

NET ZERO CITIES



EU MISSION PLATFORM

CLIMATE NEUTRAL AND SMART CITIES



NetZeroCities has received funding from the H2020 Research and Innovation Programme under grant agreement n°101036519.



RENEWABLE ENERGY FOR NON-RENEWABLE HISTORIC CITIES

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THE IMPORTANCE OF HISTORIC CITIES

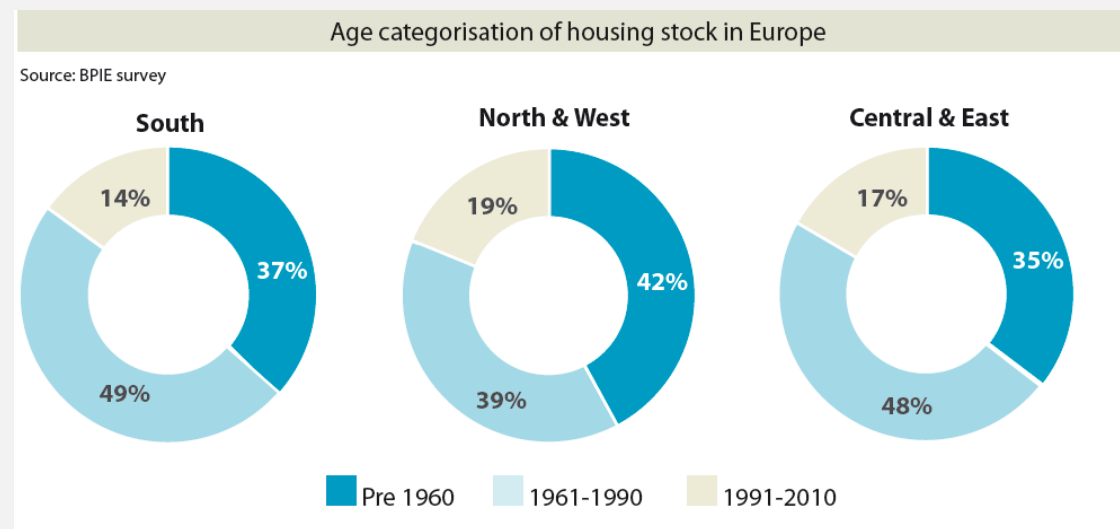


More than **40%** of our residential buildings have been constructed **before the 1960s**.

Within European building stock, **24%** of residential buildings are **pre-1945**, and about **half** of these are of historic value.

Besides, more than **120 European cities** are listed as UNESCO World Heritage Site.

We cannot achieve climate neutrality without tackling energy efficiency and introduction of renewable energies in historic cities.



THE SINGULARITY OF HISTORIC CITIES



Due to the singularity of these old buildings and urban patterns, historic materials, buildings and districts control their environment **differently from modern cities.**

Besides, **additional restrictions** with regards to non-protected buildings make that present solutions do not often fit heritage requirements.

Thus, specific approaches and solutions fitting heritage behaviour and characteristics are needed to increase energy efficiency and the use of renewable energy sources.

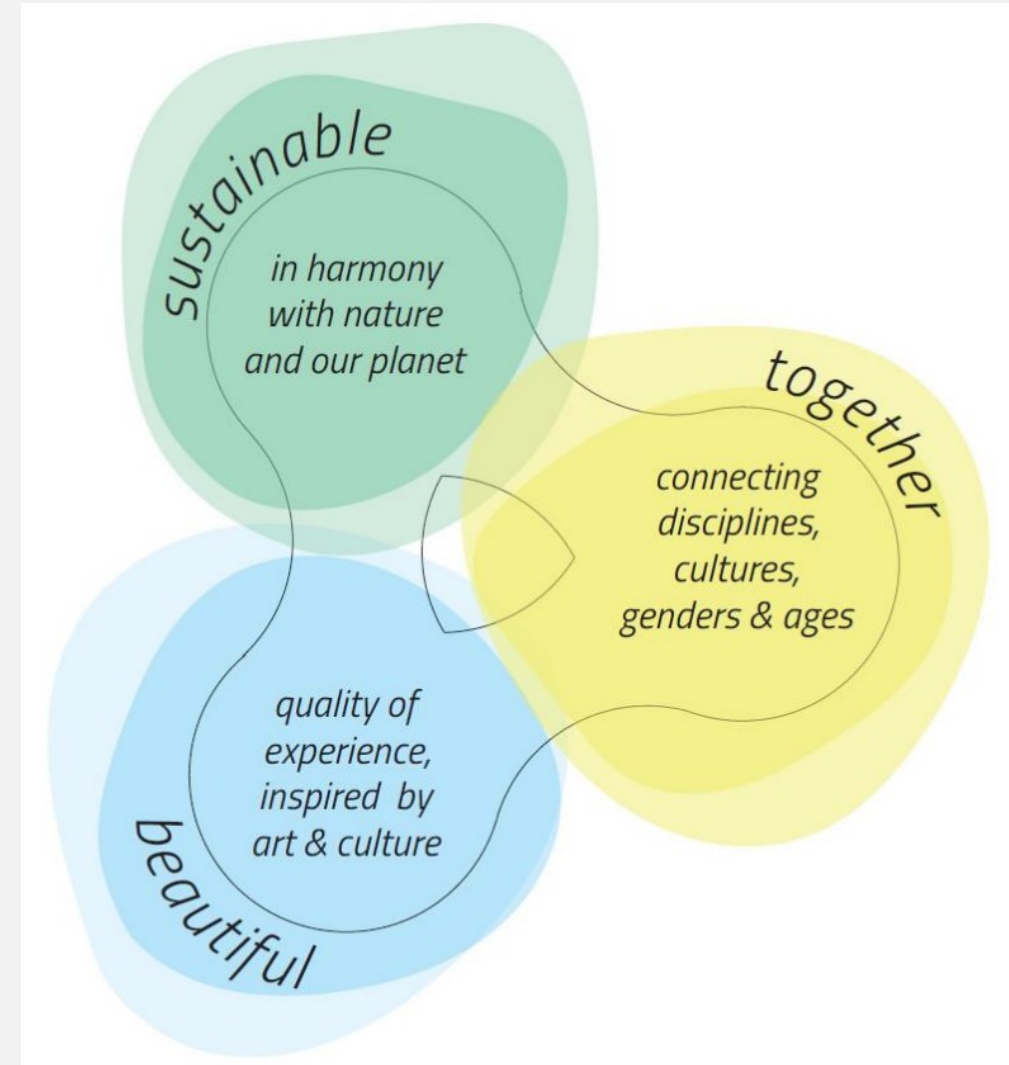


THE NEBULA PRINCIPLES

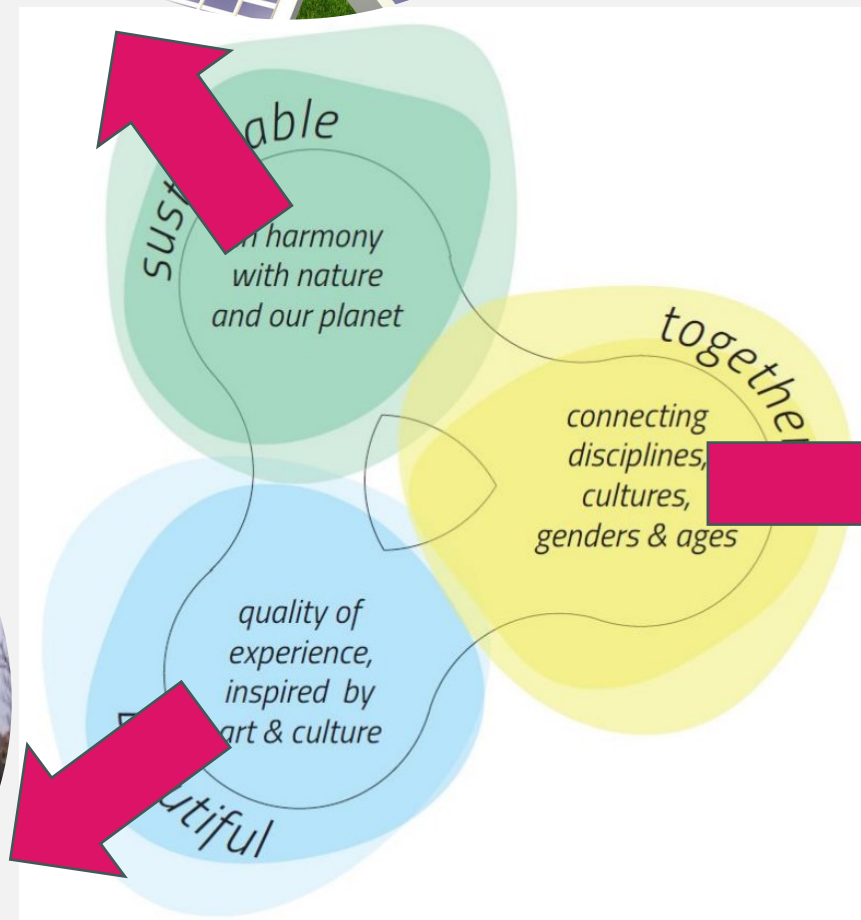
Translates the European Green Deal into tangible change that improves citizens' daily life.



"We need a positive vision, one that we can create with our own hands, wherever we live, whatever our profession. [...] The NEB will not just promote visions, but very tangible products."



THE NEBULA PRINCIPLES



EXAMPLES OF NEBULA PRIZES

AZOTEA DE XIFRÉ: JARDÍN SILVESTRE «FLOTANTE» (Spain) (2021)

5 main design objectives:

1. Heritage. Top roof of 1830's landmark, in a historical site protected under the Barcelona city heritage program.
2. Biodiversity. Mediterranean garden in a degraded area.
3. Social. Opportunities for social interaction between neighbours
4. Low Impact, thanks to the earth dunes
5. Self-sufficiency. This project uses energy, water and carbon resources in a circular way.

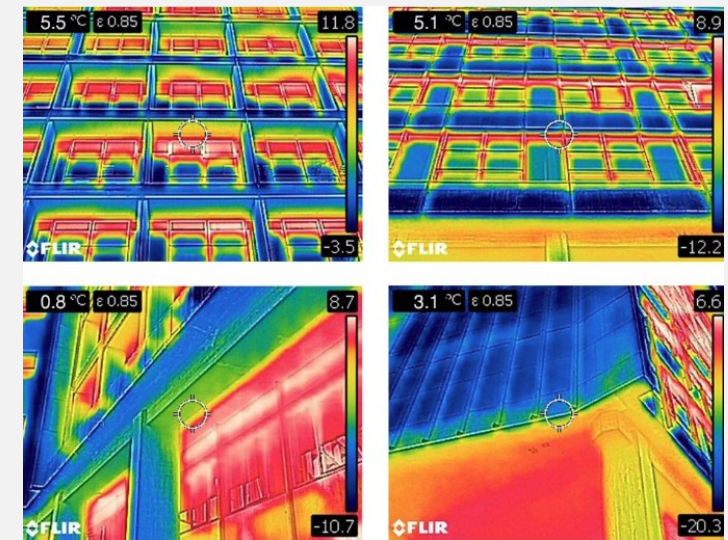


EXAMPLES OF NEBULA PRIZES

RETROFITTING THE UNESCO SITE OF IVREA (Italy) (2021)

Integrating thermal improvement of 3 modern heritage sites with architectural preservation and inclusiveness.

1. Architectural Inquiry
2. Technological analysis
3. Thermal diagnosis
4. Design proposition
5. Matrix comparison
6. Practical tool for owners



EXAMPLES OF NEBULA PRIZES

ZERO WASTE HOUSE (Slovenia) (2021)



Towards circular commons:

1. Energy efficiency: in the renovation and operation, renewable energy
2. Biodiversity and interaction with natural elements
3. Circular economy: Deconstruction and reuse of ancient materials. Local natural materials production
4. Heritage: Synthesis of heritage aesthetics and future environmental requirements
5. Self-sufficiency: in terms of fruit trees and gardens
6. Inclusiveness of local population and social uses



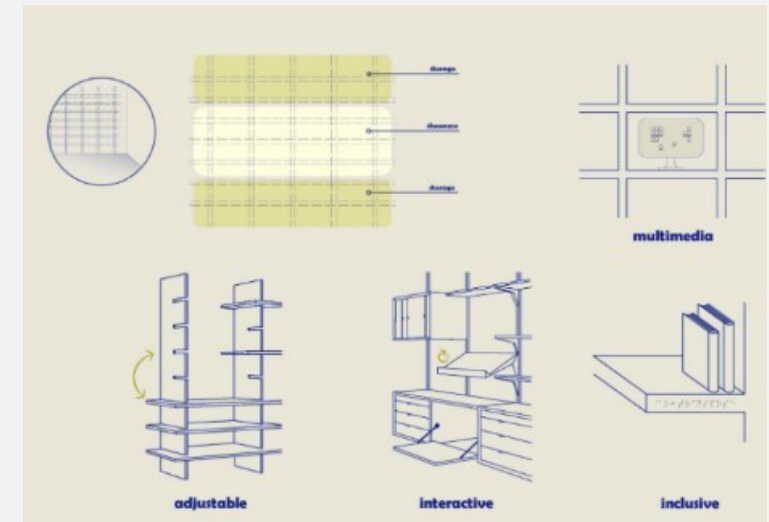
EXAMPLES OF NEBULA PRIZES

REGAINING THE SENSE OF BELONGING (Greece) (2024)



5 main design objectives:

1. Preservation and revitalization of cultural heritage of Trigono: Local traditions, stories and practices.
2. Minimization of environmental impact: locally sourced materials, energy-efficient solutions, integration of green spaces
3. Communal hub for local and international creatives
4. Generation of opportunities for the local population and reducing outmigration.



INVESTMENT OF EU RTD FUNDS IN ENERGY EFFICIENCY AND RENEWABLE ENERGY IN HISTORIC ASSETS



Objective:

Methodologies, solutions and tools to improve energy efficiency and integration of RES in historic buildings/cities while preserving cultural values.



SOLUTIONS FOR HISTORIC ASSETS



Windows:



Efficient window with new secondary glazing system for existing windows



Combined window and ventilation system

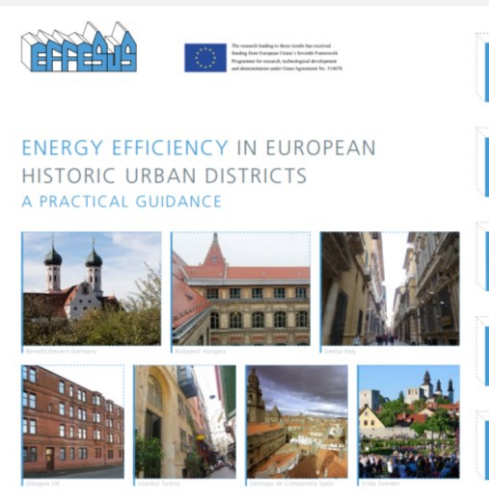


Historic wooden window retrofit protocol



SOLUTIONS FOR HISTORIC ASSETS

Thermal insulation:



Aerogels

Insulation mortars

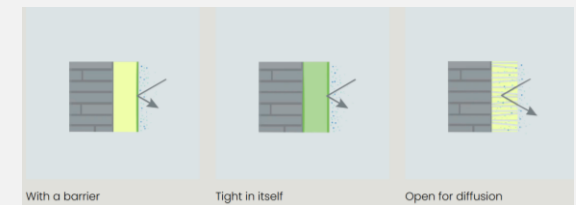
Radiant reflective coatings



Capillary active internal insulation



Natural and biobased insulation systems



Ventilated facade cladding panels with recycled materials

Guideline for selecting an internal insulation system

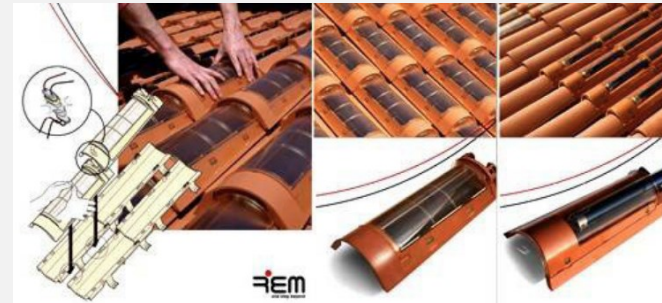


SOLUTIONS FOR HISTORIC ASSETS

Integration of RES:



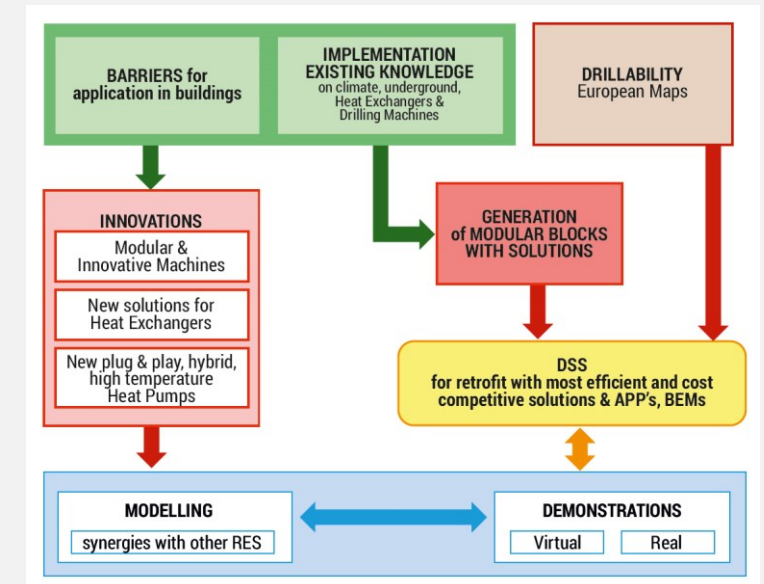
PV Roof tiles



Renewable energy integration on district level



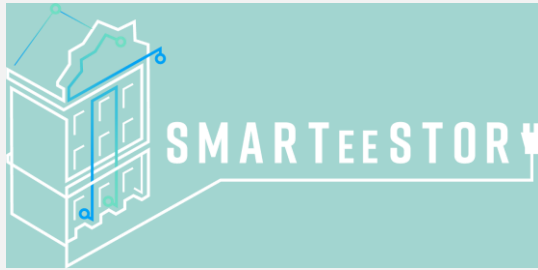
Efficient and low-cost geothermal systems



SOLUTIONS FOR HISTORIC ASSETS



Building Management & Control systems:



Integrated, interoperable, smart and user-centred building automation and control system



Decision Support Methodology for district retrofitting



SOLUTIONS FOR HISTORIC ASSETS

... many decision tools:



Get in touch with NetZeroCities!



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