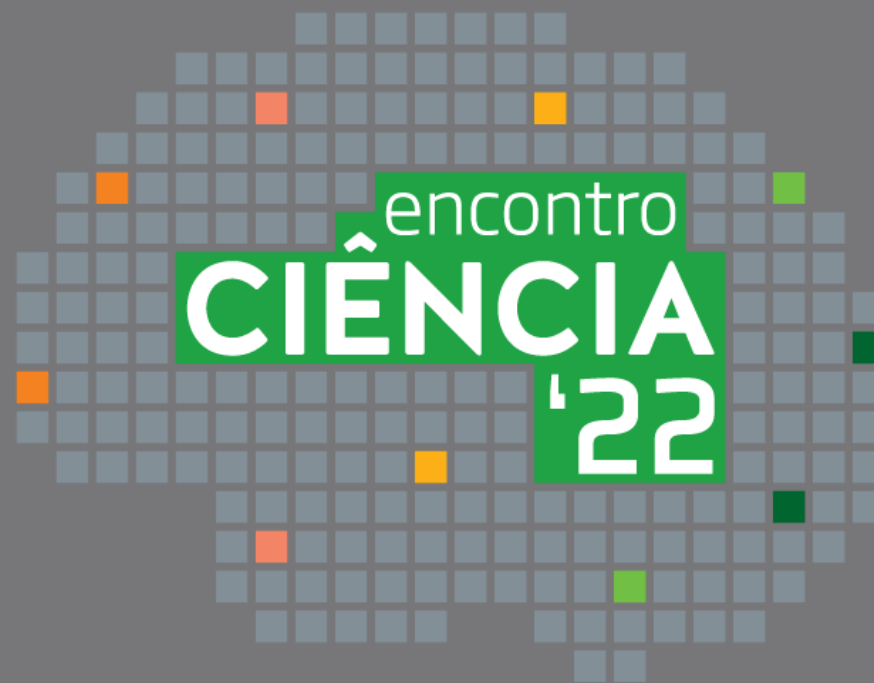




ENCONTRO
COM A **CIÊNCIA**
E **TECNOLOGIA**
EM PORTUGAL

16 a 18 MAIO 2022
#ciencia2022PT

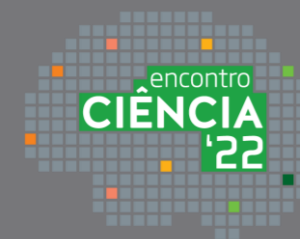
RISCO

Risks and Sustainability in Construction

Romeu Vicente & Victor Ferreira
RISCO/DECivil-UA

RISCO

Risks and Sustainability in Construction



WHO ARE WE?

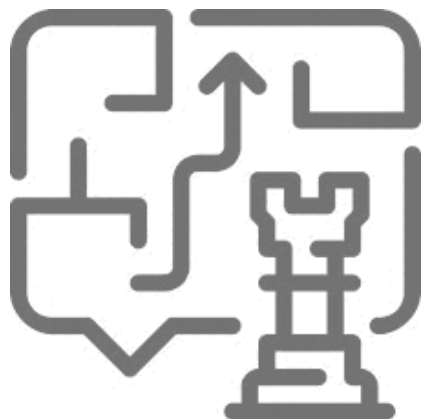


RISCO research unit

24 Integrated members
(and >30 collaborators)

@ University of Aveiro (PT)

SCOPE & STRATEGY



Risk assessment in the built environment
and mitigation measures

Sustainability in construction and **efficiency**
of resources in the built environment

Built heritage conservation and renovation

RESEARCH & DISSEMINATION



Scientific outputs

Knowledge dissemination and
transfer

Advanced formation

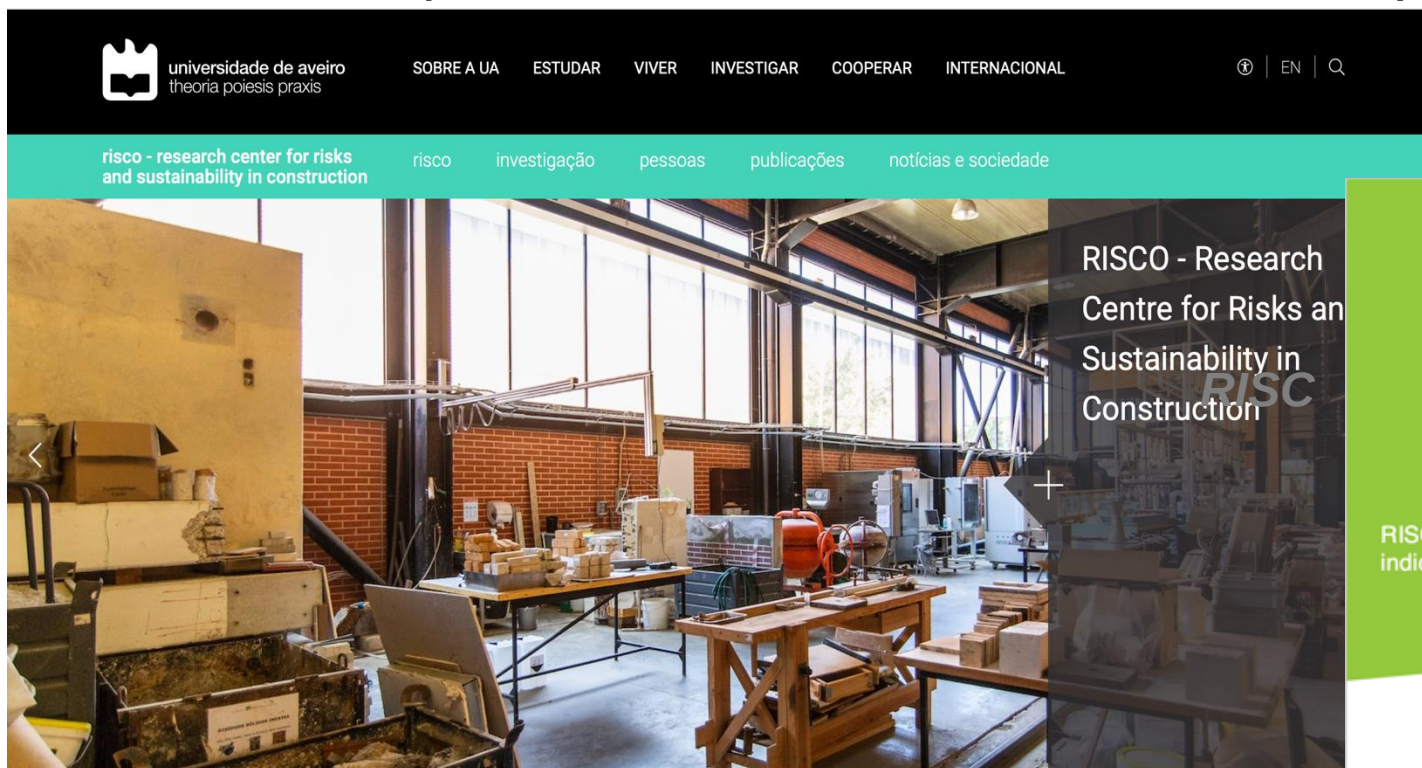
HORIZON



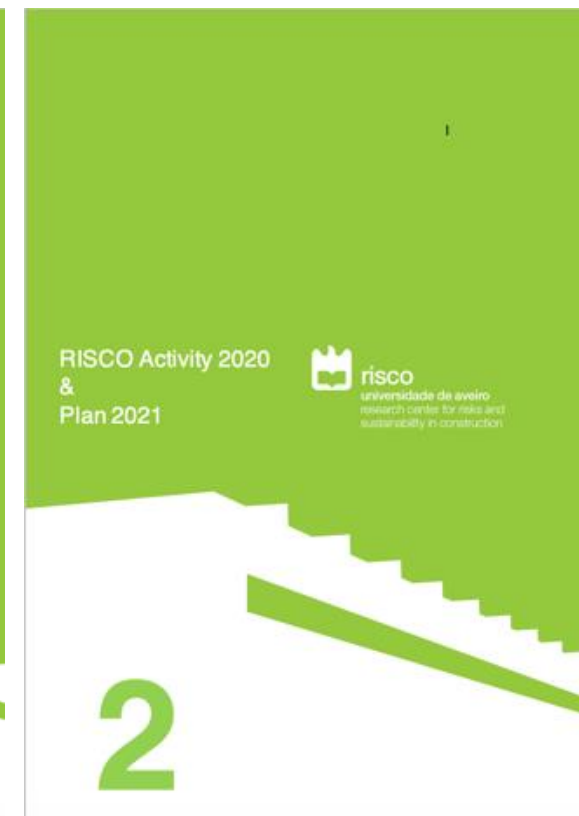
Grow through collaboration
with different stakeholders

Contributing to several **current**
and future challenges

Dissemination (Website, News and Member Profiles...)



Annual Reports on Indicators and Activities



<https://www.ua.pt/pt/risco>

National and International networks



Portuguese Association for the
quality and efficiency in building
services



Portuguese Association for
Steel and Mixed Construction



Passivhaus Zero Energy
– Portuguese Platform



Global Earthquake Model Foundation

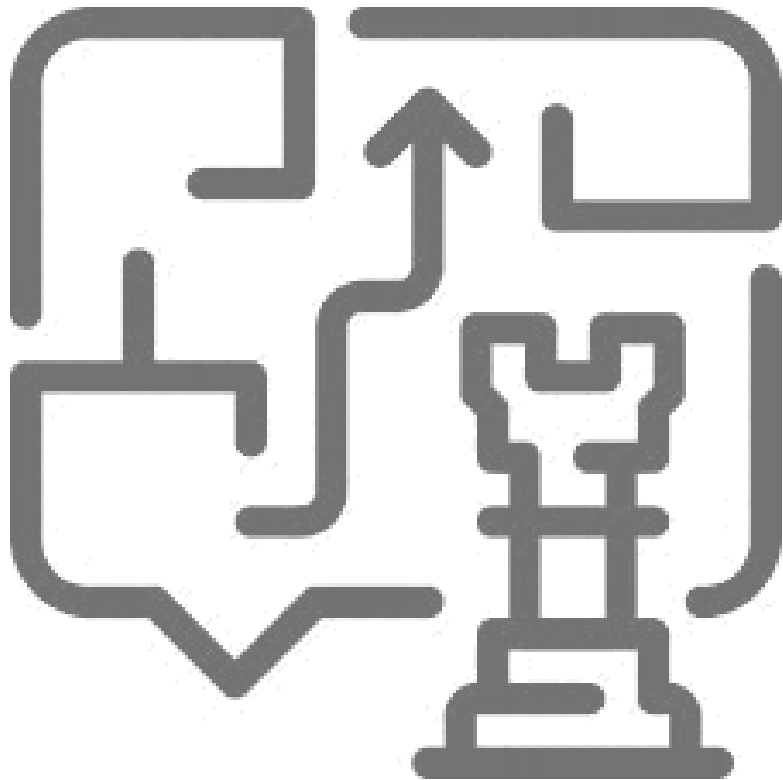


Portuguese Association of
Hydrological Resources



Portuguese Association for Urban
Rehabilitation and Safeguarding of
Heritage

SCOPE & STRATEGY

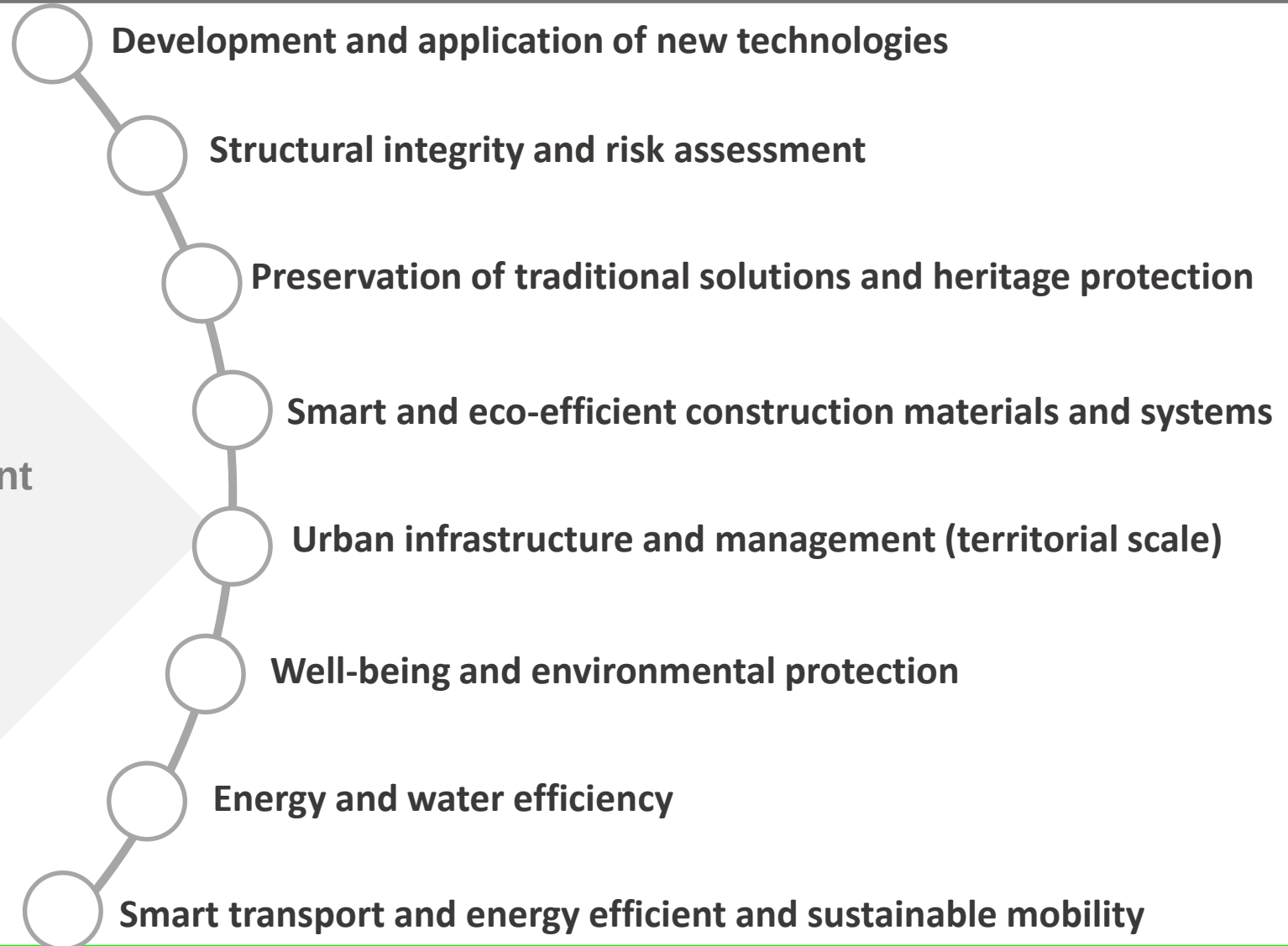


Risk assessment in the built environment and mitigation measures

Sustainability in construction and **efficiency of resources** in the built environment

Built heritage conservation and renovation

RISCO aims promote the development of sustainable and resilient cities through safe, environmentally-friendly, efficient and durable constructions and infrastructure

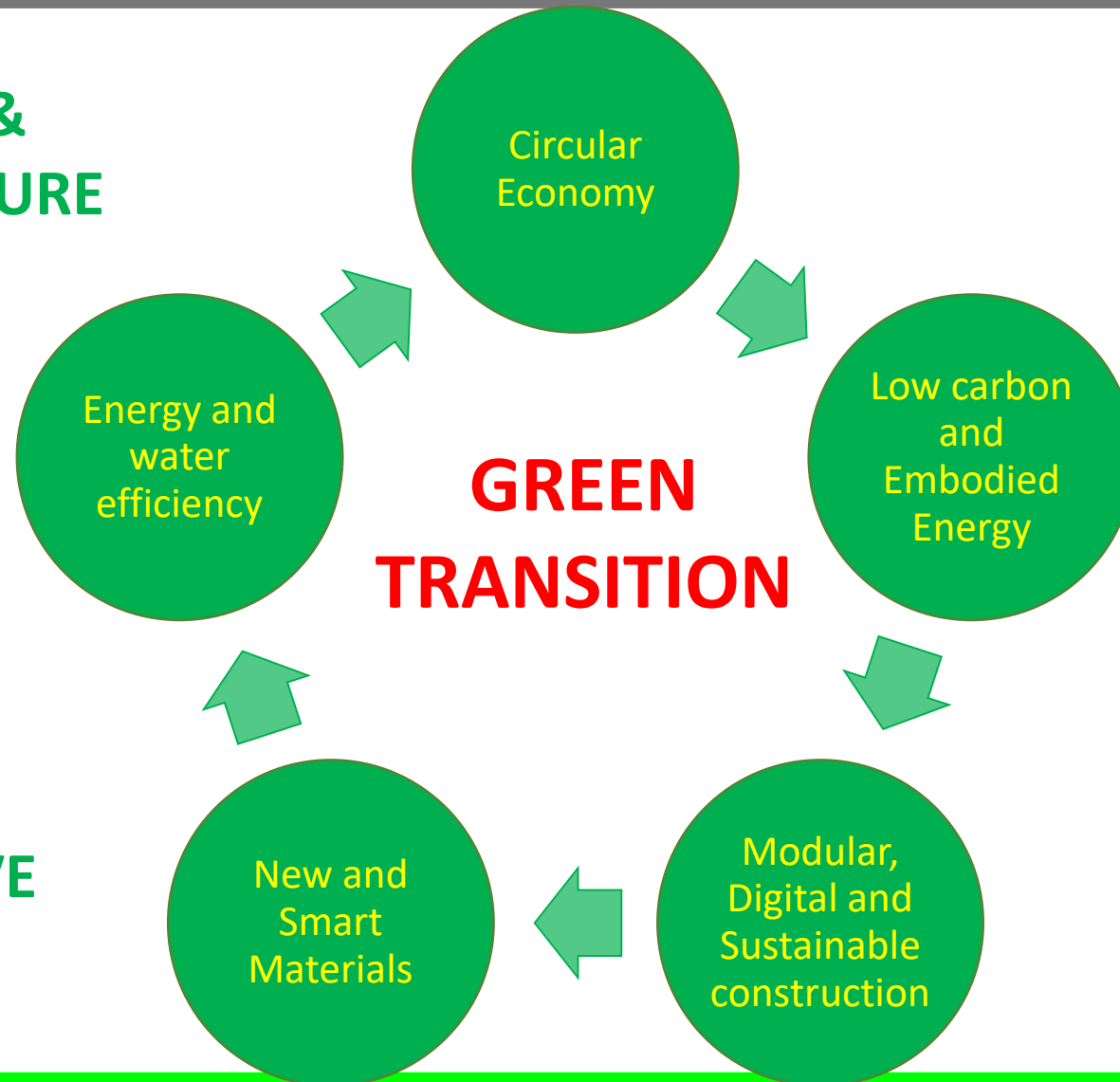


**SMART, CONNECTED &
RESILIENT INFRASTRUCTURE**

**CLIMATE
ADAPTATION**

**MOBILITY & INCLUSIVE
SOCIETY**

**WELL BEING &
HEALTHY LIVING**

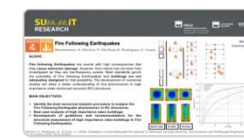
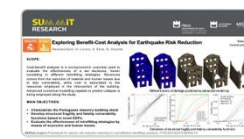
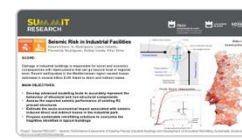
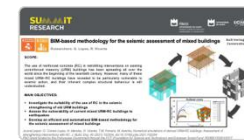
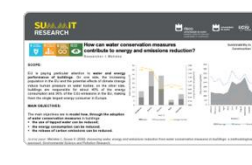
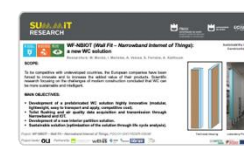
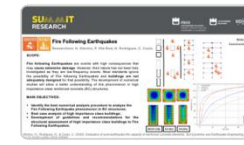
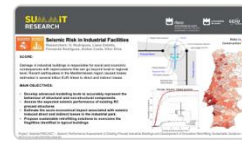


RISCO

Risks and Sustainability in Construction



risco
universidade de aveiro
risks and sustainability
in construction





Paperchain – Industrial symbiosis on paper & pulp industry wastes as alternative raw materials in construction

Researchers: V. Ferreira, M- Morais, H.Paiva, H. Maljaee

Sustainability in
Construction

SCOPE:

This work has allowed to set up in 4 different countries of Europe (Portugal, Spain, Slovenia and Sweden) **large scale demonstrators** of 5 circular cases on **waste valorization as** alternative raw materials in construction, chemical and mining sectors.

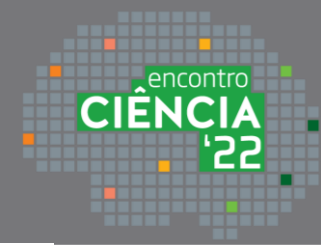
MAIN OBJECTIVES:

- Minimize the risk of huge amounts of waste landfill disposal;
- Sustainable solutions using PPI wastes as alternative raw materials in construction;
- Circular economy model studies and validation on this industrial symbiosis actions;
- Upscale and large-scale demonstration of these solutions.



RISCO

Risks and Sustainability in Construction



Coastal Erosion: how to manage it?

Researchers: C. Coelho, M. Lima, R. Pombo, P. Narra

SCOPE:

Worldwide coastal zones present serious erosion problems that cause loss of territory. This phenomenon exposes people and goods to the threat, being necessary to carry out a well-founded management of these areas.

MAIN OBJECTIVES:

- Carry out a cost-benefit analysis of intervention strategies for the Portuguese coast in short (2030), medium (2050) and long-term (2100) time horizons.
- Assess social and environmental impacts, engaging local populations and stakeholders in order to develop a participatory and economic model.
- Reduce vulnerability of coastal territories and increase resilience of local communities.





Light Steel Framing construction in the Southern European context

Researchers: E. Roque, R. Vicente, V. Ferreira

Sustainability in
Construction

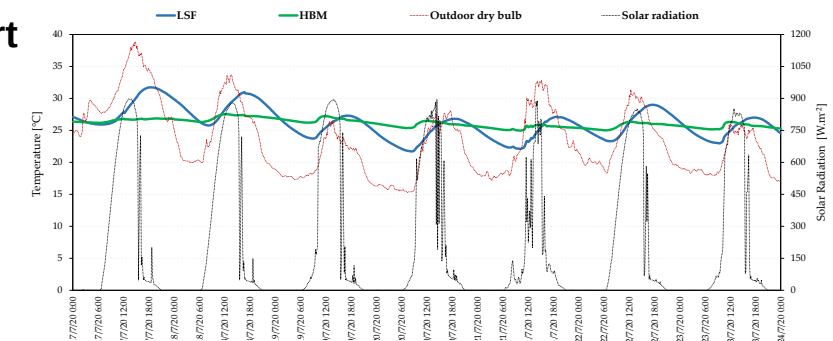


SCOPE:

Given the proliferation of the **Light Steel Framing** (LSF) constructive system for residential buildings, it is crucial to characterise how these buildings perform in the **southern European context**, in terms of **thermal comfort** and **energy efficiency**.

MAIN OBJECTIVES:

- Quantify the energy consumption required to maintain indoor thermal comfort conditions
- Assess the impact of constructive configurations on the energy consumption and comfort
- Establish and evaluate life cycle assessment and cost





Energy poverty and dependency – smarter materials and systems?

Built Heritage
Conservation



Researchers: R. Vicente, V. Ferreira, H. Rodrigues, A. Figueiredo, H. Paiva

SCOPE:

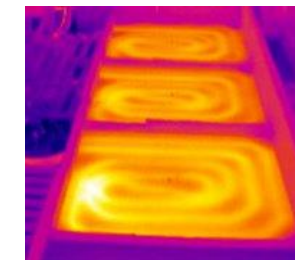
Europe is moving towards a low-carbon economy and increased awareness about environmental and energy efficiency stimulated by stringent energy efficiency standards driven by EU Energy Efficient Directive and NZEB challenge, along with development of smart digital heating/cooling technologies.

MAIN OBJECTIVES:

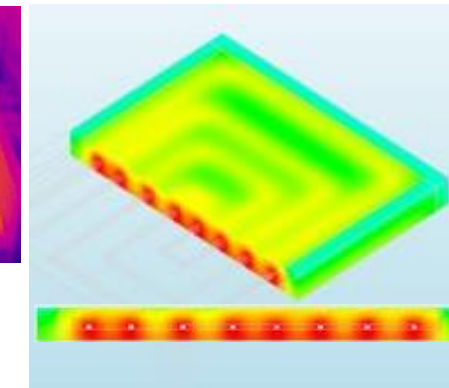
- Developing a new radiant floor system for both heating and cooling
- Incorporating of by-products from the paper pulp and steel and phase change materials
- Incorporating of a blend of phase change materials, to enhance thermal energy
- Optimization of operational conditions (smart sensing, AI and predictive control).



Sensing



Thermal imaging



Simulation and optimization



Why Built Environments for an Active, Safe and Healthy Life?

Researchers: V. Ferreira, R. Vicente

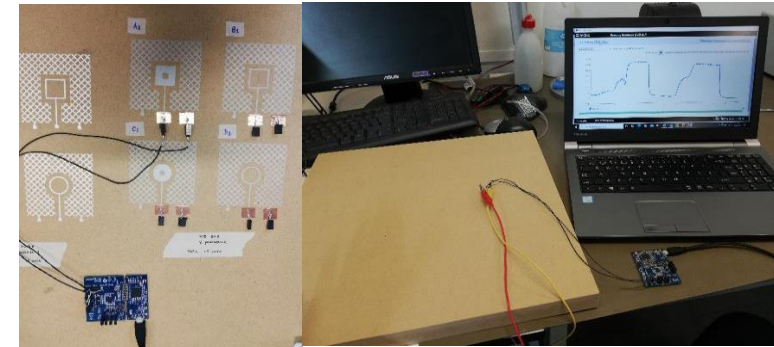
Sustainability in
Construction

SCOPE:

The decrease in young population together with the increase in the elderly one, **the aging rate will more than double from 147 to 317 elderly people for every 100 young people in 2080**. Hence, the need for **decentralized healthcare and the use of the built environment (our habitat)** as a space where the population tends to spend more time, plays a crucial role in fighting isolation and providing greater and better quality of life, together with more resilient cities (resilient Habitat).

MAIN OBJECTIVES/RESULTS:

- promote human functionality through physical and cognitive stimulation
- interaction of the built space through its digitization
- develop new materials to allow the integration of in-built sensors
- develop adaptive and transformable modular structures, furniture and equipment prefabricated modular construction systems for specific human needs



Sensors (temp, vibration, etc.)



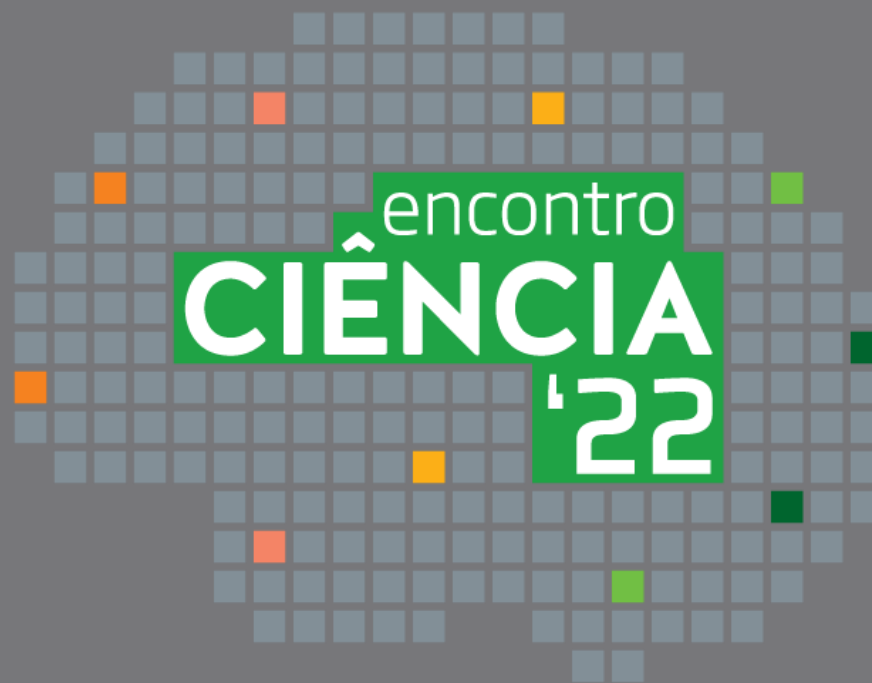
Prefabrication

with 24
entities

**SONAE
ARAUCO**
Taking wood further

ko **kentra**
technologies

IKEA



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