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## Title: Technological Dimensions of Near Zero Energy Building Design

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### **Proposal**

Today the concept of energetic sustainability besides the reduction of energy consumptions or polluting emissions, and the raising of production from renewable sources, needs a larger and more complex "convergence" between material and immaterial technological innovations, which characterize the processes of production, transformation, and consumption of energy.

This convergence replaces to the classic esthetical vision of the building process (at architectural, urban or territorial level) an integrated design vision, in which technological innovations play a key role in the redefinition of transformative dynamics of the built environment and its energy performance.

It is now crucial to think the built environment as a co-evolutionary system between artificial and natural elements to achieve the goal of Near Zero Energy Building process.

Referring to this new vision, the technological innovations could be re-localised to the centre of policies and strategies for energetic supply and reduction of greenhouse effect, predicting a radical change of the design process through the involvement of sectors not only related to the energy aspects, but also to environmental technologies, urban transport, information and communication systems.

Research and experimental projects centred on the multiple technological dimensions of the energy sector can thus advance a new inhabiting culture where users and communities become energy prosumers.

Focusing on a renewed relational framework that empowers local communities to the global energy needs, this role can thus become the main vector to move from the traditional building object to a Nearly Zero Energy architectural system. This design innovation can also activate intelligent networks of urban and territorial components (Net Zero Energy processes), and the development of complex architectures based on passive technologies and positive energy capabilities.

This special issue intends to explore the international research experiences that are focusing the challenges of technological innovation to rethink energy variables in the new buildings, in the retrofitting of existing built heritage, in the field of governance of energy resources, and the development of environmental sustainability protocols for smart communities.

The themes that can be addressed in the special issue are:

- the process and project variables to improve energy efficiency standards;
- the enhancement of the passive bioclimatic aspects of the building;
- the reduction, rationalization and optimization of primary energy consumption through technological and space innovation of the building;

- the processes of production, sharing and networking of the renewable energy sources for the development of smart communities and cities;
  - the integration of innovative technological solutions into the built environment and the possible innovative use of traditional solutions;
  - the future design scenarios according to a holistic view based on the building-city-territory integrated system;
  - the use of auditing, monitoring, controlling and managing technological systems for the improvement of energy and bioclimatic behaviour of architecture, settlements, and the city.
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