

DESTORE - YOUR THERMAL STORAGE SOLUTION FOR HEAT PUMPS

27 mai 2025

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CTO

Team

User

Integration of user needs and constraints

DestoRE

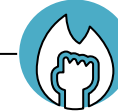
Algorithms

Optimisation,
Maintenance and predictive control



Electronis

Battery Management System,
Integration with heat pump control



Thermal (TFL)

Heat Exchange dynamics

UCLouvain

Materials (IMAP)

Content and packaging of individual
PCM cells

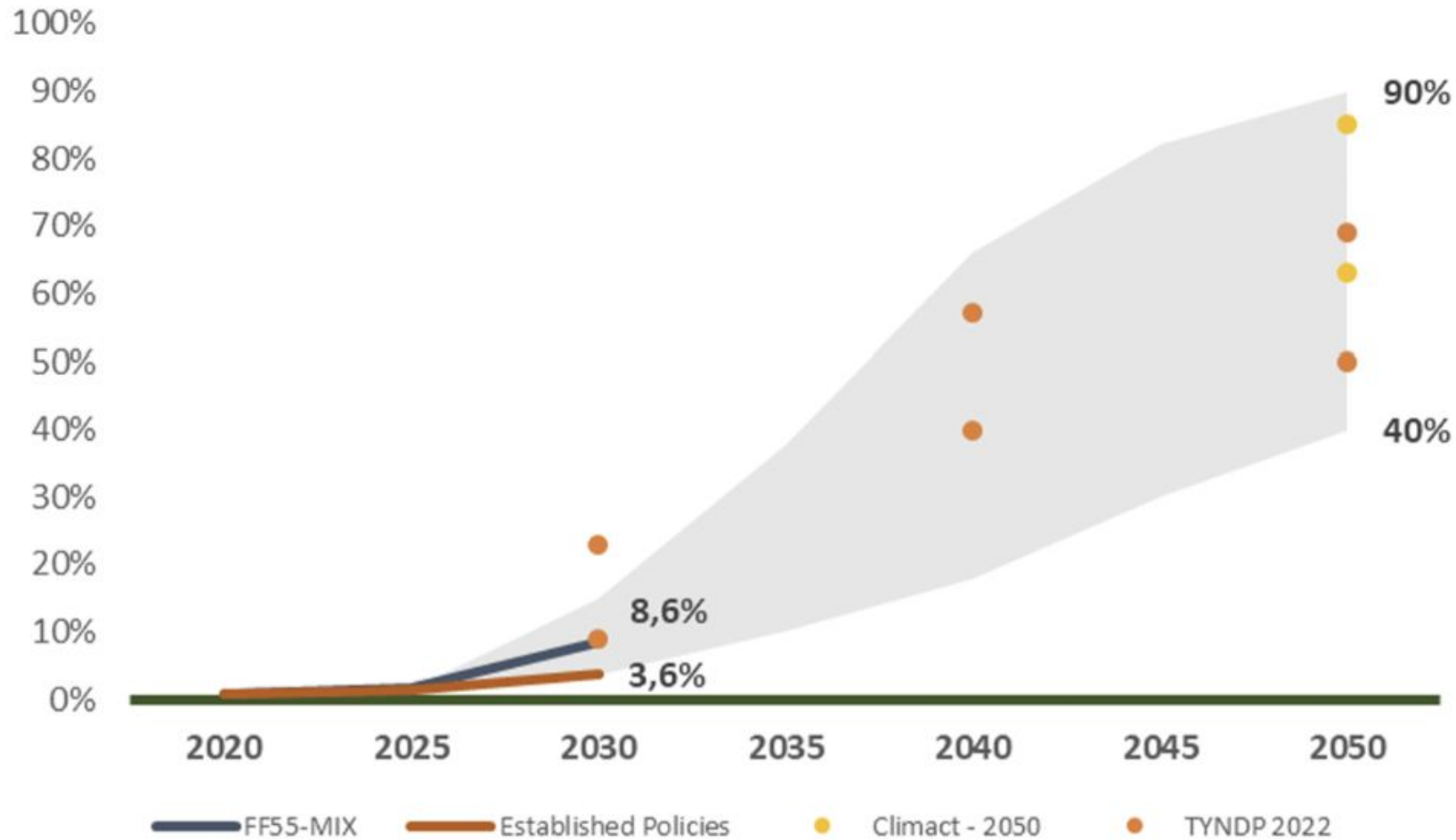


Demonstrator

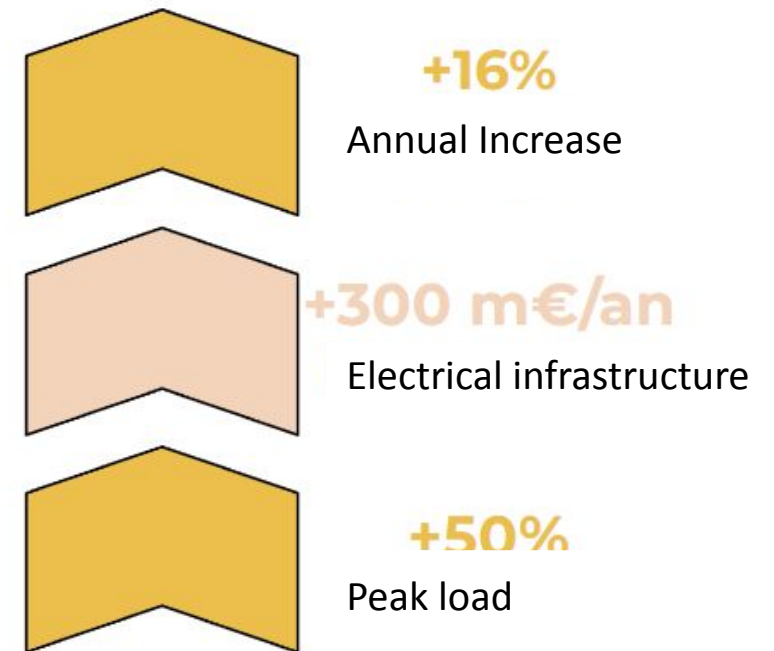
Performance testing, Design validation,
Prototyping



Our challenge



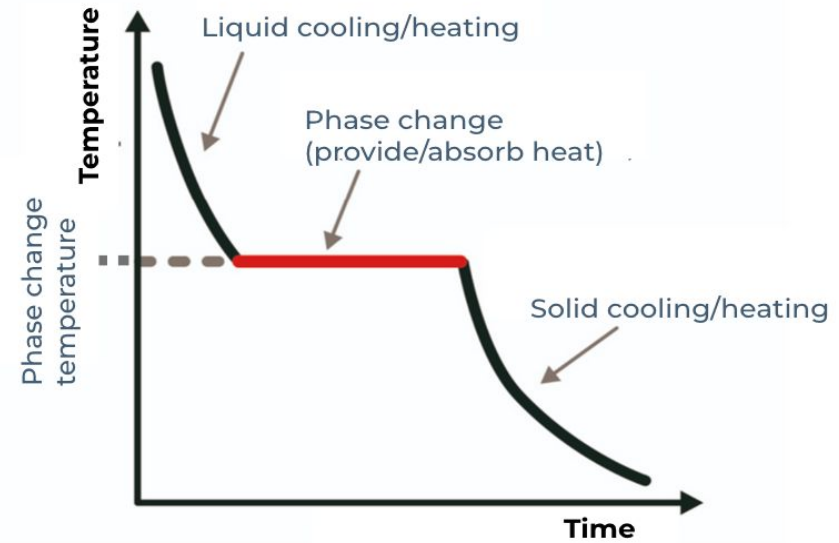
Share of electric heat pumps in heating demand (%) - [Elia 2021]



PCM storage

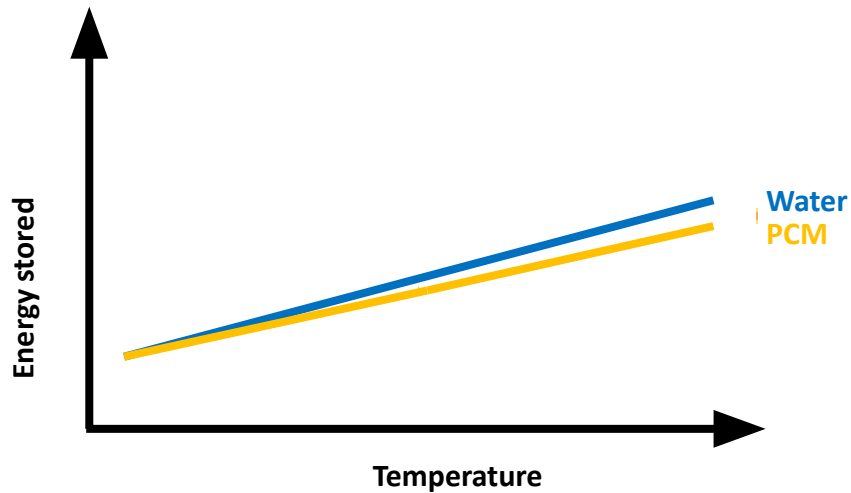


Phase change principle

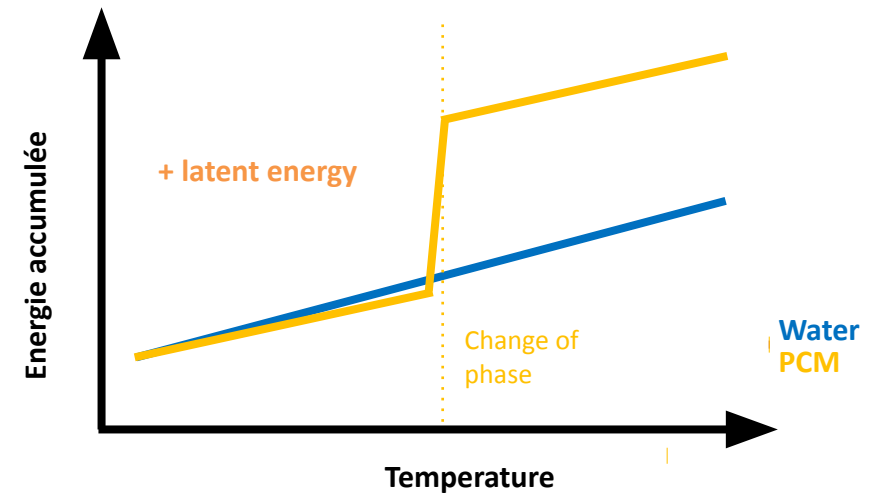


The value of latent heat

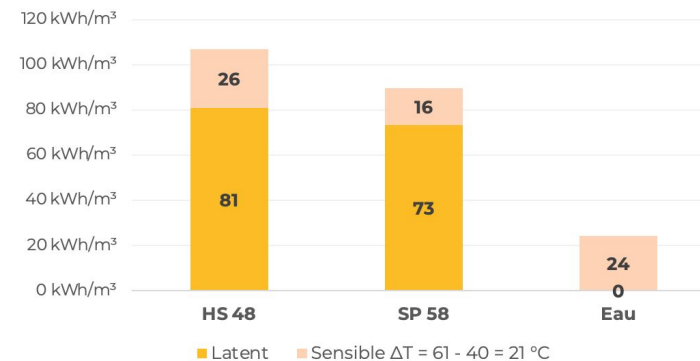
Sensible energy: energy linked to a temperature change



+Latent energy: energy linked to phase change (constant temperature)

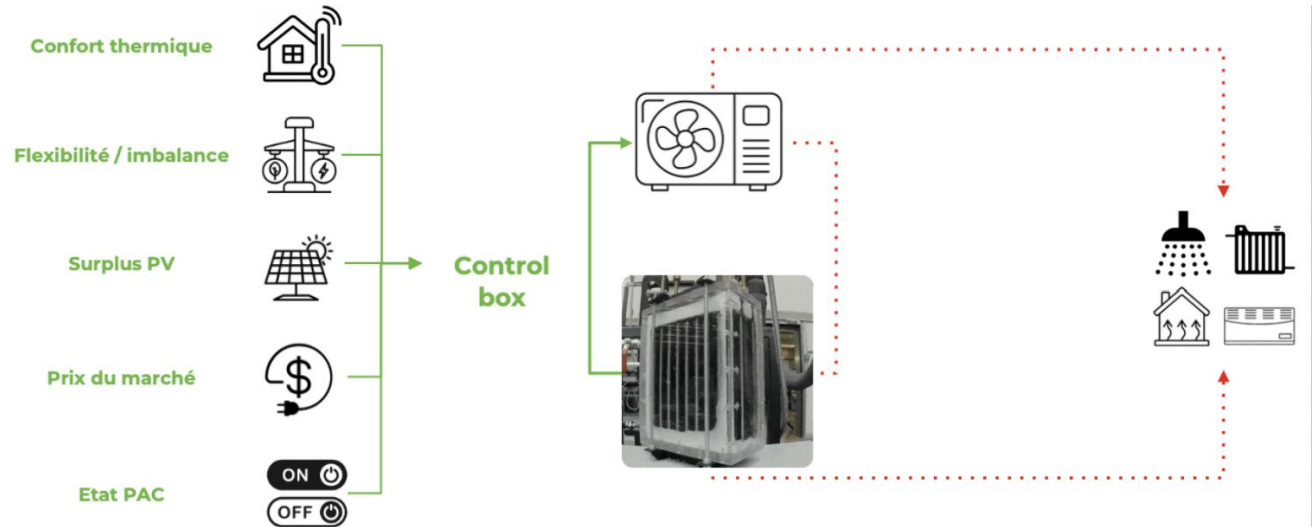
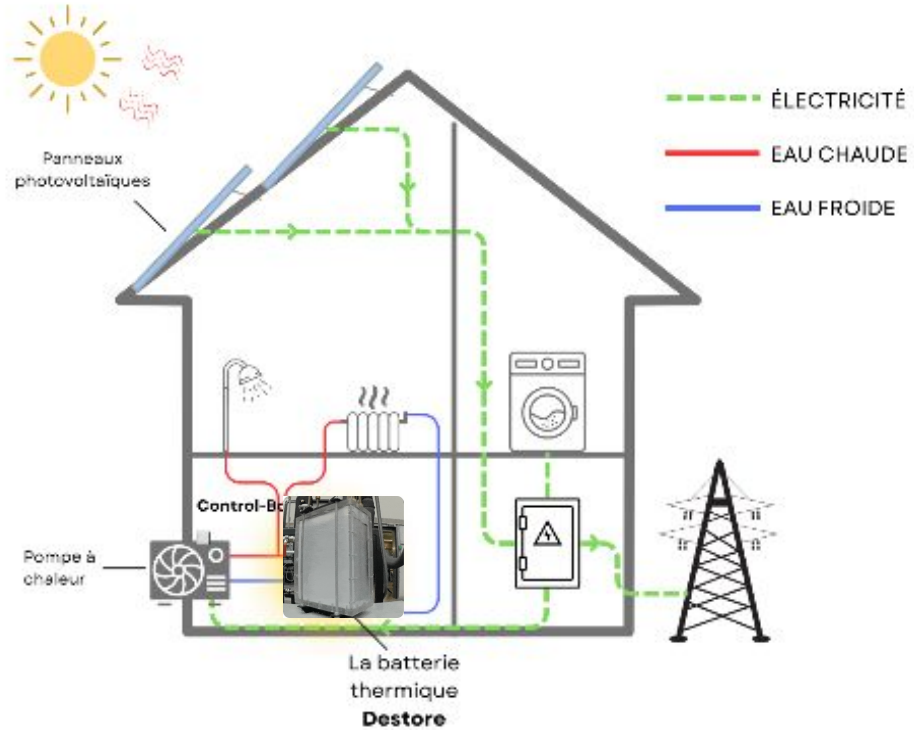


Comparatif de contenu énergétique



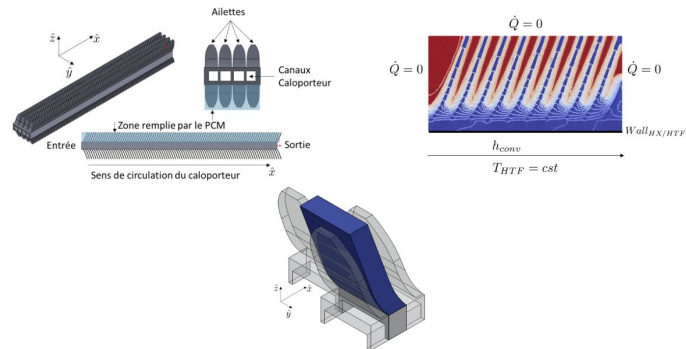
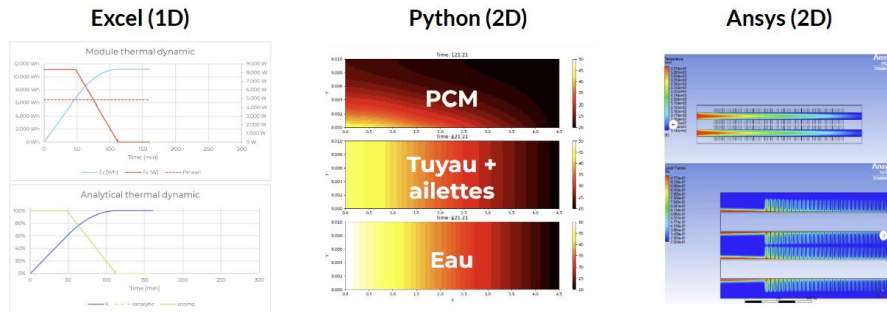
4 x higher energy density (kWh/m3)

Our solution

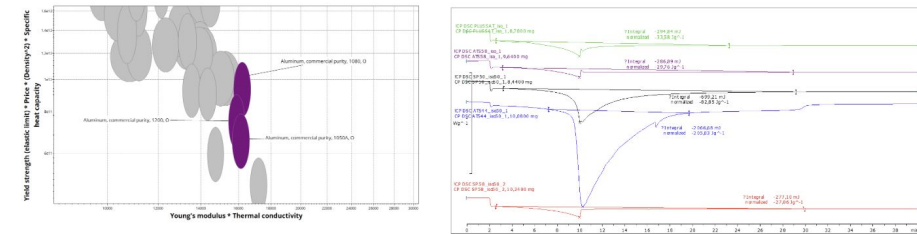


Challenges?

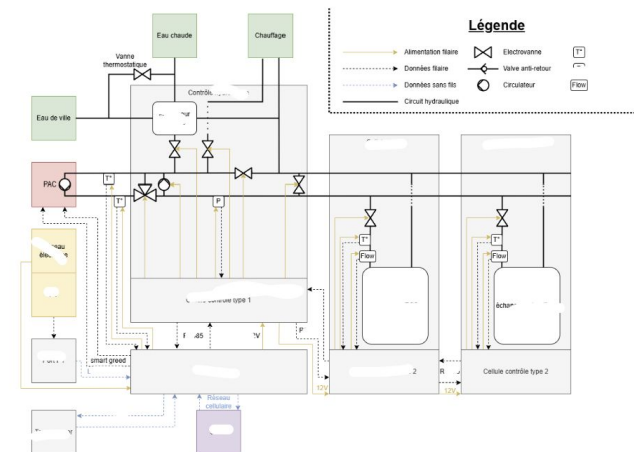
Heat exchanger validation via thermal simulations



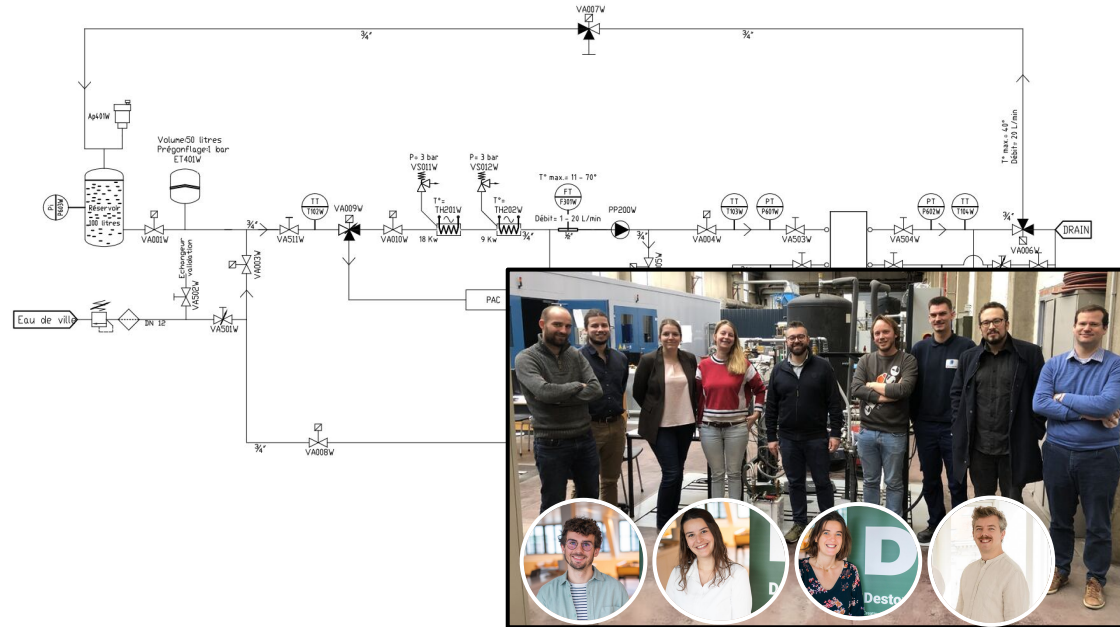
Material selection & Analysis



Functional design



Performance validation



Side track : control box



ControlBox

Optimize your heat pump

Price

499 €

TVA et installation
comprises.

Expenses

-9%

On energy bills
related to your heat
pump.



Optimization

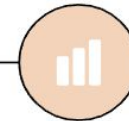
3x less

Stops/starts on
your heat pump.

Lifetime

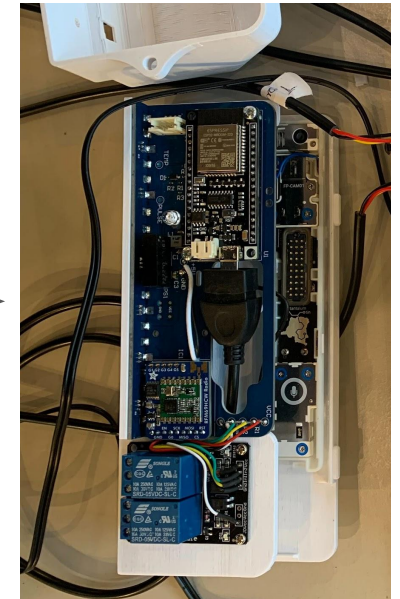
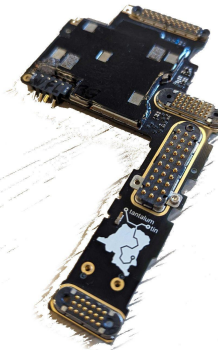
+2 years

For your heat
pump

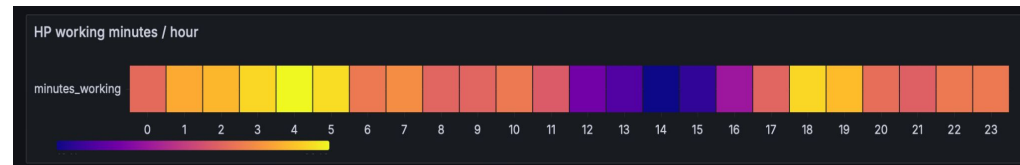
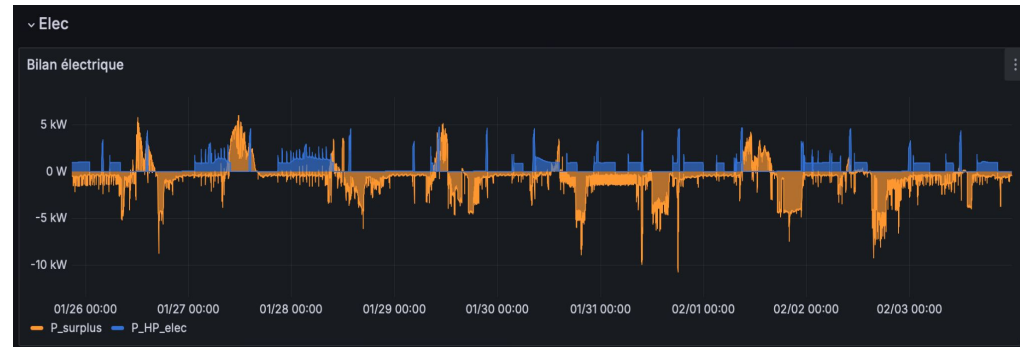


Made from a recycled
smartphone core.

Circular electronics



Control Environment



	Id	HP Brand	Smart Contr.	HP Model	123 P PV Installée	HP Type	Loc
<input type="checkbox"/>	D0001	Viessmann	Smart Control	Vitocal 200-S	9.8	ASHP	50°43'7.0"N 8
<input type="checkbox"/>	D0002	Viessmann	Smart Control	Vitocal 300-G	14.79	GSHp	50°40'48.0"N
<input type="checkbox"/>	D0003	Viessmann	Smart Control	Vitocal 200-S	NaN	ASHP	
<input type="checkbox"/>	D0004	Daikin	Smart Control	Alterna 3R	7.3	ASHP	50°45'18.0"N
<input type="checkbox"/>	D0005	Daikin	Smart Control	Alterna 3RW	6.8	ASHP	50°51'30.0"N
<input type="checkbox"/>	nnnnn	Buderus	Smart Control	THU 15 150	12.7	ASHP	50°58'11.0"N

Impact of supercooling on performance

Supercooling

”

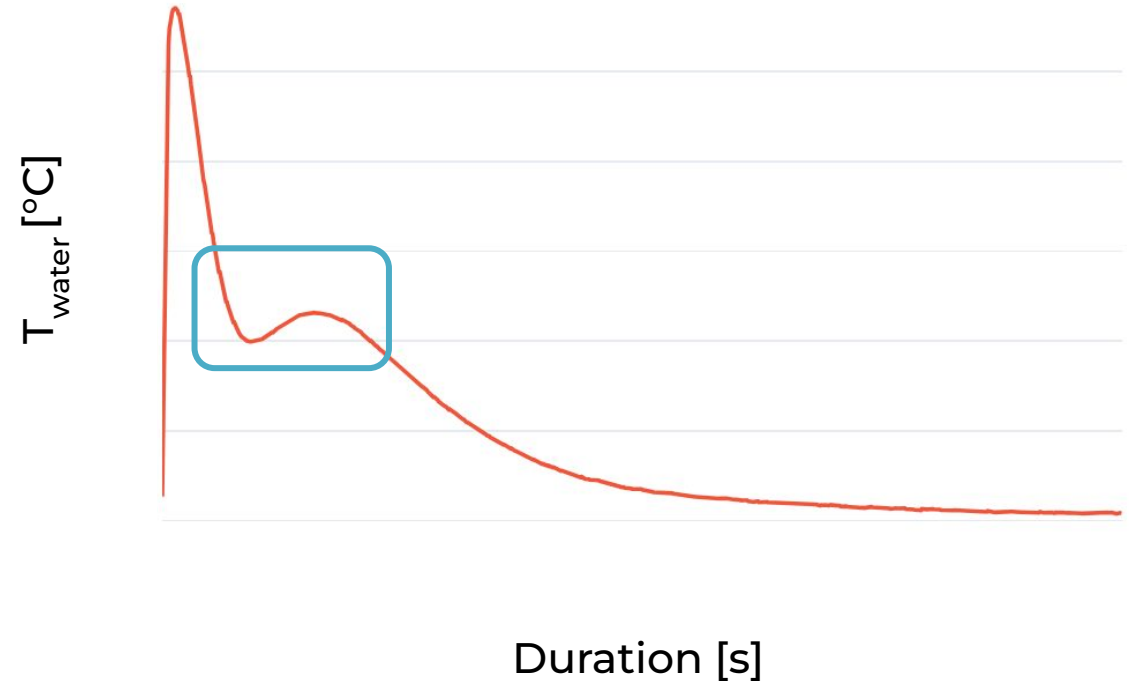
State where a substance remains liquid below its freezing point

Impact of supercooling on performance

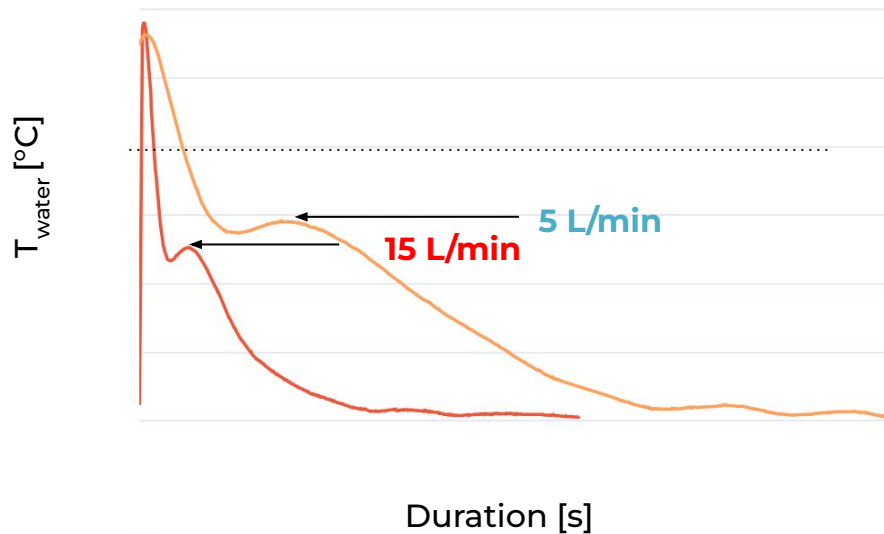
Supercooling

”

State where a substance remains liquid below its freezing point



Impact of **supercooling** on performance



Surfusion is influenced by the PCM cooling rate

- Flow rate
- ΔT
- ...

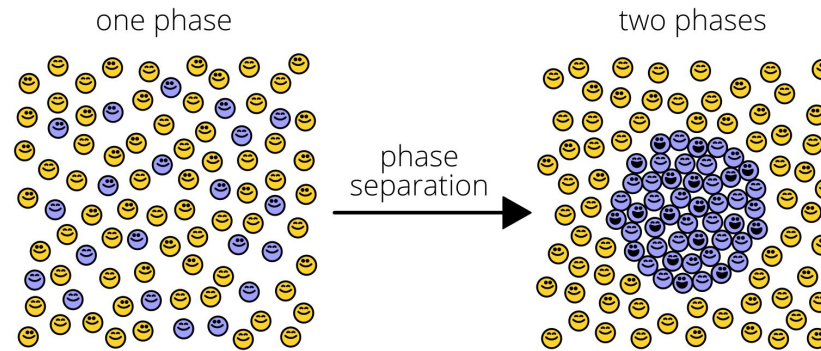
Impact of incongruent solidification on performance

Incongruent solidification

”

"Incongruent solidification of SAT leads to phase separation, reducing both energy density and thermal storage efficiency."

Impact of incongruent solidification on performance



Our technology (heat exchanger...) was adapted to minimise the impact of phase separation due to incongruent solidification

Our solution



+ 20 %

Solar Energy

- 650€/y

Savings

7 years

Free maintenance

We are looking for partners

