

**JORNADA D'ECOSISTEMA DE TRANSFERÈNCIA
I INNOVACIÓ EN ENERGIA**



RCE – Radiative Collector and Emitter

SEMB – Sustainable Energy, Machinery, and Buildings

Universitat de Lleida



Universitat de Lleida
Escola Politècnica Superior



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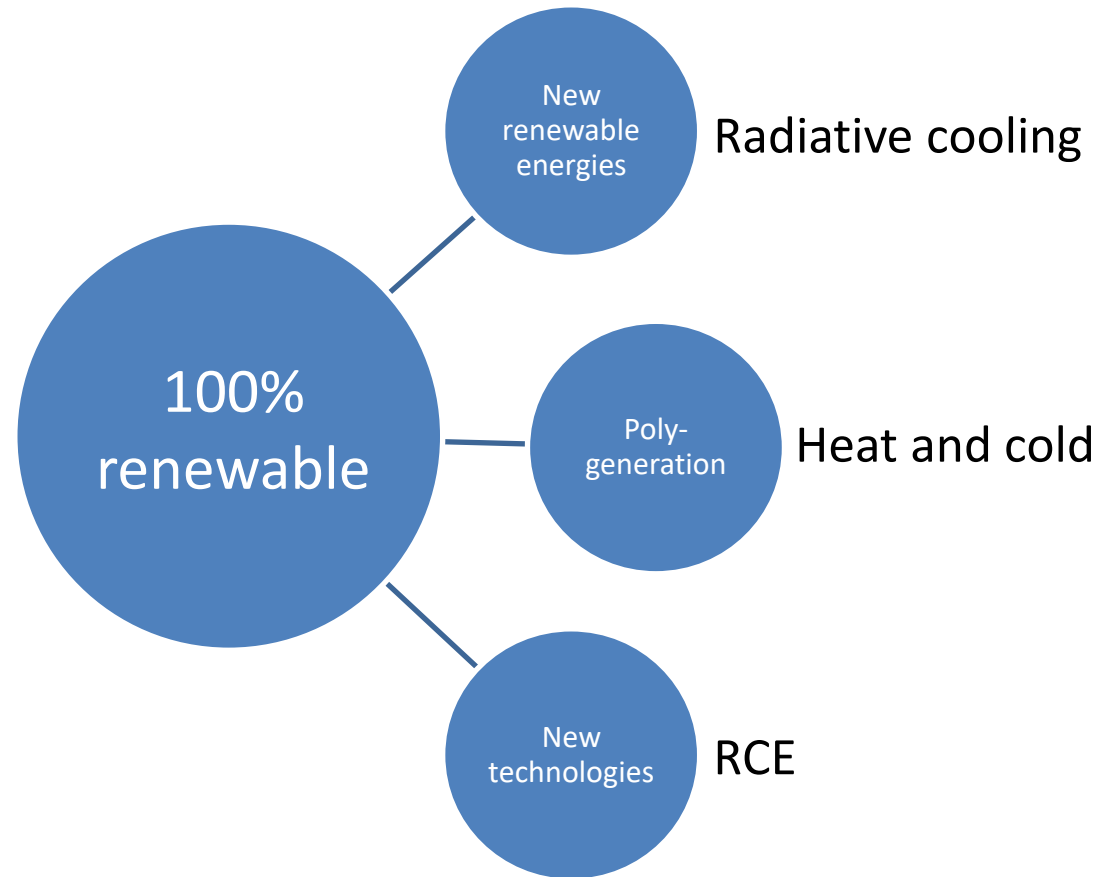
Barcelona, June 21st 2023

Albert Castell

CHALLENGES AND MARKET

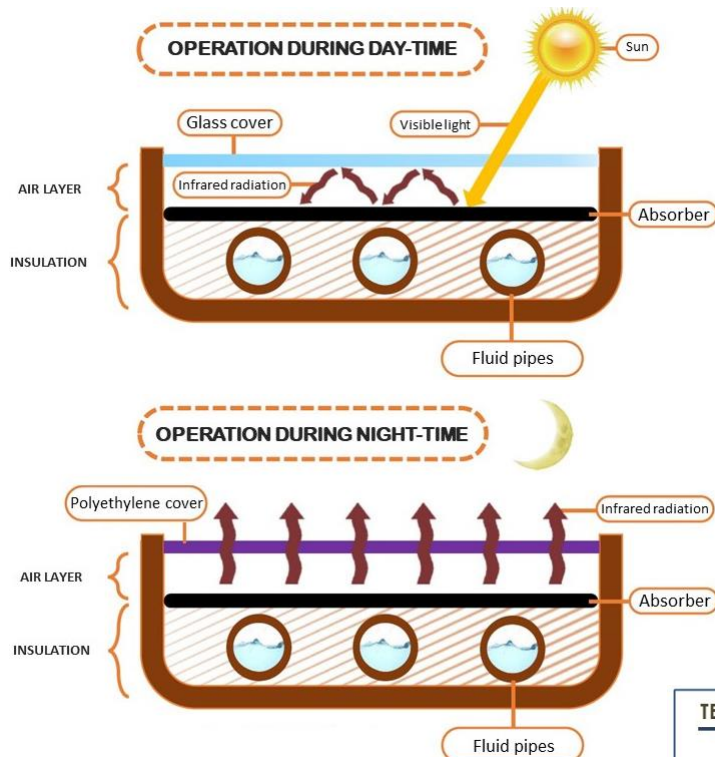


Energy transition



SOLUTION/PRODUCT

Radiative Collector and Emitter, RCE



Renewable heat and cold production



Extra cooling production

Cooling functionality not provided by a conventional solar thermal collector



Simplicity

2 operation modes with a single device characterized by its adaptive cover



Higher efficiency

Dual function installations require high temperatures to provide optimal supply

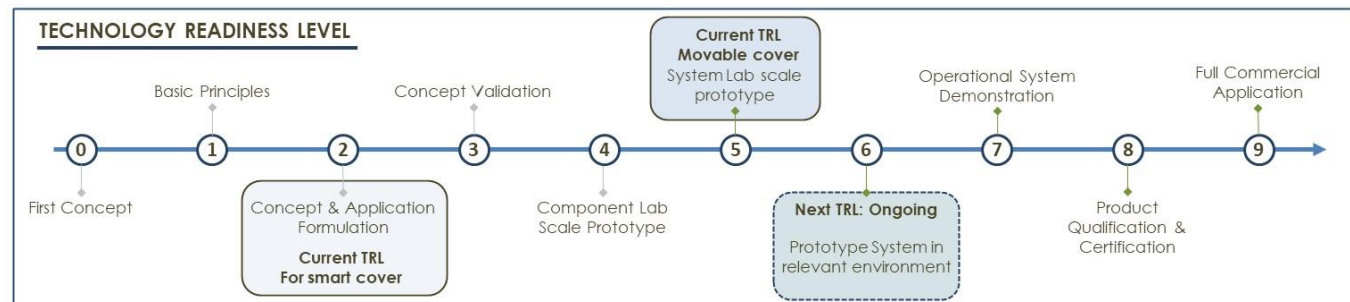


Cost-effective

The RCE would optimize the size therefore cost of the equipment

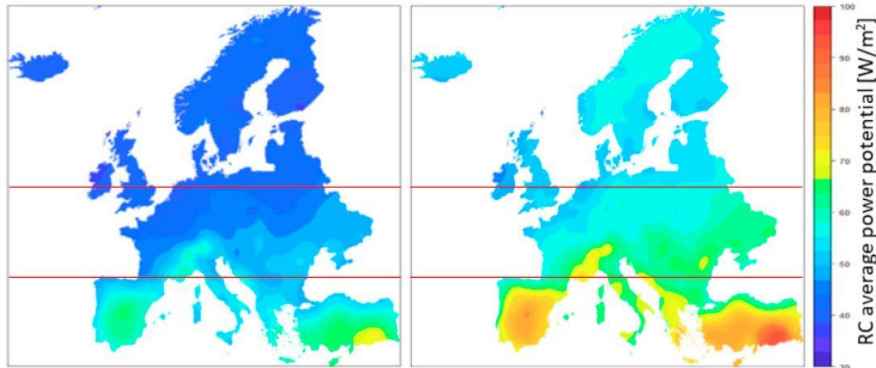
Adaptive cover with variable optical properties

SEMB → 7 years of experience



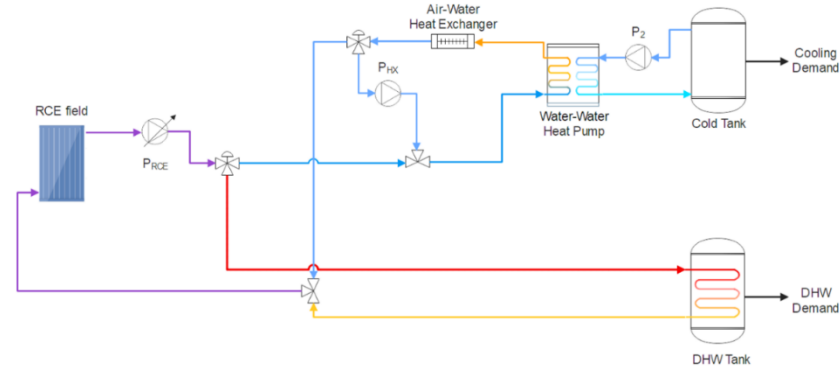
SOLUTION/PRODUCT

Radiative Collector and Emitter (RCE)



Night-time

Day-time



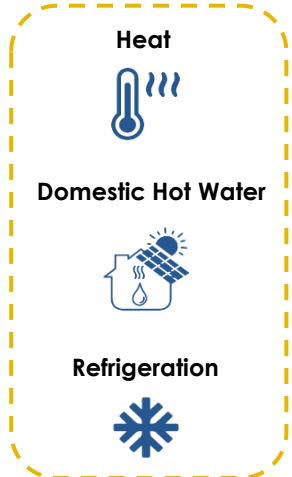
South of Europe 34.60N - 43.46N	Night-time	Day-time
Power RC (W/m ²)	57.36	72.33
Energy (kWh/m ² -year)	283.07	688.64

Cold water at sub-ambient
temperature (2-8 °C)

Market: Buildings

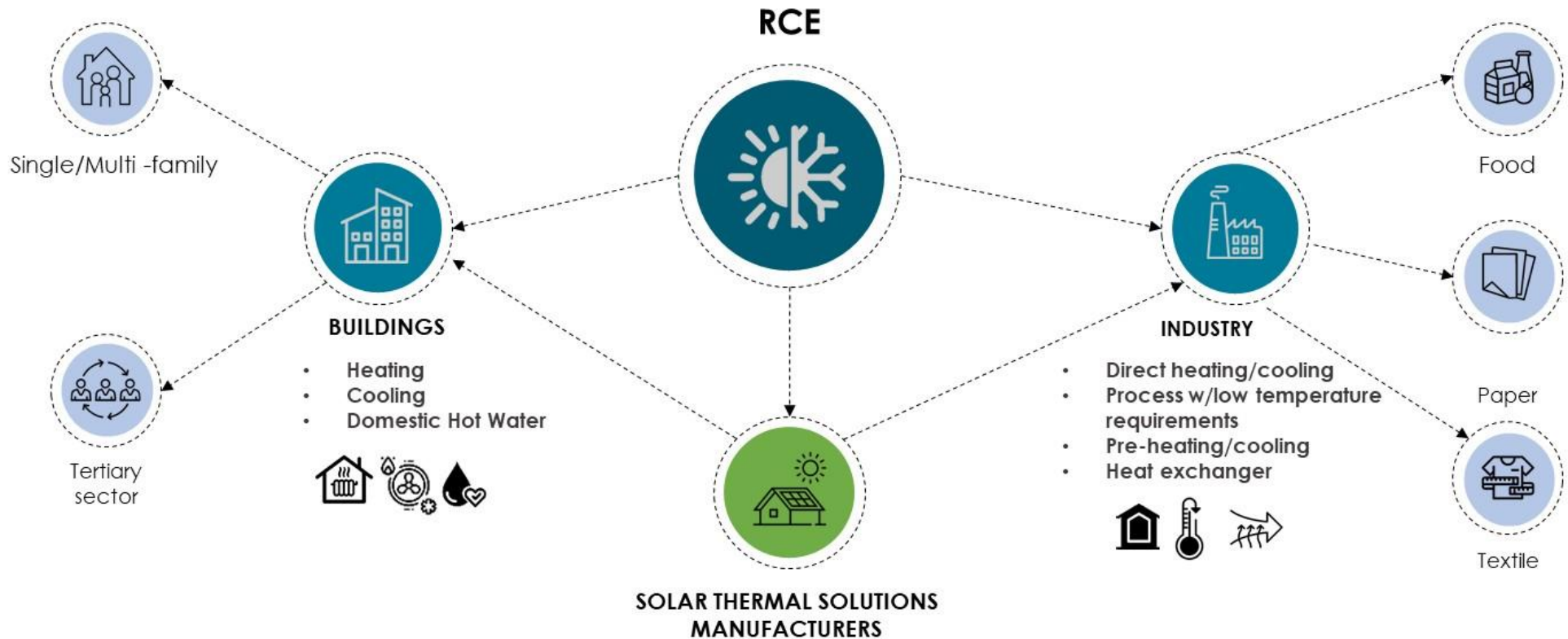
Different climates
Conventional/nZEB

- Single family
- Multifamily
- Offices
- Hotel



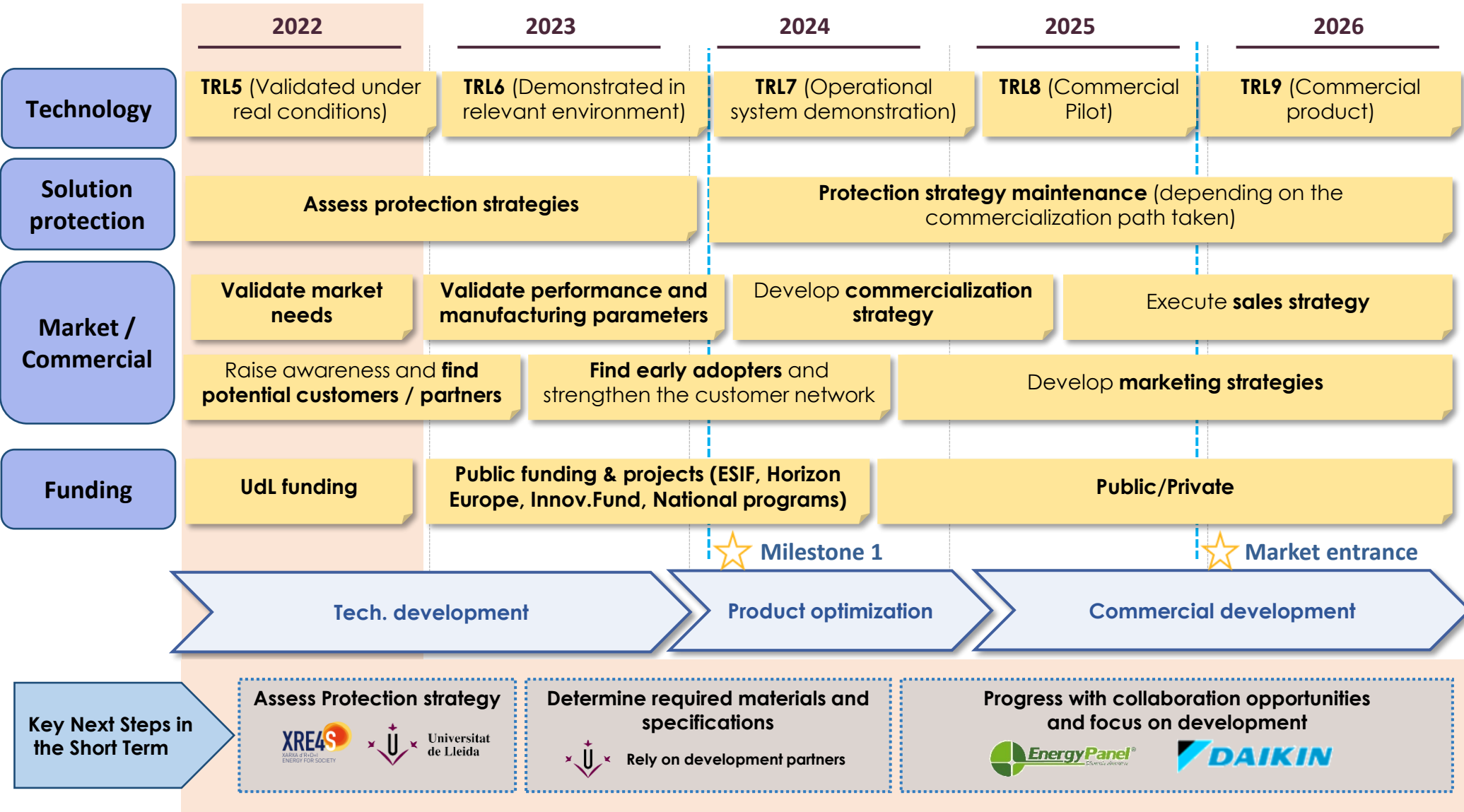
DEVELOPMENT PLAN

Radiative Collector and Emitter (RCE)



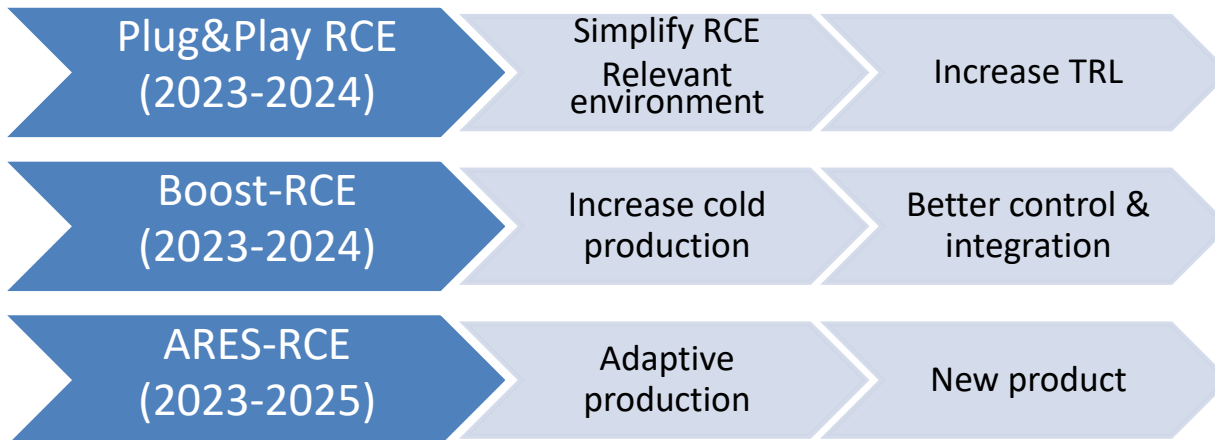
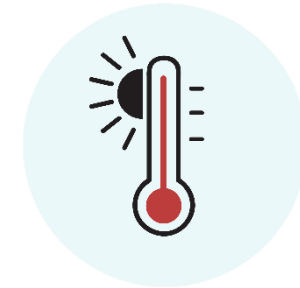


DEVELOPMENT PLAN



DEVELOPMENT PLAN

RCE – Radiative Collector and Emitter



Solar Thermal solutions
manufacturers

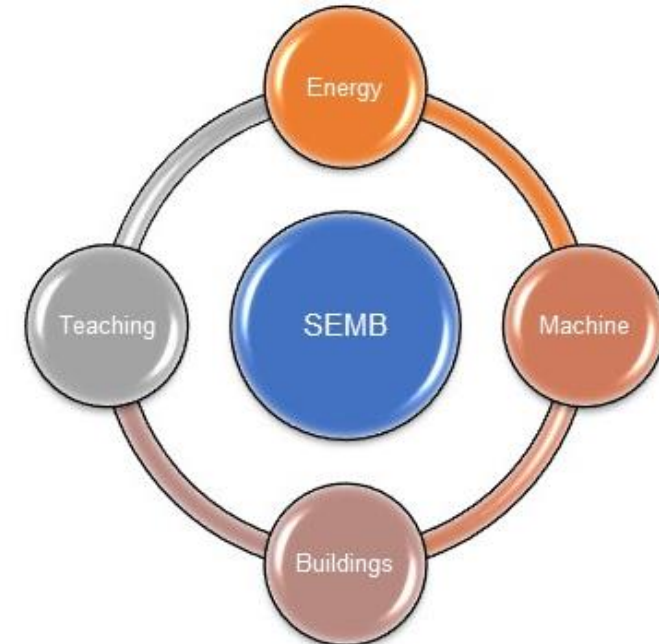
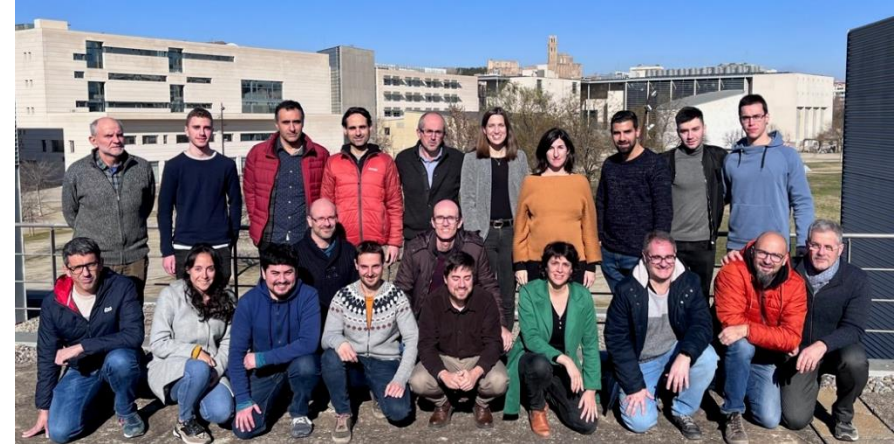


Buildings and Industry

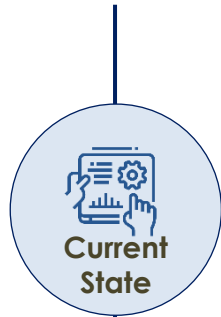


TEAM

- **SEMB** research group (Sustainable Energy, Machinery and Buildings)
- **Consolidated group (2021 SGR 01370) at Universitat de Lleida**
- **Multidisciplinary group**
 - 14 Mechanical/Industrial engineers
 - 3 Physicists
 - 2 Chemical engineers
 - 2 Architects
 - 1 Aeronautic engineer
 - 1 Agronomic engineer
- **R+D+i areas:**
 - **Sustainability in Buildings**
 - **Cooling of electronic devices**
 - **Energy Systems & Renewable Energy**
 - **Design and optimization of machinery**



FUTURE NEEDS



TECHNOLOGY READINESS

Movable cover TRL 5

Validated under real conditions.

Movable cover TRL → 6

- **Validate the technology with the market:** Test and validate the RCE connected to a real demand to verify the benefits of the technology.

Smart cover TRL 2

Technology concept formulated.

Smart cover TRL → 3

- Find **design partners in order to develop the smart material.**

FUTURE NEEDS

Demonstrator

Demonstrate the RCE product in a real application.

Developers/ manufacturers of materials

Develop and manufacture smart cover



 @XRE4S @IREC_Energia

<https://xre4s.cat/>
<https://www.irec.cat/>

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Con financiación de:

