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Climate and culture-based design and market valuable technology solutions for Plus Energy Buildings

Credits:

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Cultural-E in a nutshell

The CULTURAL-E goal is going a step beyond Nearly Zero Energy Buildings (nZEBs) towards the future of Plus Energy Buildings (PEBs). The team is approaching this topic by looking at climate and cultural differences in the use of residential buildings around Europe. By the end of the five years the project will have built four new Plus Energy Buildings in France, Germany, Italy and Norway.

CULTURAL-E develops technologies and solution sets that are tailorable to specific contexts and energy demands, as well as performing a comprehensive optimisation of the value/cost ratio of Plus Energy Buildings.

Sets of design-for-assembly technologies are developed through a careful mapping of European climates, building archetypes, and cultural energy habits.

Cultural differences in Europe

Previous studies have shown differences in the use of buildings depending on cultural differences and climatic zones. In fact, a Norwegian uses a different amount of energy for cooking than a French, and an Italian heats his/her house in a different way than a German. This is because climatic factors such as local temperature, weather, sun orientation, relation with the surroundings are integral parts of the design process and, inevitably, they influence the daily habits and how we consume energy.

Cultural-E tries to establish guidelines for designing PEBs in Europe taking into account these socio-cultural and climatic differences on order to enable a comprehensive optimisation of value/cost ratio of PEBs.

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CULTURAL-E is a EU-funded project, defining **modular and replicable solutions** for Plus Energy Buildings (PEBs), accounting for **climate and cultural differences**, while **engaging** all key players involved in the **building life cycle**.

Expected results

During the five years of the project the Cultural-E team will produce results in 4 areas: design tools, smart technologies, methodologies and policy recommendations for PEBs.

1 The design tools

will provide an interactive map of the different European geo-clusters in order to shape a common basis for the development of technology solutions-set for different climates and cultural factors.

2 Smart technologies

such as the cloud-based House Management System, smart hybrid ventilation system, smart air movement system, and decentralised Packed Heat Pump system will be further developed. Existing technologies such as photovoltaic/battery systems, thermal insulation materials, thermal mass activation and storage, shading systems will be further consolidated. Eight climate and cultural solutions sets will be developed.

3 Methodology and guidance

will be developed to help designers to maximise the solutions co-benefits according to the specific context. The designer will also be provided with an easy to understand and informative data visualisation for energy simulations to support the design of Plus Energy Buildings.

4 Transition from nZEBs to Plus Energy

Finally, the project intends to accelerate the transition from nZEBs to Plus Energy Buildings by providing policymakers with evidence-based policy recommendations that address cultural factors and legal barriers.