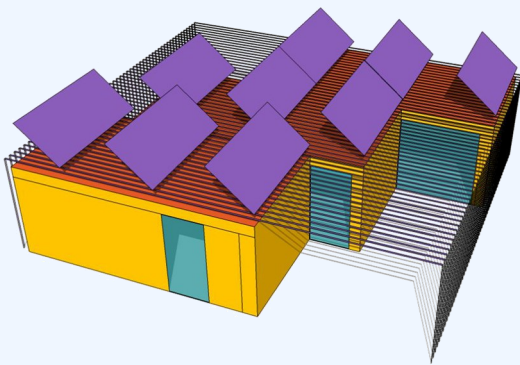


# SUSTAINABLE BUILDINGS AREA

## EnergyLab Description

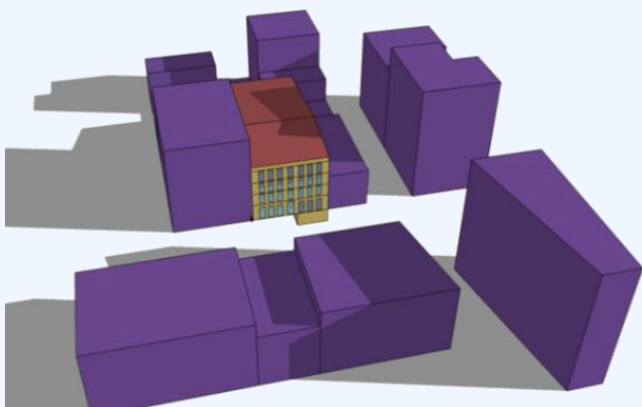
EnergyLab is a private technology centre specialised in energy efficiency and sustainability. It is a non-profit private entity set up in 2008 as an initiative of the industry and the Regional Government.

EnergyLab identifies, develops and promotes technologies, processes, products and consumption behaviours able to contribute to the improvement of the energy efficiency and sustainability through its applications in industry, domestic products, mobility and buildings.



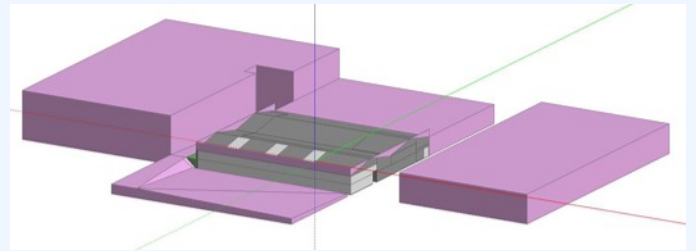
In 2014, EnergyLab was recognised as National Technological Centre by the Ministry of Economy and Competitiveness and it is member of ATIGA (Galician Technological Alliance) together with other five Galician centres.

EnergyLab's staff is highly qualified, with large experience on international projects development, and a 38% rate of PhDs.



## Introduction

The building area is focused on efficient technologies for heating, cooling and lighting in buildings to deliver Energy Efficient and nearly Zero Buildings (EEB&nZEB).



EEB are achieved by implementing and optimising building and district concepts that have the technical, economic and societal potential to reduce energy consumption and decrease CO<sub>2</sub> emissions, both in new and existing buildings.

## Main Areas of Work

The main areas of work in the building area are aligned to more efficient buildings and geothermal energy development.

- Heat pump technology development for heating and cooling in buildings.
- Geothermal systems aligned with heat pump uses.
- Energy storage solutions for building and districts conditioning.
- Nearly zero energy buildings (nZEB) with renewable energies and energy storage.
- Monitoring and data processing in buildings for energy efficiency.
- Calculation of Carbon Footprint and environment impacts by LifeCycle Assessment (LCA).

## R&D Technical Capabilities

### Software

Building Energy Simulation to estimate the energy demand and to evaluate energy savings in the new building's design or in a building restoration.

- Design builder software (EnergyPlus). Advanced energy simulation software with modelling technology to reduce a building's impact on the environment.
- TRNSYS 17 software. Graphically based software environment used to simulate the behavior of transient systems
- Simapro software. Tool for quantification of environmental impacts of the whole life cycle, to determine CAPEX and OPEX and perform sensitivity analysis.
- Ansys Fluent. CFD Analysis for temperature distribution, interior airflows, natural ventilation, HVAC in buildings and subsystems.

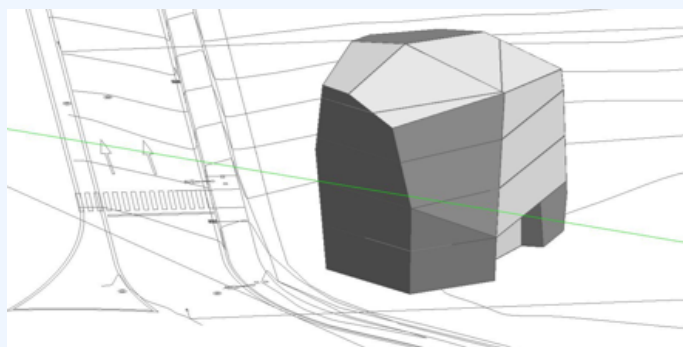
### Technological skills

- Improvement of heat pump system's uses.
- Optimisation of geothermal systems for building air conditioning.
- Research on the energy storage systems.
- Training of energy efficiency and sustainability.

## R&D Projects

- GeoAtlantic: Boosting local ecosystems for the use of geothermal energy in the communities (Atlantic Area Project).
- Domestic hot water applicability and introduction combined with heat pumps.
- OP Trigen. Trigenation in industrial environment study and optimisation.

- LIFE OPERE - efficient management of energy networks. Energy Management System development, implementation and optimization of thermal and electrical networks in existing buildings with large energy consumption.
- LIFE-LUGO + Biodinámico. Design and construction of a Net Zero Energy Building in the city of Lugo. Analysis of local renewable generation and reduction of building energy consumption in a cross-laminated timber building.



- Solar Decathlon Europe. Novel building conditioning systems based on Phase Change Materials.

## Research Lines of Interest

- Energy efficiency simulation for different novel materials and innovative solutions under different climatic conditions.
- Local interior environmental quality for high efficiency buildings.
- Techno-economic assessment of novel EEB solutions.
- Standard and quality fulfilment of innovative EEB developments.
- Remote inspection technologies for energy efficiency evaluation of buildings.
- Thermal energy storage systems, including phase change materials.

