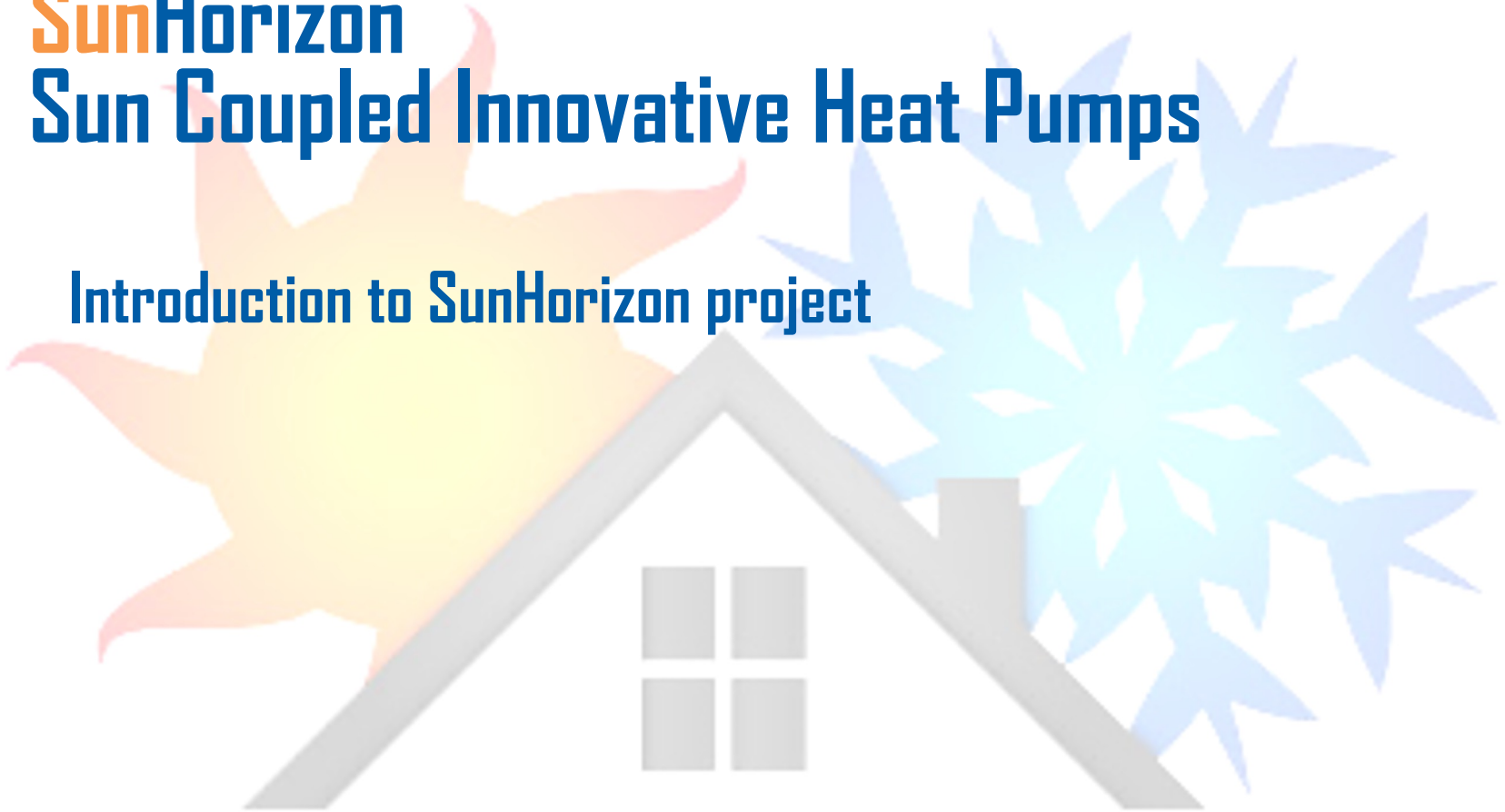


SunHorizon Sun Coupled Innovative Heat Pumps

Introduction to SunHorizon project



Contents

- Project vision
- Project team
- Project demosites and climatic areas
- SunHorizon 5 Technology Packages (TPs) and results from simulators
- Conclusions

As stated in EU Strategy H&C (2016), "*large-scale demonstration projects of energy-efficient and low/zero-carbon technologies are needed to help reduce technical and market barriers by providing robust data to evaluate their performance in each market segment*". For this purpose SunHorizon aims to be a breakthrough demonstration to a market project involving 21 partners' expertise and 6 Demonstration Sites around EU, focusing its activities on "*reducing system costs and improving performance as well as optimising existing technologies for H&C applications and for some of the most promising market segments*".

- To demonstrate up to TRL 7 innovative and reliable heat pump solutions coupled with solar technologies
- To provide heating and cooling to residential and tertiary buildings with lower emissions, energy bills and fossil fuel dependency.
- The technologies are managed by a cloud-based functional monitoring platform with services (e.g., demand prediction, proactive and predictive maintenance tools, ...). The services will help on maximizing solar exploitation and give the manufacturer inputs for new installation design.



6 Technologies to be integrated
5 Technology Packages
6 Demos (7 buildings)

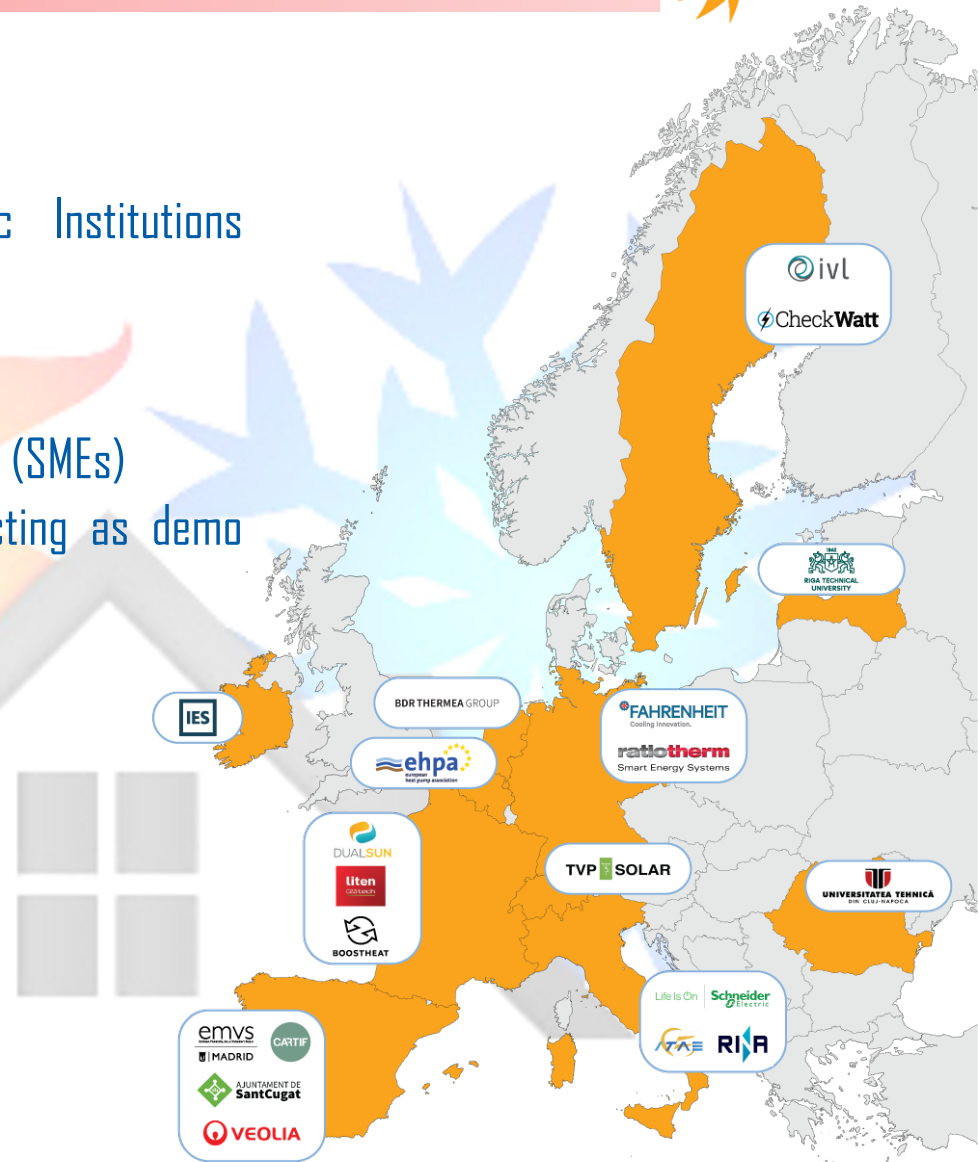
Project team

An Industry Driven Consortium

- 5 top-level Academic Polytechnic Institutions (RTOs)
- 11 industrial partners:
 - ✓ 4 Large Enterprise (LE)
 - ✓ 7 Small and Medium Enterprises (SMEs)
- 4 associations and stakeholders acting as demo site

Third Parties involved:

- IES UK (LTP of IES Ireland)
- GNSE and GNS (LTPs of GNF)

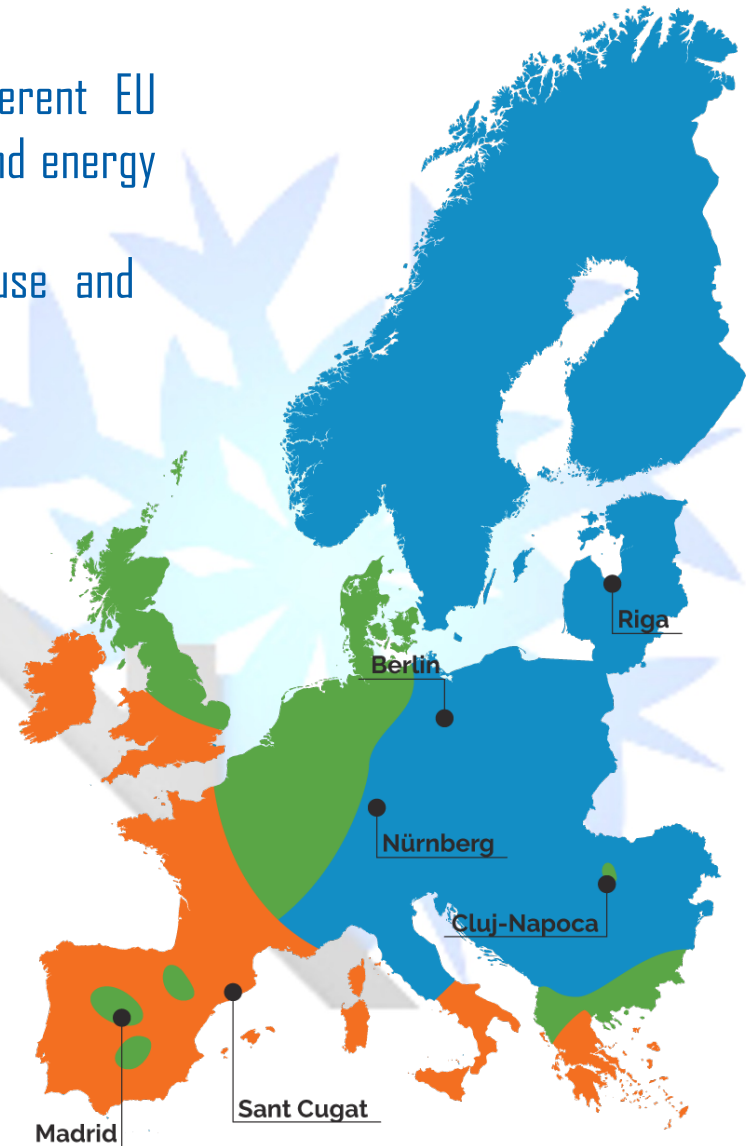


Project demo sites and climatic areas



SunHorizon project will be demonstrated in different EU contexts (7 demos) to evaluate different climatic and energy market solutions:

- Small and large-scale residential (single house and apartment blocks)
- Tertiary buildings (public buildings, etc)



The demosite needs, are supplied with 5 different technology combinations, that combine the following technologies:

Heat pumps



FAHRENHEIT
Cooling Innovation.

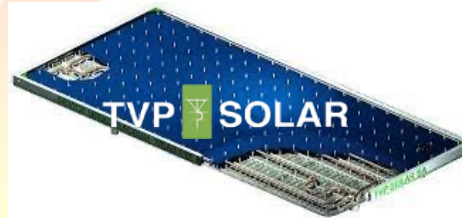


BDR THERMEA GROUP



BOOSTHEAT
ENERGY UNITES PEOPLE

Solar technologies



BDR THERMEA GROUP



DUALSUN

Storage



ratiotherm



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Needs

- Space cooling
- Space heating
- DHW



Technology Package 1

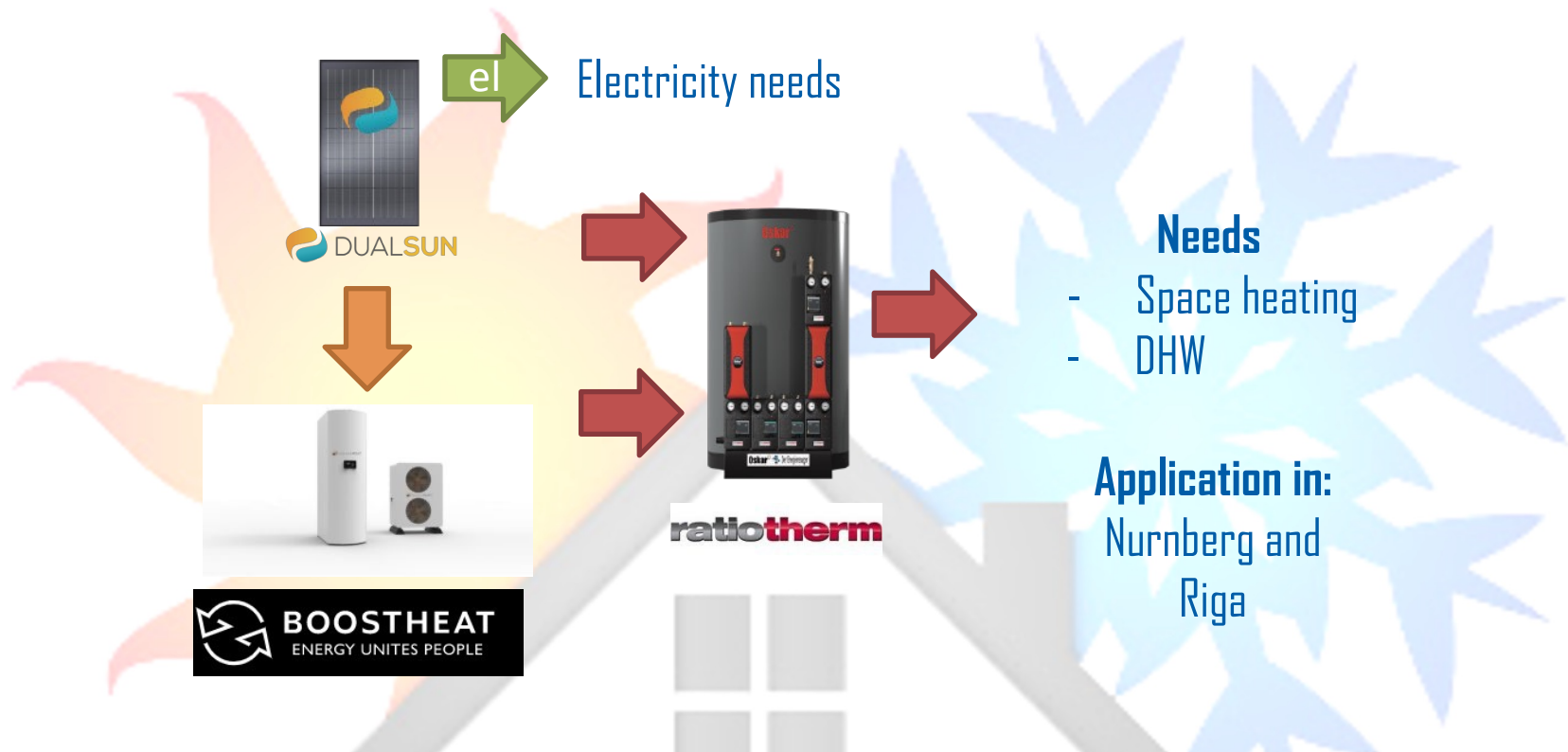
Technology package 1 (TPI): Innovative gas-fired heat pump with high-vacuum solar panels



SunHorizon TP	Solar-HP integration concept	Description
TVP+BH	Parallel integration	TVP for space heating + DHW; BH to cover non solar periods

Technology Package 2

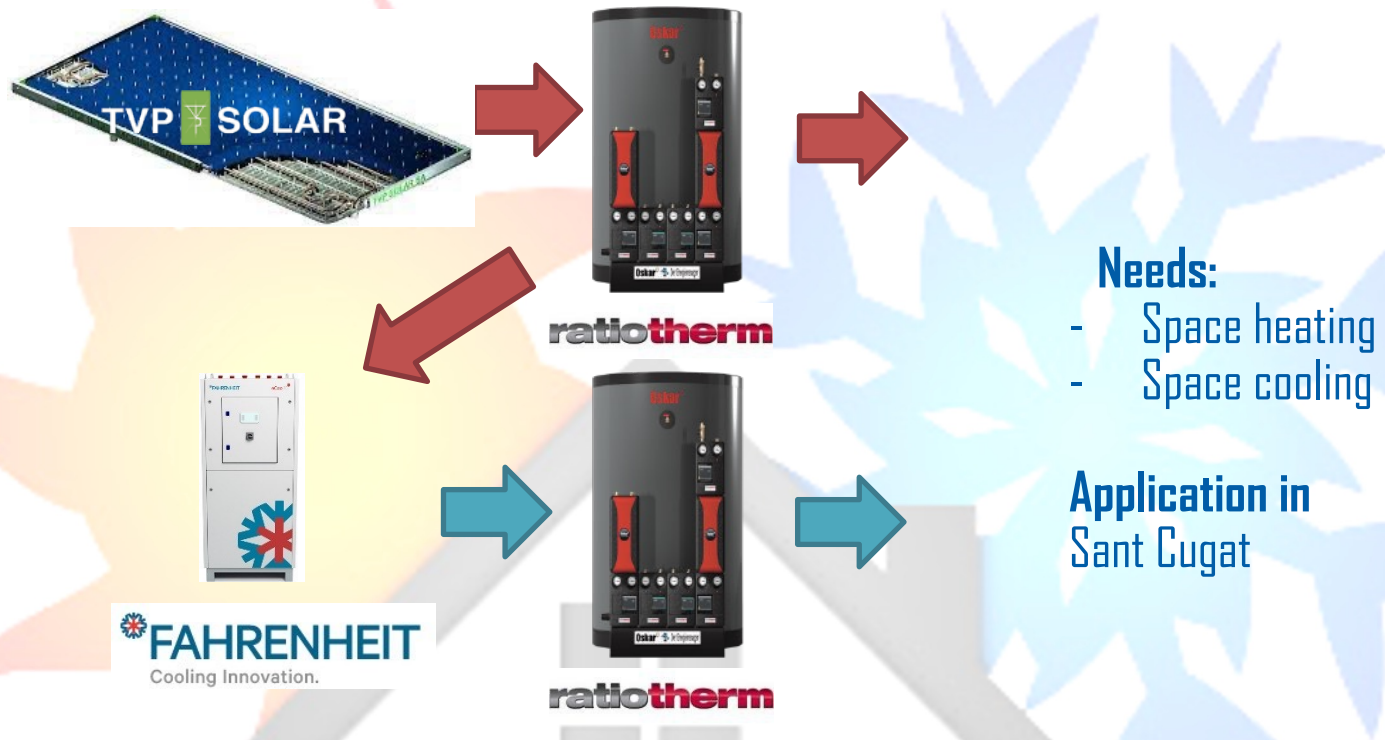
Technology package 2 (TP2): Innovative gas-fired heat pump with improved PVT solar panels



SunHorizon TP	Solar-HP integration concept	Description
DS+BH	Mixed solar-assisted/parallel integration	BH for space heating + DHW support; DS PV-T thermal output to assist BH evaporator and cover preheating of demand; + electricity for appliances

Technology Package 3

Technology package 3 (TP3): Hybrid adsorption-compression chiller with high-vacuum solar panels



SunHorizon TP	Solar-HP integration concept	Description
TVP+FAHR	Solar-driven HP for cooling	TVP for space heating + DHW in winter + activation of the thermal The compressor of the adsorption chiller for cooling in summer

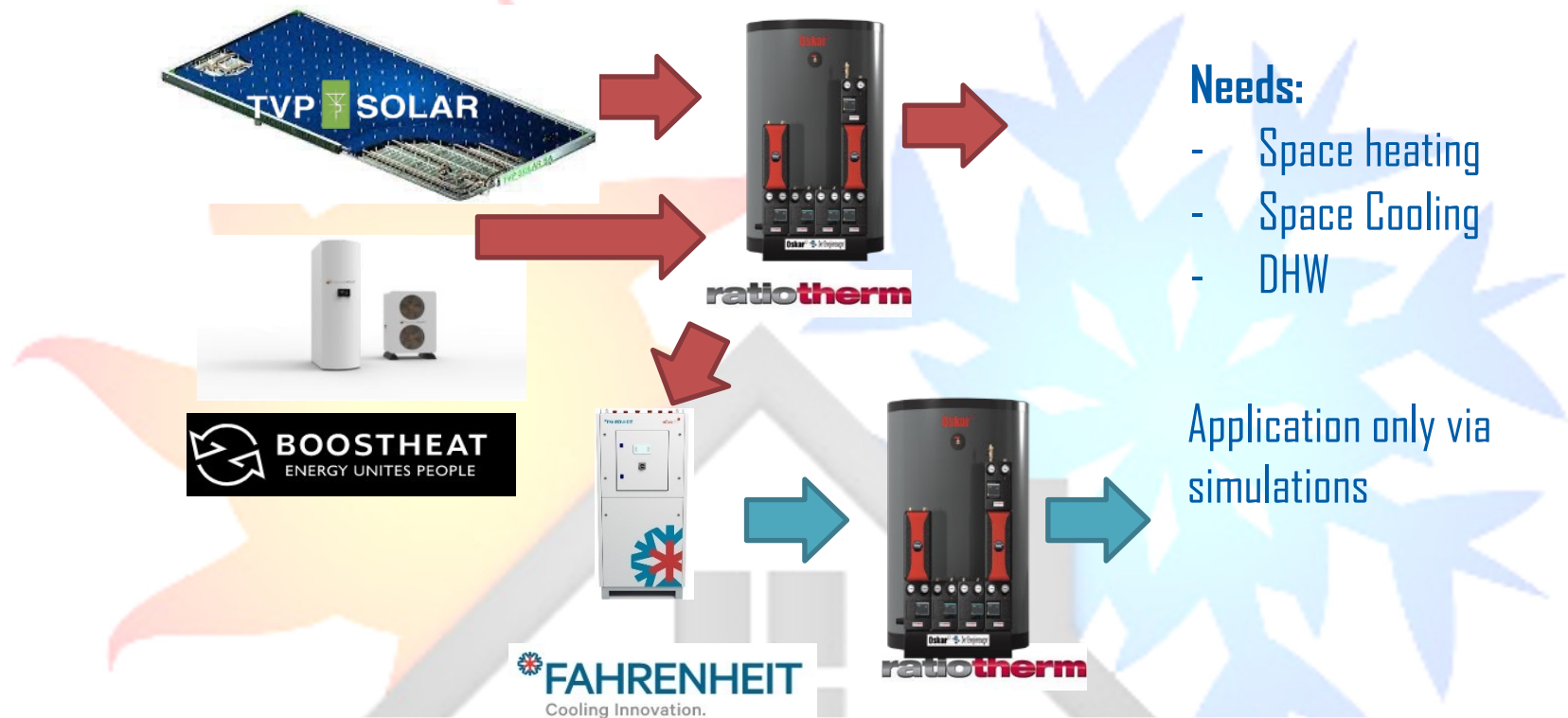
Technology Package 4

Technology package 4 (TP4): brine water heat pump assisted with improved PVT solar panels



SunHorizon TP	Solar-HP integration concept	Description
DS+BDR	Mixed solar-assisted/ parallel integration	DS PV-T thermal output coupled with heat pump to cover part of SH and DHW heat demand + electricity production to cover reversible HP electricity consumption

Technology package 5 (TP5): Hybrid adsorption-compression chiller with high-vacuum solar panels innovative gas-fired heat pump



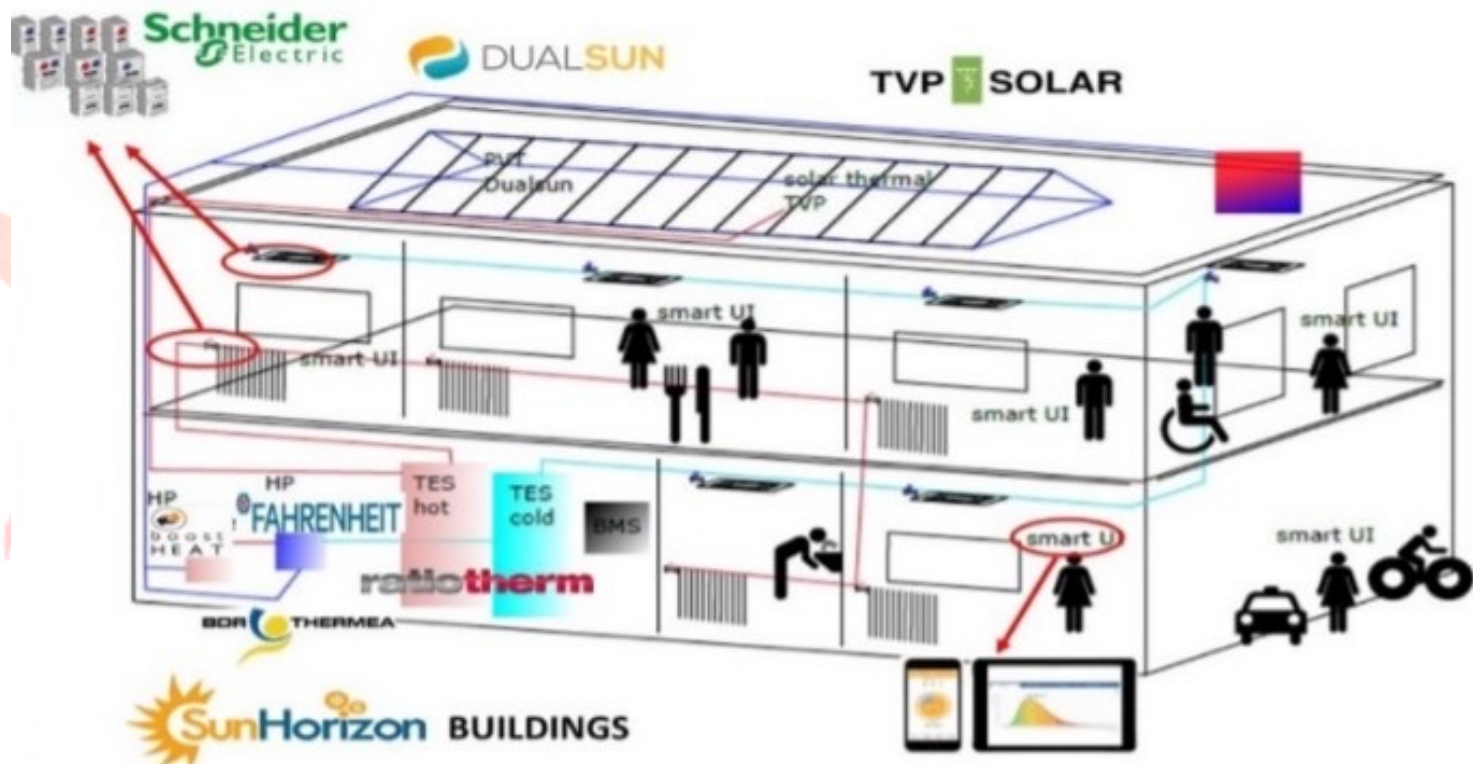
SunHorizon TP	Solar-HP integration concept	Description
TVP+BH+FAHR	Mixed solar-driven/parallel integration	TVP for space heating + DHW; BH to cover non solar periods; FAHR adsorption chiller activated only by BH or also by TVP

It has been estimated that TPs will allow saving 33-70 % GHG emissions and 30-85% operation costs in the different demosites.

TPs	Solar-HP integration concept	Results from simulations
TP1	Parallel integration	In Berlin: 32% of primary energy savings and GHG emissions savings, 25 renewable energy ratio, and 578 EUR/year cost bills reduction
TP2	Mixed solar-assisted/ parallel integration	In Nurnberg: ~ 33% of primary energy and costs savings, 80% of electrical self-consumption ratio (SCR). In Riga: ~22% of primary energy savings, 31 GHG emissions savings, 15% renewable energy ration, and 32% cost bills reduction
TP3	Solar-driven HP for cooling	In Sant Cugat: ~5-50% range of primary energy and costs savings according to the position (high / medium / low solar zone)
TP4 TP5	Mixed solar-assisted/ parallel integration Mixed solar-driven/ parallel integration	In Madrid: ~76% of primary energy and 70% of greenhouses gases savings Tertiary building: primary energy saving ranges from 19% to 57% depending on the location Multifamily residence building the primary energy saving ranges from 33% to 41%

Conclusions

A pre-industrial project with high TRL that combines different types of heat pumps with solar technologies will help to meet the H&C demand with lower emissions, energy bills and fossil fuel dependency.



Thank you for your time!

<https://sunhorizon-project.eu/>

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