

GreenGypsum: energy efficiency in construction

Innovative construction material based on gypsum that can reduce energy consumption up to 40%



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Technological Offers type

[Technological solutions](#)

Research and innovation areas

- [Climate, Energy and Mobility](#)
- [Industry, Materials and Circular Economy](#)

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Where?

[Bioclimatic Architecture in a sustainable environment - ABIO](#)

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Brief description of the technology solution and the added value it provides

Energy consumption reduction in buildings is necessary (40% of global consumption), so researchers from the Architecture School of the Technical University of Madrid (UPM) have developed a new construction material based on gypsum boards that can reduce energy consumption up to 40% in buildings and also contribute to reduce CO2 emissions. This solution, experimentally tested and patented by UPM, takes advantage of the benefits and accessibility of gypsum as a base. Spain is an European and global leader in manufacturing and exportation of this material. The business opportunity is focused on the energy efficiency scope applied to construction: it is estimated that every invested dollar implies \$2 in energy savings.

Description of the technological base

The proposed solution enables the creation of a gypsum board with thermal energy storage capacity. Thanks to the addition of phase change materials, this new constructive element can storage, in 1,5cm of thickness, 5 times the thermal energy that can be stored in a regular board with the same thickness.

The PCMs are materials which store or release thermal energy as latent heat, achieving the same effect as a thick and heavy wall with a great thermal inertia. The integration of PCMs made of gypsum oriented to construction is not new, but this solution has 45% of these materials compared to the 26% for currently commercial products.

“This patented solution is able to maintain the premises temperature in the confort range (20°C-30°C) without air conditioning”

Market demands

- According to current projections, 70% of the world population will live in cities by 2050.
- According to forecast, up to 2020, global energy demand will grow 2.2% annually, most of it in the developed world.
- Investment in building energy efficiency would release this scarce resource for other purposes.
- The need for energy savings in buildings. According to the European Union 20/20/20 objective, it is estimated that 40% of European energy consumption is concentrated in buildings .
- Lack of material and energy resources and need for consumption optimization in the construction sector.
- Energy consumption in buildings is responsible for about 30% of CO2 emissions.
- China will concentrate 50% of new construction between 2008 and 2015, being a key factor in its commitment of greenhouse gases emissions [McKinsey]
- Although they have proven to be less costly for governments and investors strategies, current efficiency policies in construction often receive less attention than renewable energy projects.

“Spain leads the gypsum manufacturing and exportation industry, which is the material base of this solution”

Competitive advantages

- The thermal energy storage in combination with passive strategies (sunlight, natural ventilation ...) reduces building energy consumption up to 40% .
- Short amortization period of the initial investment: 1 or 2 years.
- High availability of gypsum, widespread use in construction and low cost.
- Compliance of the Spanish Physical and mechanical performance regulations.
- Results from experimental tests conducted to meet the physical, mechanical and static properties.

Development stage

- Concept
- Research

- **Lab prototype**
- Industrial prototype
- Production

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