

ReNaturalNZEB LIFE PROJECT SUMMARY.

Project objectives:

1 Develop a model of nearly zero energy building social house with low carbon footprint and low cost using green and circular economy criteria. This new model will use only natural and recycled materials in its construction and will be only 50% more expensive than the current standard. The natural products used must have low industrialization and they are used as raw as possible.

2 Introduce sustainable construction materials and technologies "close to the market" such as kenaf and rice husk insulation, biomass ash concrete structure, green roof and façade and others

3 Promote sustainable construction technologies with low market rate such as wood structure, windows and finishes, compressed earth block structure, cork insulation, olive kernel biomass, clay wall panels and others

4 Build 10 prototypes in existent and new buildings with natural and recycled technologies selected in the project. They have different typologies, sizes and uses to check the viability of those technologies.

5 Develop technical documentation and urbanism regulations to habilitate and promote the use of construction technologies based on natural, recycled and indigenous materials. They will comply the current construction regulations and CE marks as well as green labeling according to Europe law.

6 Decrease the environmental impact of the buildings construction and rehabilitation using recycled and natural materials during construction and building use. **The average reduction is 80%** compared with the current standard.

7 Decrease the energy demand in buildings using envelopes made with natural materials and/or recycled. The energy demand of the building will be 10% of the average in Portugal and Spain building stock. This demand will be lower than the recommendations published by EU in 2016/1318 (29th of July 2016) for Mediterranean countries: 0-15 kWh/m² year for dwellings and 20-30 kWh/m² year for offices

8 Dissemination of proposed technologies. Hosting workshops, courses, technical talks and ads in media highlighting the long term environmental and economical advantages compared with the current construction standards

9 Promotion and dissemination of nearly zero energy buildings in Portugal and Spain. Visiting the prototypes, promoting their replication and the use of the technologies with low carbon footprint and circular economy criteria

Actions and means involved: (to include more)

- INNOVATION CENTER AND BUILDING QUALITY EDEA: Center where tests were carried out laboratory and real scenario of materials and innovative technologies. It is a proper center of the Junta de Extremadura. (For more information about this center www.proyectoedea.com/es/doucmento-y-videos/videos).

- TRAINING CENTERS OF FUNDACION LABORAL DE LA CONSTRUCCION (FLC):The "Fundación Laboral de la Construcción" provides centers for training and dissemination tasks included in the project.

- NATIONAL NETWORK OF FUNDACION LABORAL DE LA CONSTRUCCION (FLC):It is available to the network project outreach and online training of the Fundación Laboral de la Construcción (www.fundacionlaboral.org)

- CICYTEX and CTAEX laboratories. Material characterization and environmental documentation will be prepared at these headquartes.

- OPEN SOURCE SENSOR SYSTEM. EFICIEEX.

EFICIEEX sensor system will be used to acquire real-time data and user awareness in the pilot sites and workshops. This system was developed during LIFE09 EDEA RENOV project. (www.renov.proyectoedea.com).

- BROADCAST NETWORKS CHANNELS OF JUNTA DE EXTREMADURA The Junta de Extremadura will provides different broadcast through social networks and communication channles with the central governments of Portugal and Spain, municipalities and directly to the population.

Expected results (outputs and quantified achievements):

ENVIRONMENTAL RESULTS:

- **Reduction of 90% of embedded energy in the construction and rehabilitation of 10 pilot buildings** using innovative construction technologies based on **natural and recycled materials with low industrialization**. (From 1100 kgCO/ m² year to 150 kgCO/m²)

- **Reduction of 80% of energy demand and consuption during the building use** compared with the average of the building stock in Portugal and Spain. (From 100 kg CO₂/m² year to 20 kgCO₂/m² year).

- **Reduction of 50% of the wastes produced during construction** of the building compared with current standard in Portugal and Spain (from 280 kg/m² to 110 kg/m²)

- **Reduction of 50% of the weigth of the building** compared with current standard in Portugal and Spain (from 800 kg/m² to 430 kg/m²)

SOCIAL RESULTS:

- **10 direct employments created** related to the development and application of the green technologies supported by the project.
- **1500 technicians** trained to design nearly zero buildings according to the EU regulations in Spain and Portugal with low carbon footprint.
- **500 building workers** trained to develop buildings using the technologies selected in the project.

MATERIAL RESULTS:

- **10 prototypes of new buildings or rehabilitated buildings** using technologies based on natural and recycled materials.
- **5 technical documents** to allow the use of the "close to the market" technologies selected in real buildings
- **5 urban regulations** including the use technologies based on natural and recycled materials in construction and urbanism.
- **3 environmental and economical studies** about the viability of technologies based on natural and recycled materials in construction.
- **10 practical workshops** for the use of technologies based on natural and recycled materials in construction.
- **6 courses of sustainable technologies** for technicians and professionals, including the integration of women in construction field.
- **30 seminars in CICE-EDEA** for dissemination of sustainable buildings in educational area.
- **10 dissemination guidelines** for non-technicians to learn how to build and rehabilitate buildings using the selected technologies and the beneficiaries associated to them.

Is your project significantly climate-related? Yes

The project focuses on improving the sustainability of construction field enhancing and augmenting the use of natural and recycled materials in buildings. The project will reduce emissions of greenhouse gases from construction and use of buildings. Also this project promotes the reduction of resources and the use of natural and non-industrialized materials.

The emissions decreased and the resources reduction has environmental and climate benefits side effects. Also the project actions take into account European Directives, National Strategies and Climate Change Strategy of Extremadura.

The main climate regulations that are contemplated for the realization of this project are:

- Strategy for adaptation to climate change in the EU COM/2013/2016
- National Strategy for Climate Change Adaptation in Portugal (n.º 24/2010)
- National Plan for Adaptation to Climate Change of the Government of Spain.
- Roadmap of Diffuse Emissions Sectors 2020 for the Government of Spain.
- Climate Change Strategy 2013-2020 Extremadura.

Project activities related to climate are:

Climate change mitigation:

- Energy saving in buildings through the use of more sustainable technologies.
- Production of energy using renewable technologies.
- Reducing emissions through the use of low carbon footprint materials instead of industrial materials in construction.
- Reduction of emissions through awareness and training of technicians and population about the low carbon alternatives in construction fields.

Adapting to climate change:

- Increasing the circular economy and green economy through the use of natural and recycled materials in construction field in the regions participant in the project.
- Promotion of the use
- The use of agriculture sub-products and wastes substituting industrial materials is a smart adaptation to the climate change.

Does your proposal address any of the following project topic(s)? (Maximum 2 topic(s))

Urban environment - integrated and comprehensive policies for sustainable urban planning and design

Projects implementing integrated and comprehensive policies for sustainable urban planning and design through innovative approaches regarding urban public transport and mobility, sustainable buildings, energy efficiency or urban biodiversity conservation

1- The project **reduces the CO₂ emissions and wastes produced by the construction and buildings "during use"** through promotion and development of technologies based on natural and recycled materials.

2 - The project develops the needed works to **introduce sustainable construction materials and technologies "close to the market"**

3 - The project promote the use of **sustainable existent construction technologies with low market rate**

4 - The project improves the **energy efficiency of the buildings** using **uncommon and innovative** natural and recycled insulation materials.

5 - The project introduces **a new variety of sustainable building**: a Nearly Zero Energy Building using natural and recycled materials to comply the EU Directive 31/2010 promoting the circular economy and low carbon footprint construction.

6 - The project develops **technical documentation** for natural and recycled materials and technologies to use them in real buildings **according to EU and national legislations**.

7 - The project develops **environmental and impact studies of the natural sources of the natural materials used in selected technologies**. These tasks will allow to know the sustainability and production possibilities for a correct market introduction of the technologies selected.