsorption chiller in base load operation
- Usage of Propane (R-290) as refrigerant in the compression part (GWP 3)



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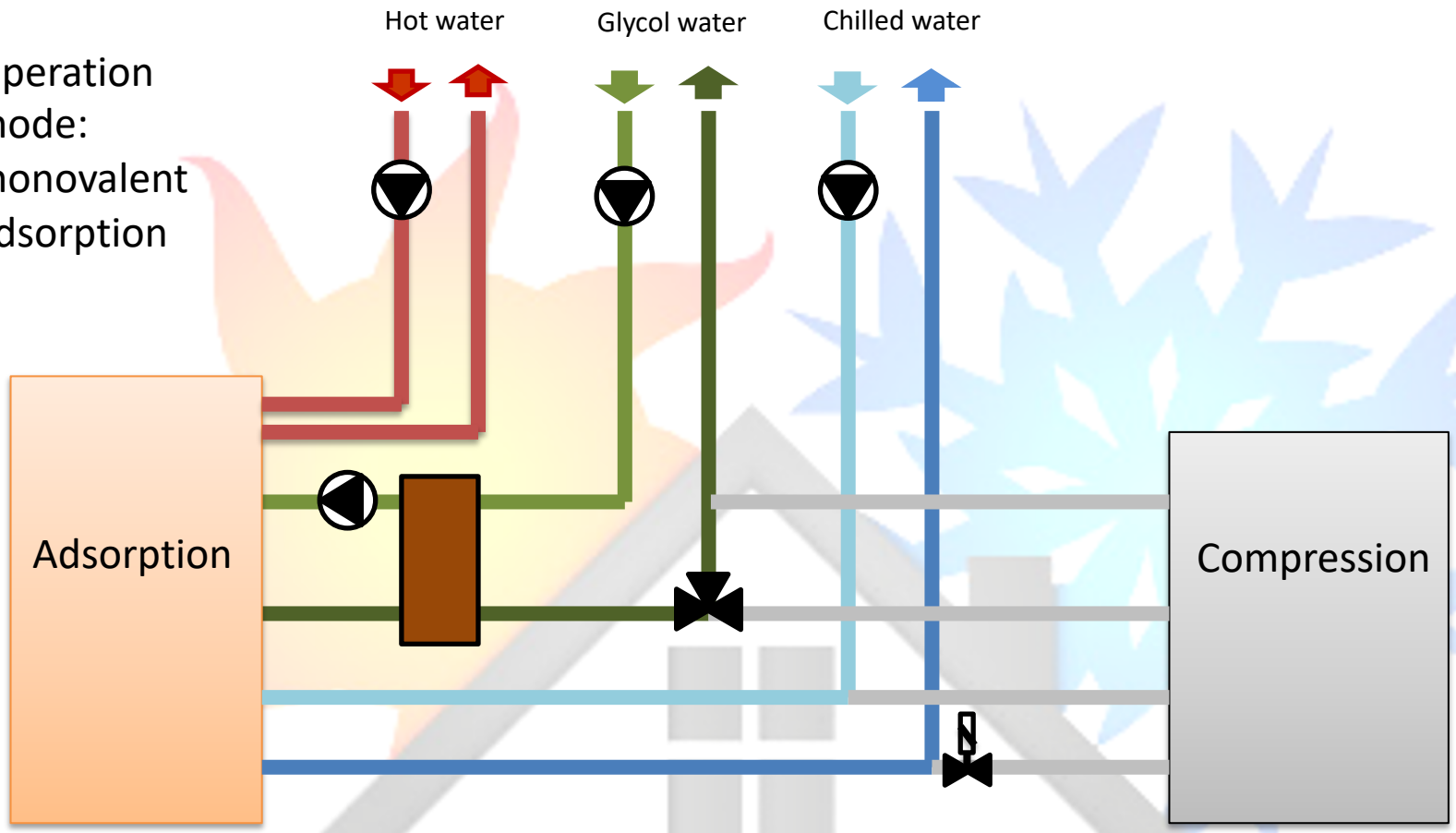
Flow Diagram & Operation Modes

Operation mode: monovalent adsorption



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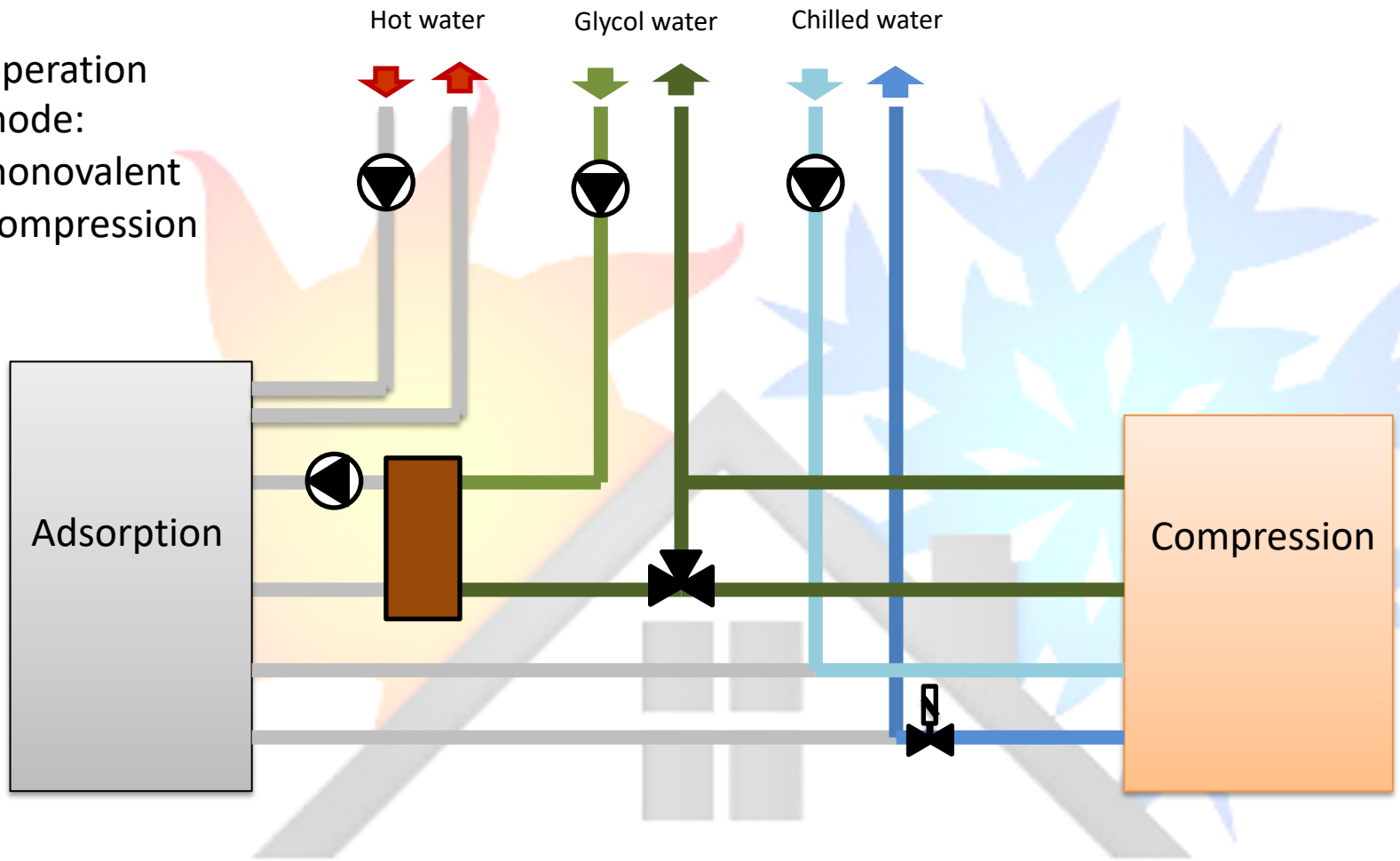
Flow Diagram & Operation Modes

Operation mode: monovalent Compression



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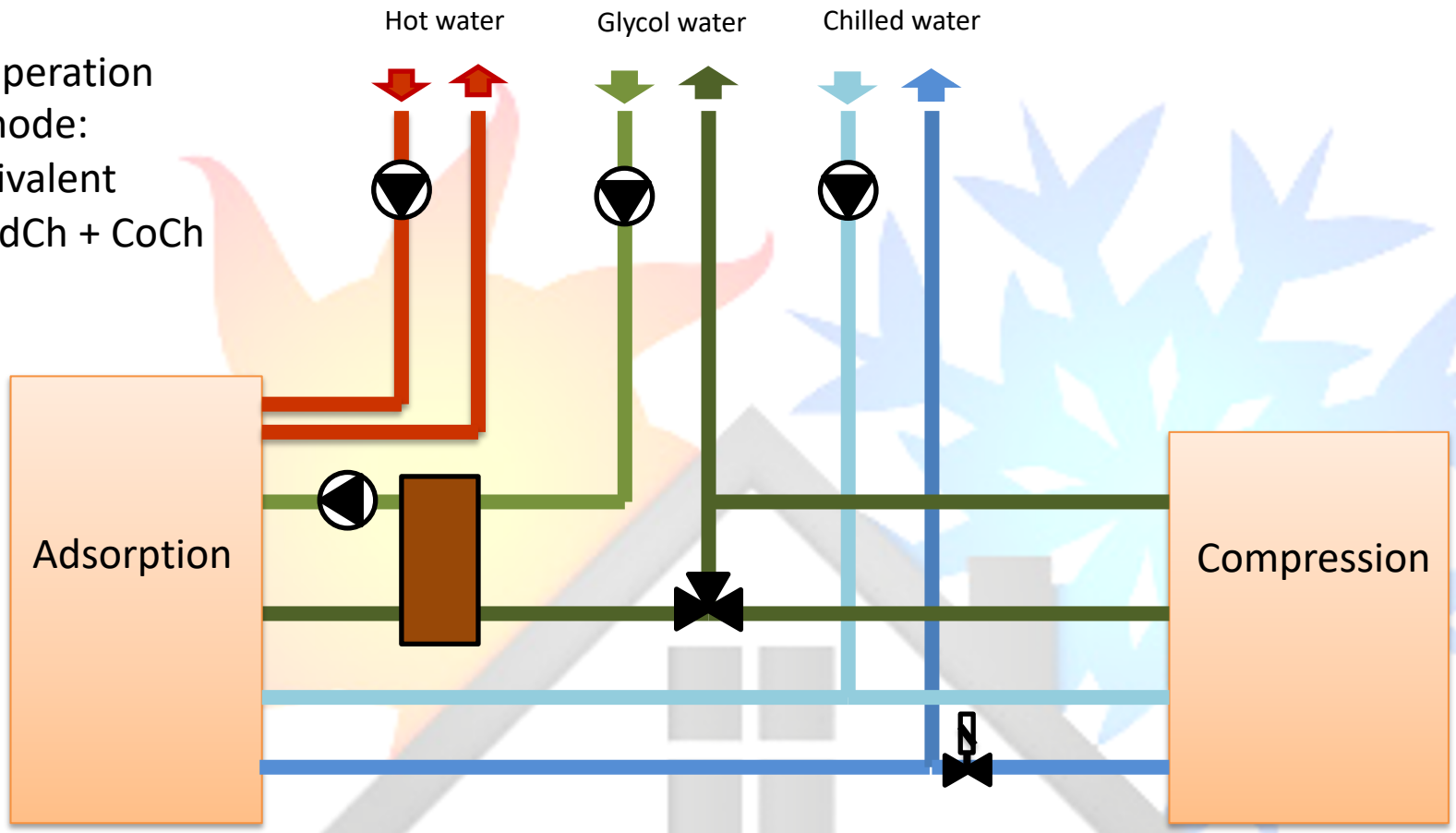
Flow Diagram & Operation Modes

Operation mode: bivalent AdCh + CoCh



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Fahrenheit Hybrid Chiller in Sant Cugat

Design parameters:

- Total cooling capacity: up to 100 kW
    - Adsorption part: up to 40 kW
    - Compression part: 60 kW
- Refrigerants:
    - Adsorption: Water (R718)
    - Compression: Propane (R290)
- Chilled water buffer tank: 1000 l
- Indoor installation
- Chilled water temperature: 8°C
- Hot water temperature: 95°C
- Required heat 80 kW
- Dry Re-cooler with 160 kW capacity

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