

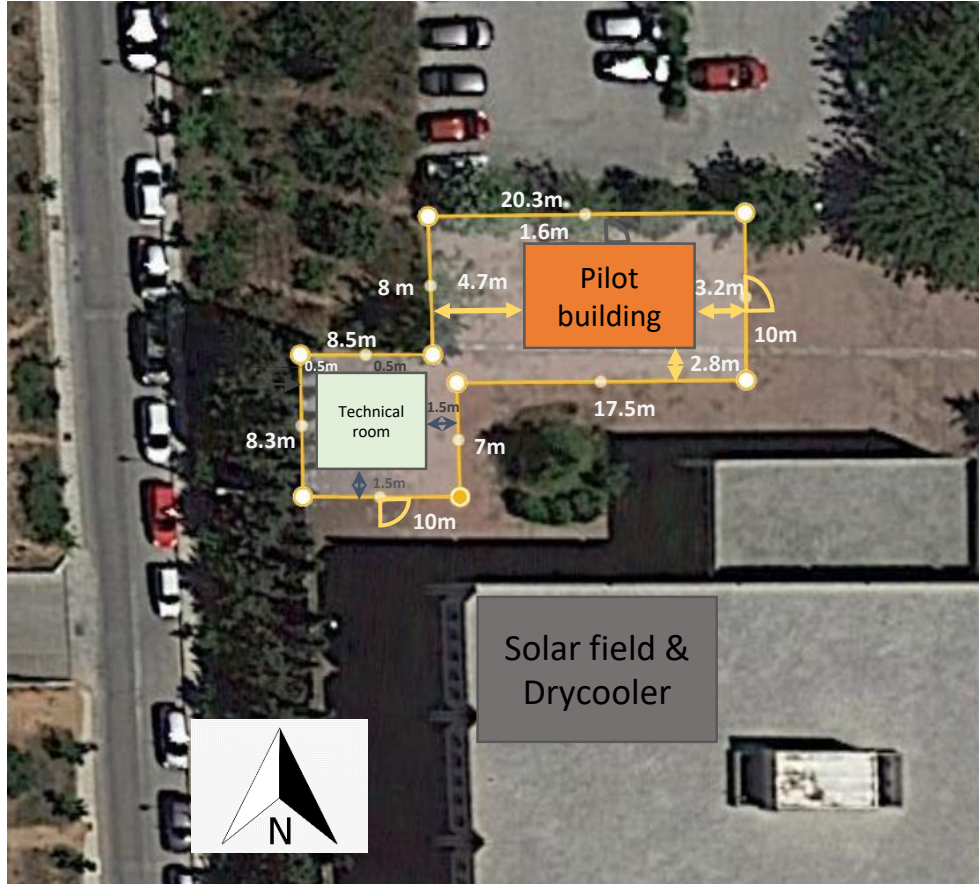
# The EULiST waiting for the evaluation!

Sotirios Karellas (NTUA)



# EULIST

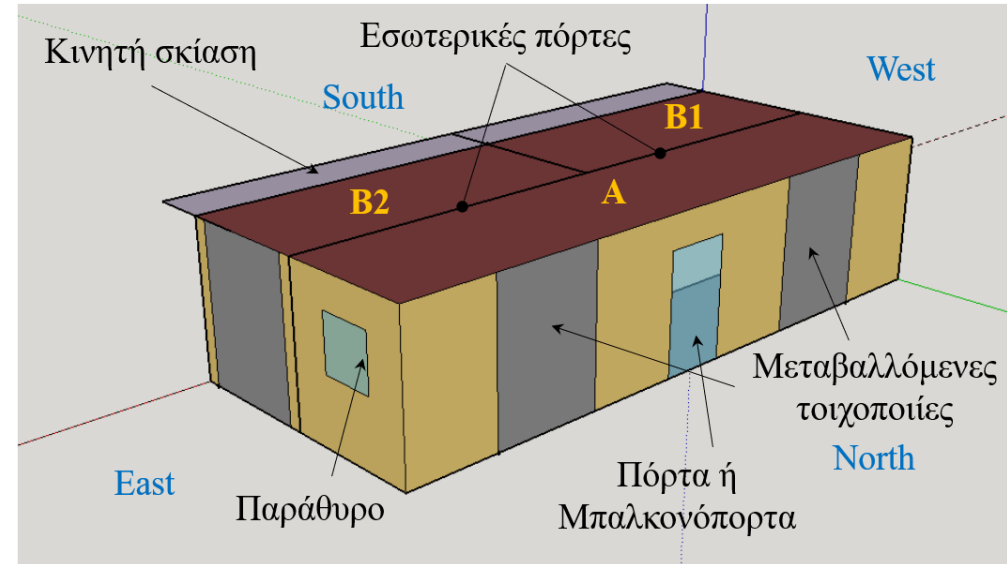
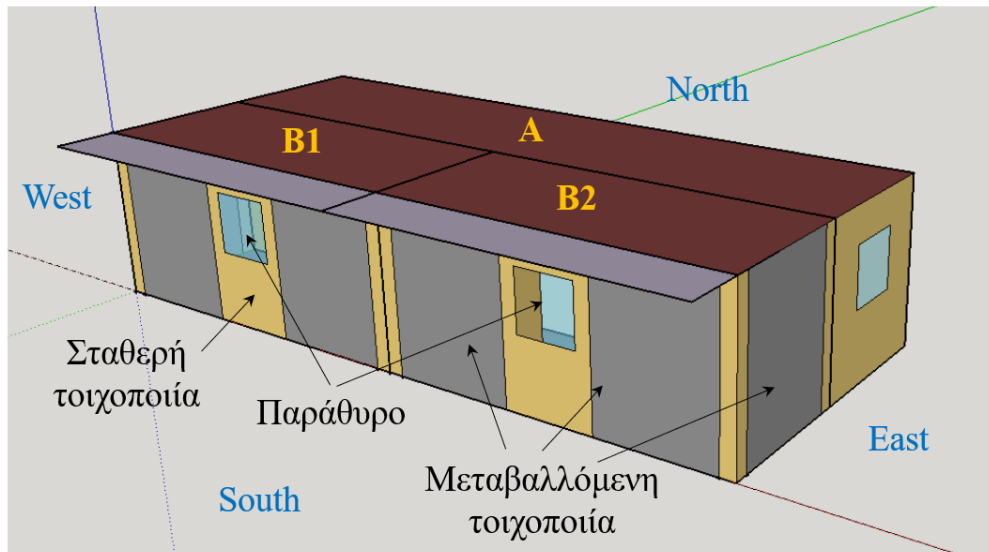
# Pilot building



## Pilot building:

- South-North orientation
- Surface floor area: 64 m<sup>2</sup>
- Interchangeable wall components
- 3 individual spaces  
(1 x 32 m<sup>2</sup> + 2 x 16 m<sup>2</sup>)
- 7-circuits underfloor heating
- 4 fan-coil units
- 4 air-conditioning units

# Pilot Building





# Insulation of the containers





Reformation of commercial containers

# Pilot building



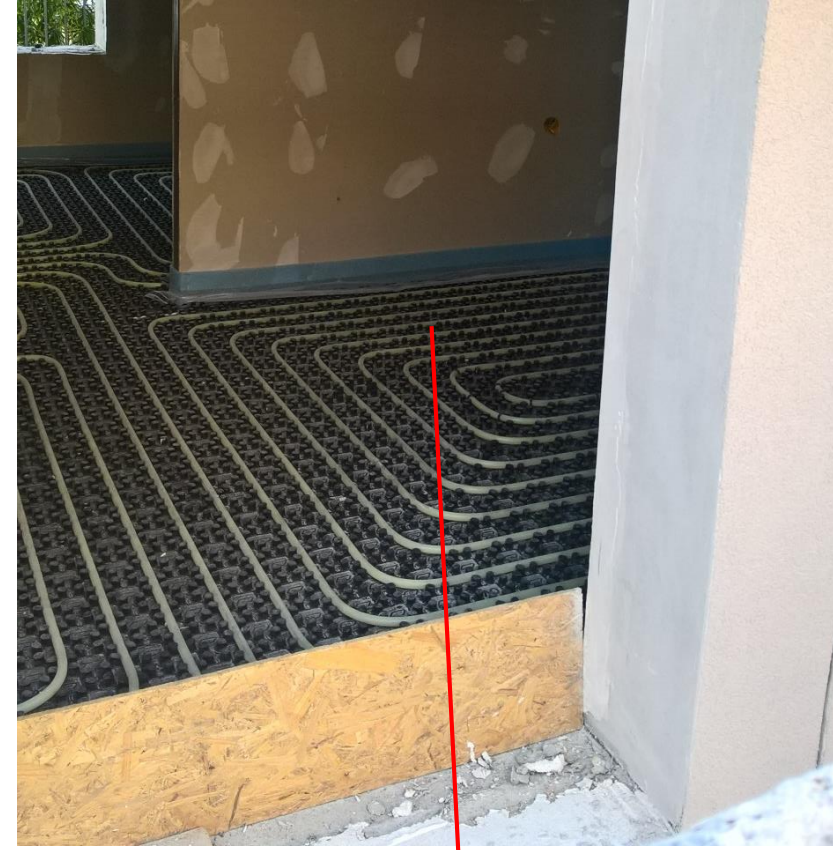
*Inside preparation*

*Interchangeable wall components*



Heating/cooling emission systems

# Pilot building



*Distribution manifold (selection between underfloor and fan-coil units)*

*Underfloor system*



Pilot building

Pilot building





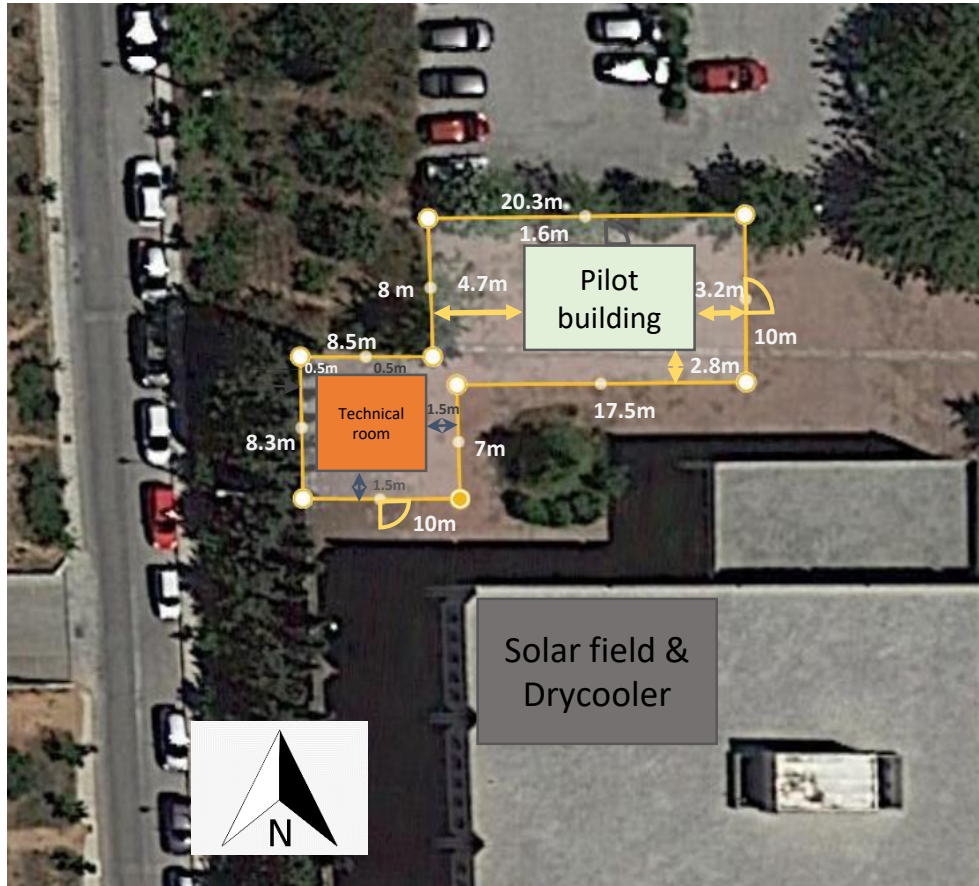
Pilot building

Pilot building





# Technical room



## Mechanical equipment room:

- Surface floor area  $\approx 40 \text{ m}^2$
- 5 x 63 A Circuit breaker
- Mechanical ventilation (2000  $\text{m}^3/\text{h}$ )
- Water softening installation
- Chimney
- Back-up heat pump/chiller (5 kW)

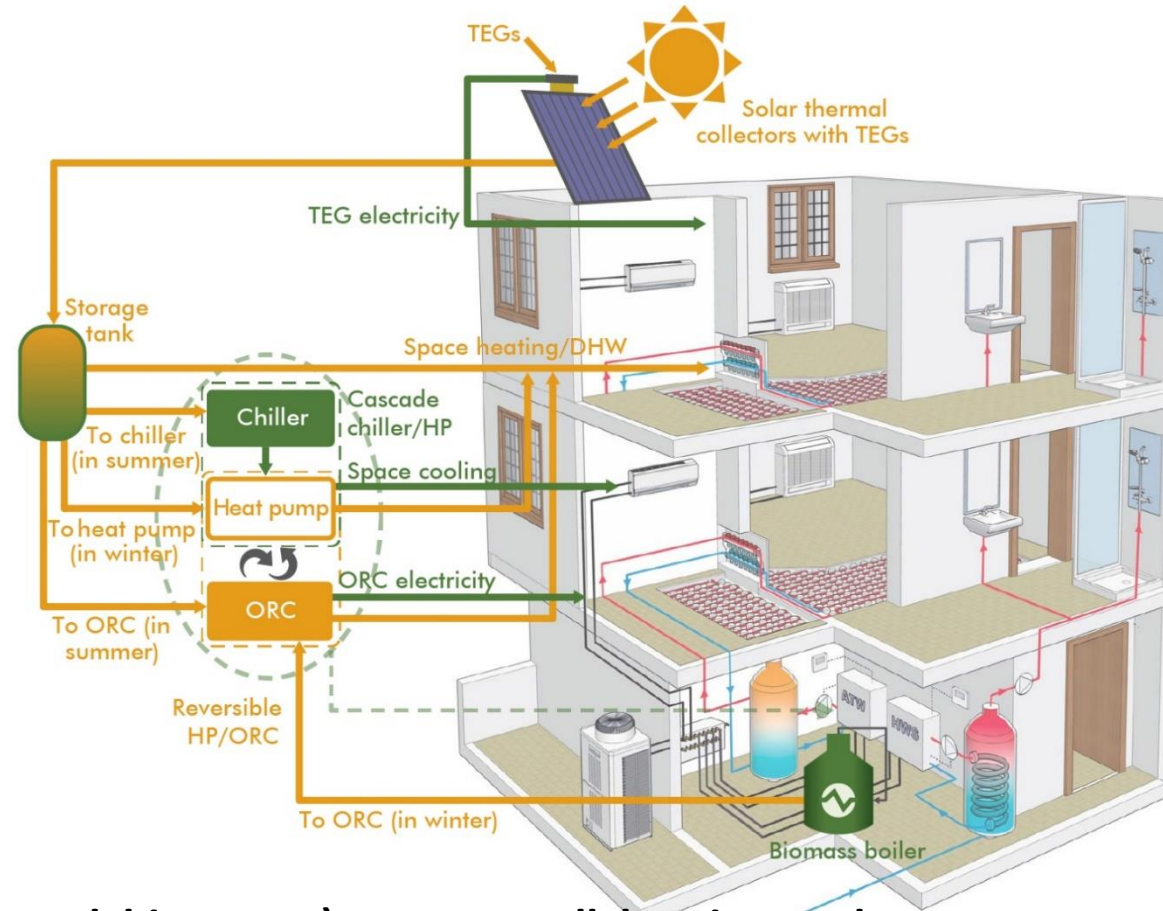


**Solar-Biomass Reversible energy system for covering a large share of energy needs in buildings**

<p>National Technical University of Athens</p>  <p>Greece</p>	<p>Friedrich-Alexander University of Erlangen-Nuremberg</p>  <p>Germany</p>	<p>Fahrenheit GmbH</p>  <p>Germany</p>
<p>Consiglio Nazionale delle Ricerche (CNR), Institute for Advanced Energy Technologies</p>  <p>Italy</p>	<p>Techniki Eteria Antiprosopion Viomichanikoy Exoplismoy Ltd</p>  <p>Greece</p>	<p>AkoTec Produktionsgesellschaft mbH</p>  <p>Germany</p>
<p>Universidad de Lleida</p>  <p>Spain</p>	<p>Daikin Air-Conditioning Hellas SA</p>  <p>Greece</p>	<p>Science Policy Research Unit (SPRU), University of Sussex</p>  <p>United Kingdom</p>
<p>DBC Europe SA</p>  <p>Belgium</p>	<p>Techlink</p>  <p>Belgium</p>	<p>Karlsruhe Institute of Technology</p>  <p>Germany</p>
<p>ÖkoFEN Forschungs- und Entwicklungs GmbH</p>  <p>Austria</p>	<p>N.V. STRABAG Belgium SA</p>  <p>Belgium</p>	<p>Universita Degli Studi di Messina</p>  <p>Italy</p>



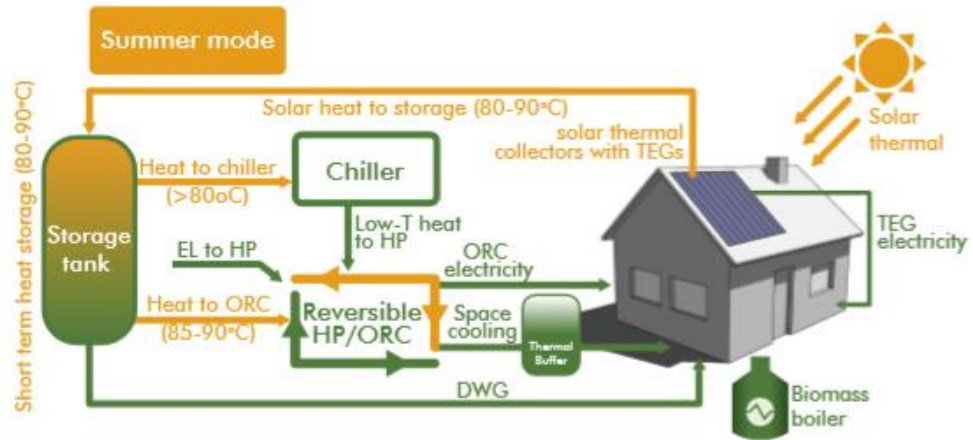
# SolBio-Rev Concept



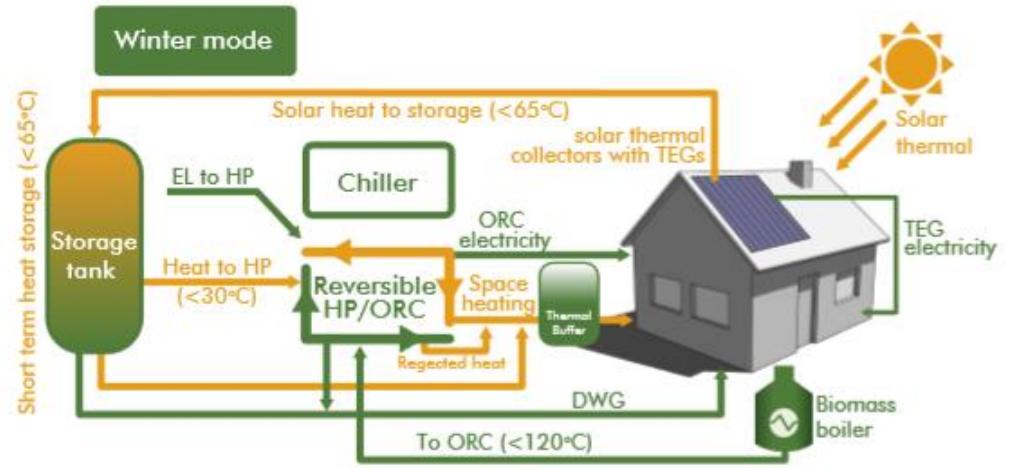
- Exploitation of renewables (solar, ambient and bioenergy) to cover all heating and cooling demand and a variable electricity demand in a cost-effective manner suitable to be installed in various buildings types/sizes without any geographical restriction

The SolBio-Rev project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 814945.

# SolBio-Rev Concept



**Heat pump-based configuration** with innovative components and an advanced system control that combined, allow the maximised use of renewable energy in buildings at any moment of the year in all EU climatic zones





### Integration of innovative components

- **Cascade adsorption chiller/heat pump (HP)**

Reduced temperature lift in Vapour Compression Cycle (VCC) HP thanks to adsorption chiller, resulting in high electrical COP

- **Reversible heat pump/ORC (HP/ORC)**

Versatility to supply heating, cooling or electricity with the same equipment

- **Heat pump-based configuration**

Integration of cascade chiller and HP/ORC

- **Solar thermal collectors with TEGs**

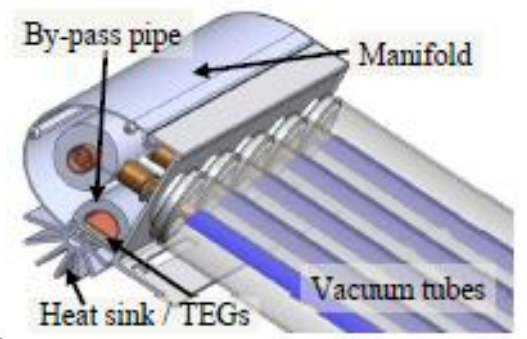
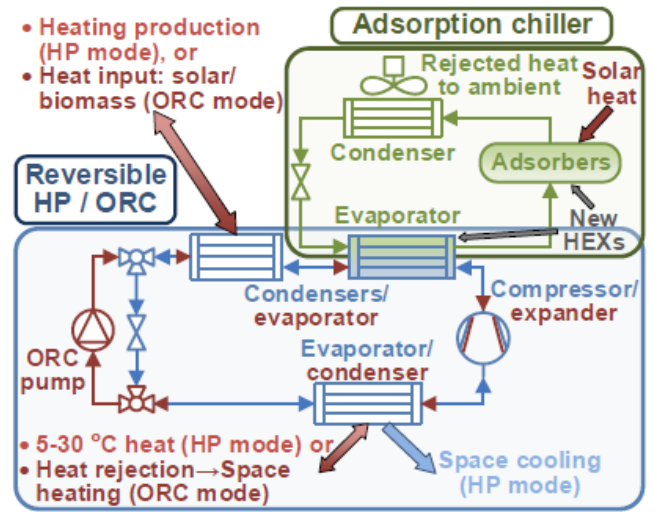
Evacuated tube solar collectors coupled with TEGs for excess heat removal and electricity production

- **Biomass boiler for cogeneration**

Addition of an internal HEX and EGR increasing supply temperature and reducing emissions

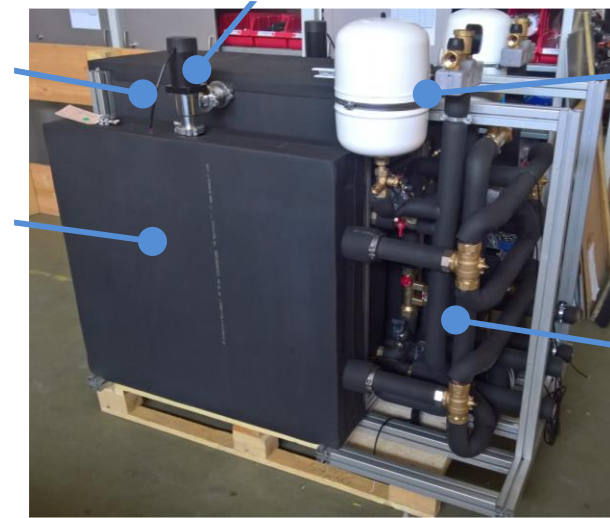
- **Advanced control system**

Smart and predictive control with self-learning features



**Integration of innovative components:**

- **Cascade adsorption chiller/heat pump (HP)**  
Reduced temperature lift in Vapor Compression Cycle
- **Reversible heat pump/ORC (HP/ORC)**  
Versatility to supply heating, cooling or electricity with the same equipment
- **Heat pump-based configuration**  
Integration of cascade chiller and HP/ORC
- **Solar thermal collectors with TEGs**  
Evacuated tube solar collectors coupled with TEGs for excess heat removal and electricity production
- **Biomass boiler for cogeneration**  
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Smart and predictive control with self-learning features









# Reversible Heat Pump/ORC – Test-rig

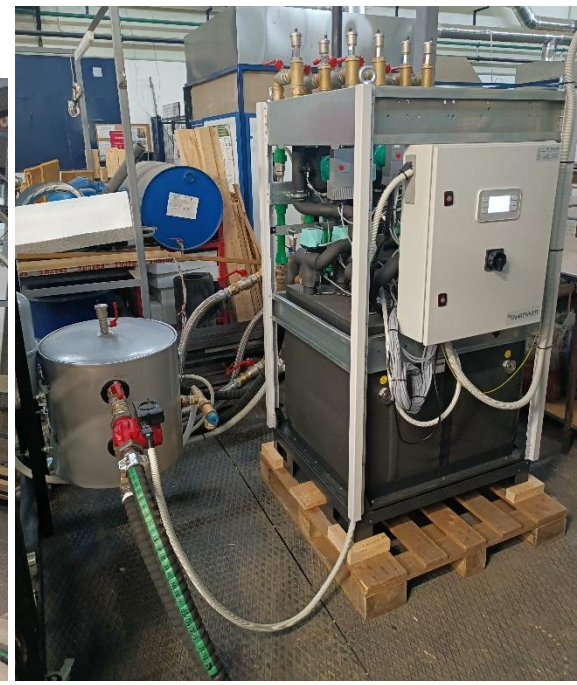
## Sorption chiller integration into NTUA lab



*Chiller & Separators*



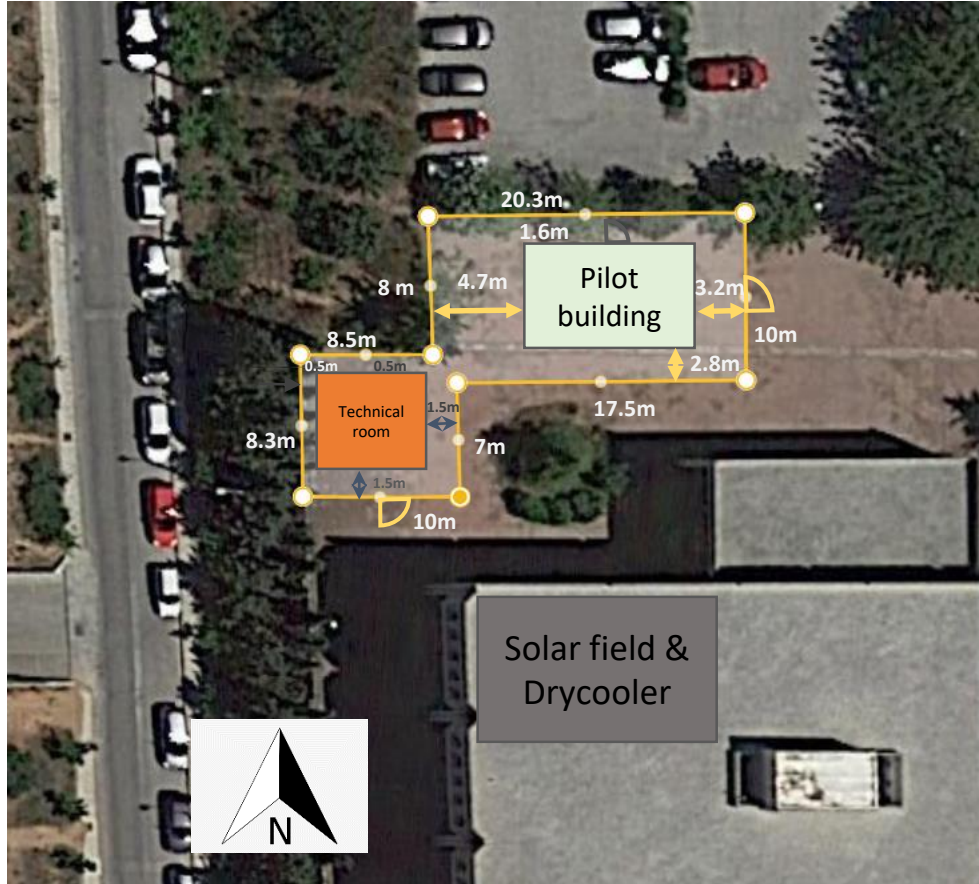
*Integrated system*



*Chiller & Buffer tank*



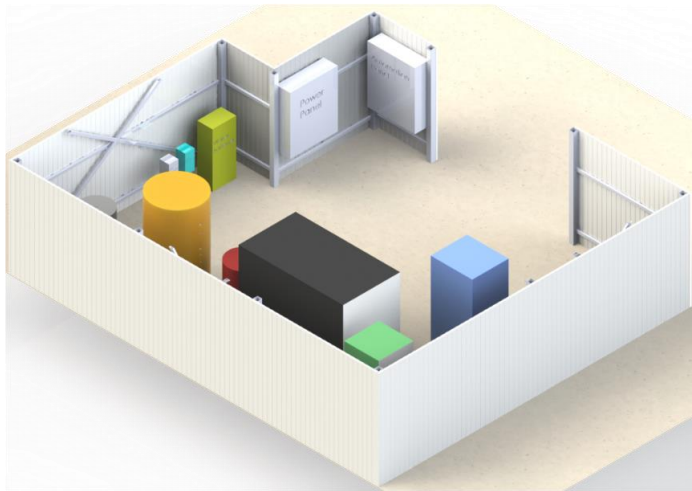
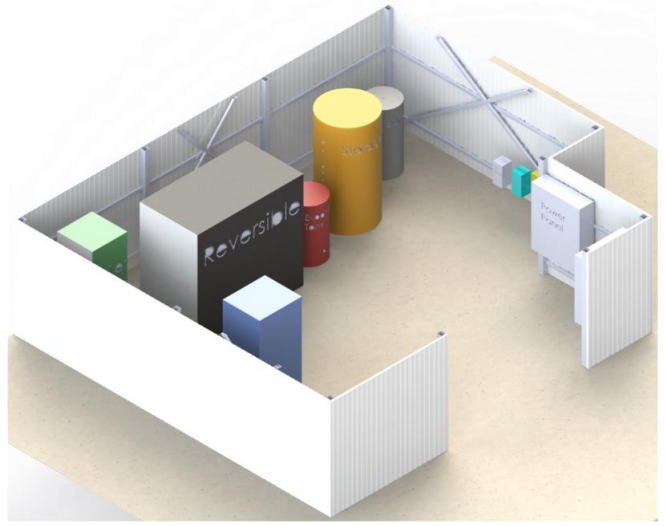
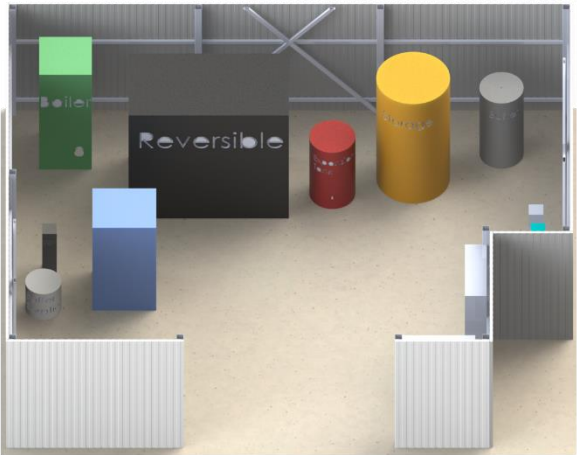
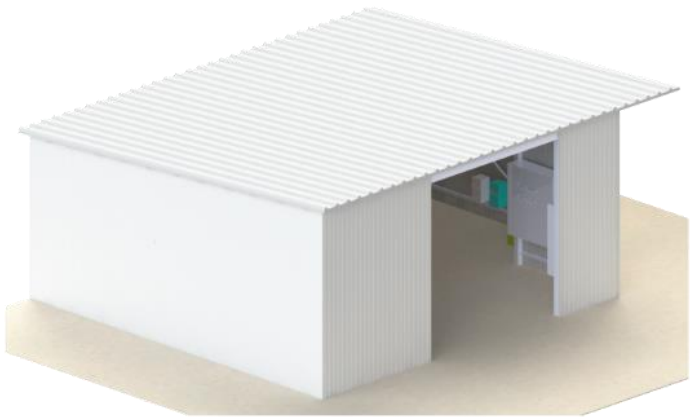
# Technical room



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**Technical room**







Thank you very much for your attention!

Ευχαριστώ πολύ για την προσοχή σας!