



Education and Culture DG

Lifelong Learning Programme



**eurocrea**merchant  
consulenza direzionale d'impresa



# ENEf

## ENERGY EFFICIENCY IN THE BUILDING SECTOR: A SUSTAINABLE FUTURE

Project number: 510198-LLP-1-2010-1-IT-LEONARDO-LMP

Funding Programme: LLP - Development of Innovation – Leonardo da Vinci

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## THE CONSORTIUM

- EUROCREA MERCHANT SRL – Italy
- INNOVATE – Ireland
- SPISSKA DEVELOPMENT REGIONAL AGENCY – Slovakia
- FRIEDRICH ALEXANDER UNIVERSITÄT ERLANGEN NÜRNBERG,  
INSTITUT FÜR LERN-INNOVATION – Germany
- IDEC – Greece
- VICOMTECH – Spain
- DIRECCION DE ARQUITECTURA – REGIONAL GOVERNMENT OF  
EXTREMADURA – Spain
- BULGARIAN CONSTRUCTION CHAMBER – Bulgaria

# THE BUDGET

**TOTAL PROJECT EXPENDITURE: 326.546 €**

**TOTAL PROJECT GRANT: 262.053**

# ENEF PROJECT

EnEf is a two year project aiming to improve energy efficiency in buildings, by alleviating the lack of knowledge of entrepreneurs and managers of the building industry.

This is achieved by **creating** an **innovative training system** accessible by an **e-Learning platform** and **enriched by visual elements**, simulations and interesting practices in building industry.

# VIS-EDUCATION

The project intends to be innovative in the way the training is delivered: the consortium uses the new-coined word “VIS-EDUCATION”, a **matching of traditional education and visual interactive elements** that makes learning faster, more attractive, and memorization of contents more effective. The innovation in learning is assured by the interplay of:

- ☐ an e-learning platform providing **flexible learning modules and test for self-evaluation**
- ☐ a **3D simulation tool** linked to the contents and giving instant feedback about the efficiency of energy-saving measures in a building that the learner can modify interactively.



## TARGET GROUP

Target group of the project are **entrepreneurs and managers of the building industry, employing up to 50 persons**, which are the vast majority of the companies of the sector, one of the largest in Europe and a major motor for development.









## ENEF MODULES – THE TRAINING PLATFORM

[Content](#) [Info](#)


**Categories**

-  **Downloads**  
All learning modules as an offline version
-  **tests**



**Learning Resources**

-  **1 - CONCEPTS TRAINING MODULE EnEf**
-  **2 - LEGISLATION IN IRELAND**
  -  **2.1 - EU LEGAL FRAMEWORK ON ENERGY EFFICIENCY OF BUILDINGS**
-  **3 - MARKETING TRAINING MODULE EnEf**
-  **4 - MODULE: HEAT INSULATION OF EXTERNAL WALLS /FACADES/ OF BUILDINGS**
-  **5 - GLAZING TRAINING MODULE EnEf**
-  **6 - INSTALLATIONS TRAINING MODULE EnEf**
-  **7 - IMPROVING THE ENERGY EFFICIENCY OF FLAT ROOFS**

**Weblinks**


-  **8 - QUESTIONNAIRE ABOUT THE PROJECT**  
Tell us your opinion.

# ENEf MULTILINGUAL


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EnEf Learning Platform








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Categories

 <b>Deutsch</b> Alle Lerneinheiten und Tests in deutsch	<a href="#">Actions</a> ▼
 <b>English</b> All learning modules and tests in English	<a href="#">Actions</a> ▼
 <b>Español</b> Todos los módulos de aprendizaje y las pruebas en el idioma español	<a href="#">Actions</a> ▼
 <b>Italiano</b> Tutti i moduli di apprendimento e test in lingua italiana	<a href="#">Actions</a> ▼
 <b>Slovensky</b> Všetky vzdelávacie moduly a skúšky v jazyku slovenčina	<a href="#">Actions</a> ▼
 <b>ελληνικά</b> Όλες οι εκπαιδευτικές ενότητες και τα τεστ στην ελληνική γλώσσα	<a href="#">Actions</a> ▼
 <b>Български</b> Всички учебни модули и тестове на български език	<a href="#">Actions</a> ▼



# WITHIN A MODULE

Overview

- 4 - MODULE: HEAT INSULATION OF EXTERNAL WALLS /FACADES/ OF BUILDINGS
- 1. Introduction
- 2. Heat insulation on facades
  - 2.1. Purpose of the heat insulation on facades
  - 2.2. Types of heat insulation on facades
    - 2.2. Types of heat insulation on facades
    - 2.2. Types of heat insulation on facades (2)**
  - 2.3. Architectural-structural solutions with heat-insulating effect
- 3. Heat insulation materials
- 4. Technologies for implementation of heat insulations on facade walls
- 5. Steam insulation
- 6. Performance faults in heat insulations and the resulting defects
- 7. Rules for control and acceptance of heat insulation works in construction
- 8. Main terms, main rules and EU policy

**EnEf** **HOME** **3D** EnEf Learning Platform

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English - 4 - MODULE: HEAT INSULATION OF EXTERNAL WALLS /FACADES/ OF BUILDINGS - 2. Heat insulation on facades - 2.2. Types of heat insulation on facades

4 - MODULE: HEAT INSULATION OF EXTERNAL WALLS /FACADES/ OF BUILDINGS

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2.2. Types of heat insulation on facades 2.3. Architectural-structural solutions with heat ...

## 2.2. Types of heat insulation on facades (2)

### Internally insulated wall

- The wall remains cold.
- The freezing point appears to be into the insulation.
- The wall could not be accumulating heat.
- The dwellings are cooled quickly after heating has been stopped.
- Humidity damages the structure and creates premises for development of microorganisms and mould growth.
- There is lack of heat bridge insulation.


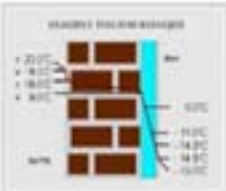
### Externally-insulated wall

- The wall is heated and serves as accumulator of heat.
- The freezing point is located into the insulation from the outer side of the wall.
- Walls return accumulated heat back in the dwellings and thus reduce the heating costs.

After comparing the models it is evident that the best solution is the one in which the insulation is placed over the external side of the walls. All other solutions are successful when it is impossible for external insulation to be built. The implementation technologies for the internal and external insulation are similar, this is, it is possible to work in a similar way, therefore we shall look at the implementation technology of the external insulation.

2.2. Types of heat insulation on facades 2.3. Architectural-structural solutions with heat ...

Permanent Link: <http://learning-content> [Access to menu](#)

# ASSESSMENT EXCERSISES



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Repository • EnEf multilingual • English • tests • 4. Assessment Test

 4. Assessment Test  
FACADE SYSTEMS TRAINING MODULE

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Question 2 of 10 - Performing Heat Insulation on Facades (1 Point)

Indicate which answer is not a mistake when performing heat insulation on facades

- ☐ Incorrect application of the glue mixture on the plates
- ☐ Gluing of very dusty and crumbly sandy surface
- ☐ Non-adherence to the glue preparation technology
- ☐ Removing of old layer of wall cover

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# Why 3D? Why Simulation?

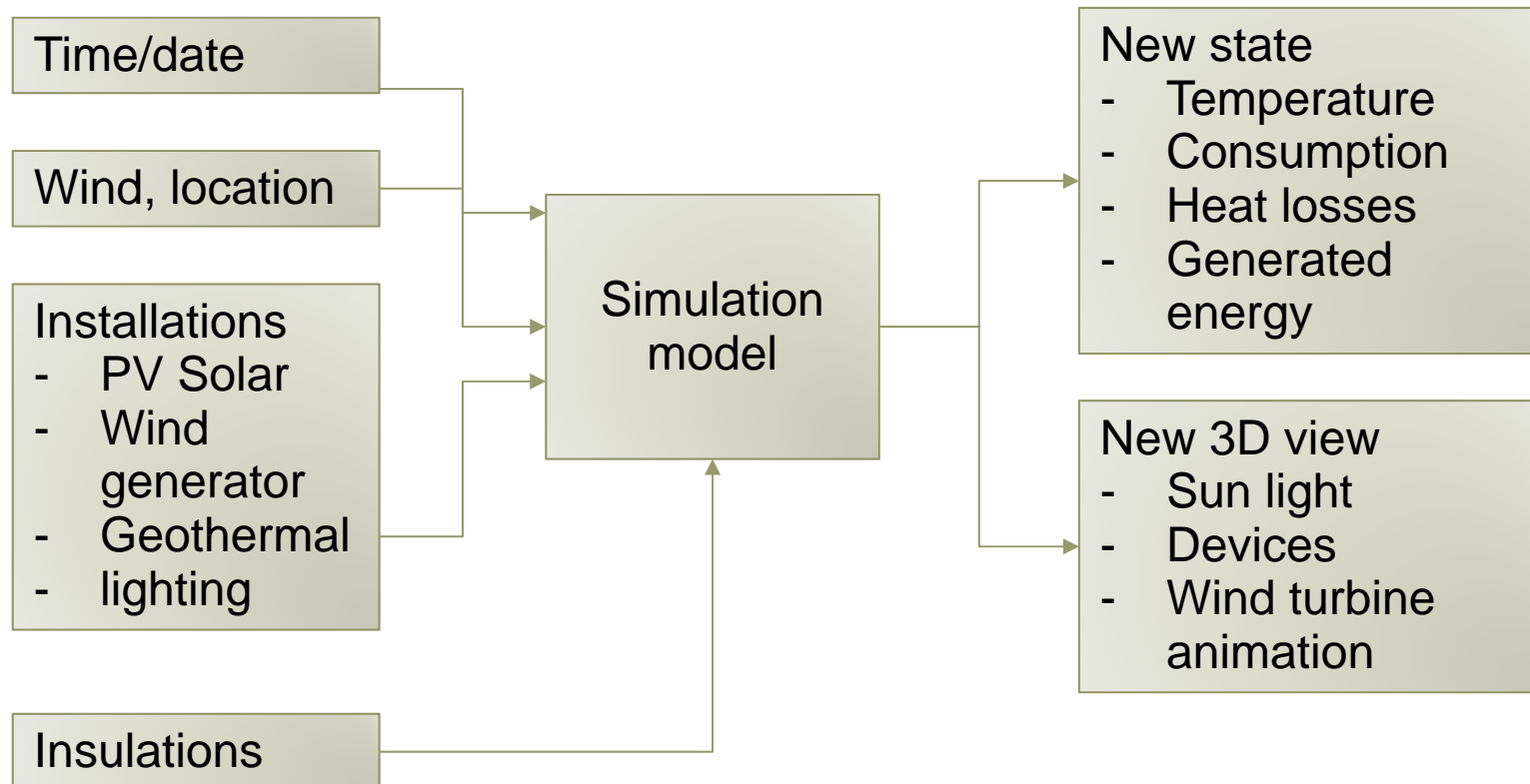
LEARNING IS FASTER, MORE ATTRACTIVE AND MEMORIZATION OF  
CONTENTS MORE EFFECTIVE  
AND...

LEARNING BY “PLAYING”  
MEANS  
LEARNING BY ENJOYING



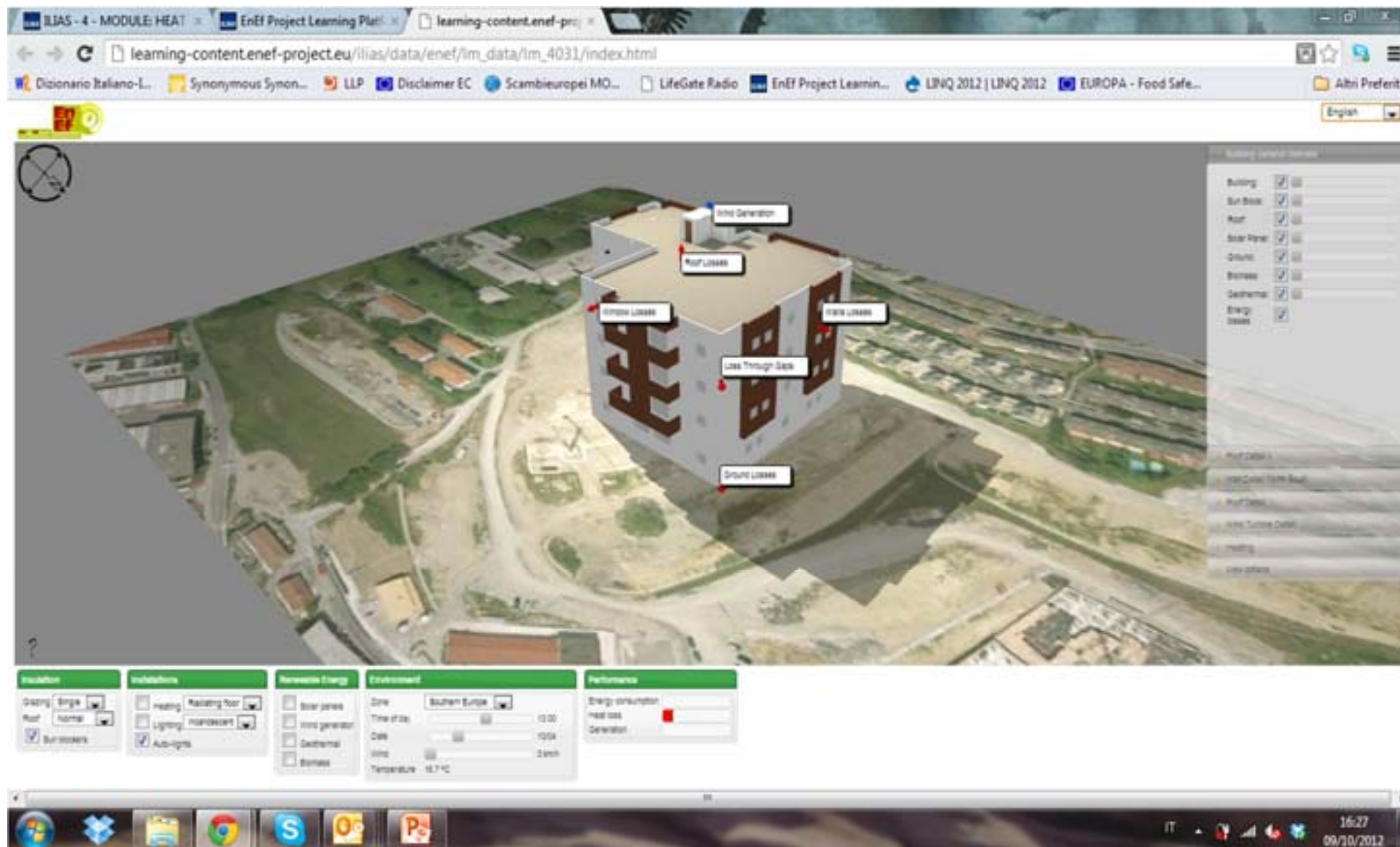
# Development: model

- Link input variables with changes in the state





# ENEF SIMULATION TOOL



The screenshot displays the ENEF Simulation Tool interface within a web browser. The main view shows a 3D model of a building with several energy loss labels: "Wind Generation", "Roof Losses", "Window Losses", "Loss Through Gaps", and "Ground Losses". The interface includes a top navigation bar with tabs for "ILIAS - 4 - MODULE HEAT" and "EnEf Project Learning Platform". The browser address bar shows the URL "learning-content.enef-project.eu/ilias/data/enef/im\_data/im\_4031/index.html". The right sidebar contains a "Building General Settings" panel with checkboxes for various building components. The bottom panel features five tabs: "Insulation", "Renewable Energy", "Environment", and "Performance". The "Insulation" tab is active, showing settings for "Heating", "Cooling", "Lighting", and "Auto-Heating". The "Renewable Energy" tab shows settings for "Solar panels", "Wind generator", "Geothermal", and "Biomass". The "Environment" tab shows settings for "Zone", "Time of day", "Date", "Wind", and "Temperature". The "Performance" tab shows "Energy consumption" and "Heat loss". The bottom status bar indicates the date "09/10/2012" and time "16:27".

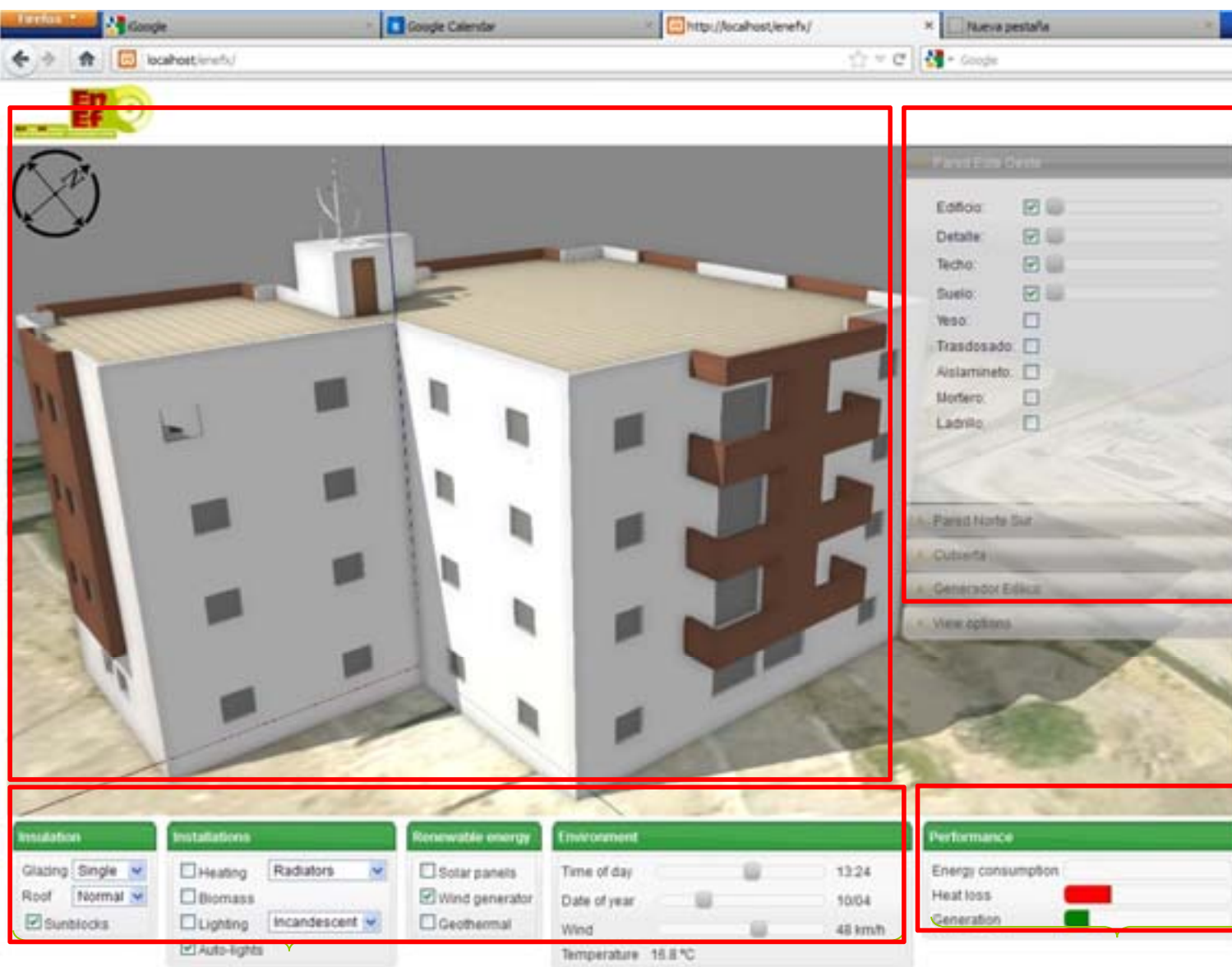
The building can be seen in  
all its sides and angles



With a more or less details at  
choice of user

# Integrated application

3D view



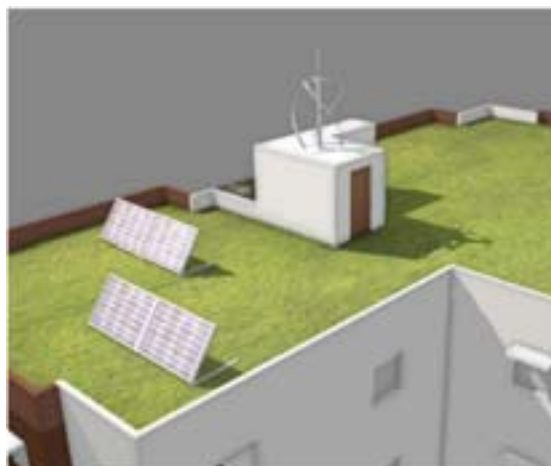
Scenes/  
Views

Controls

Output

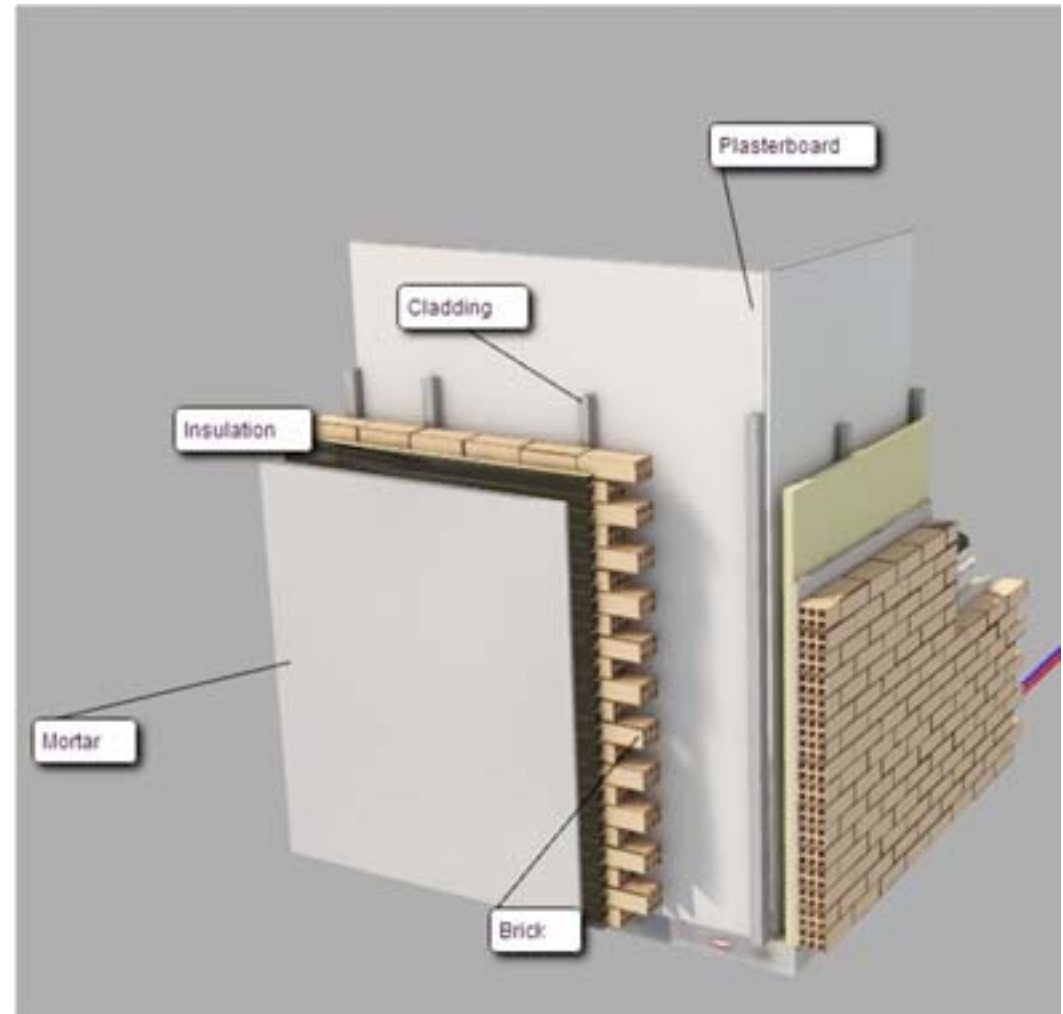
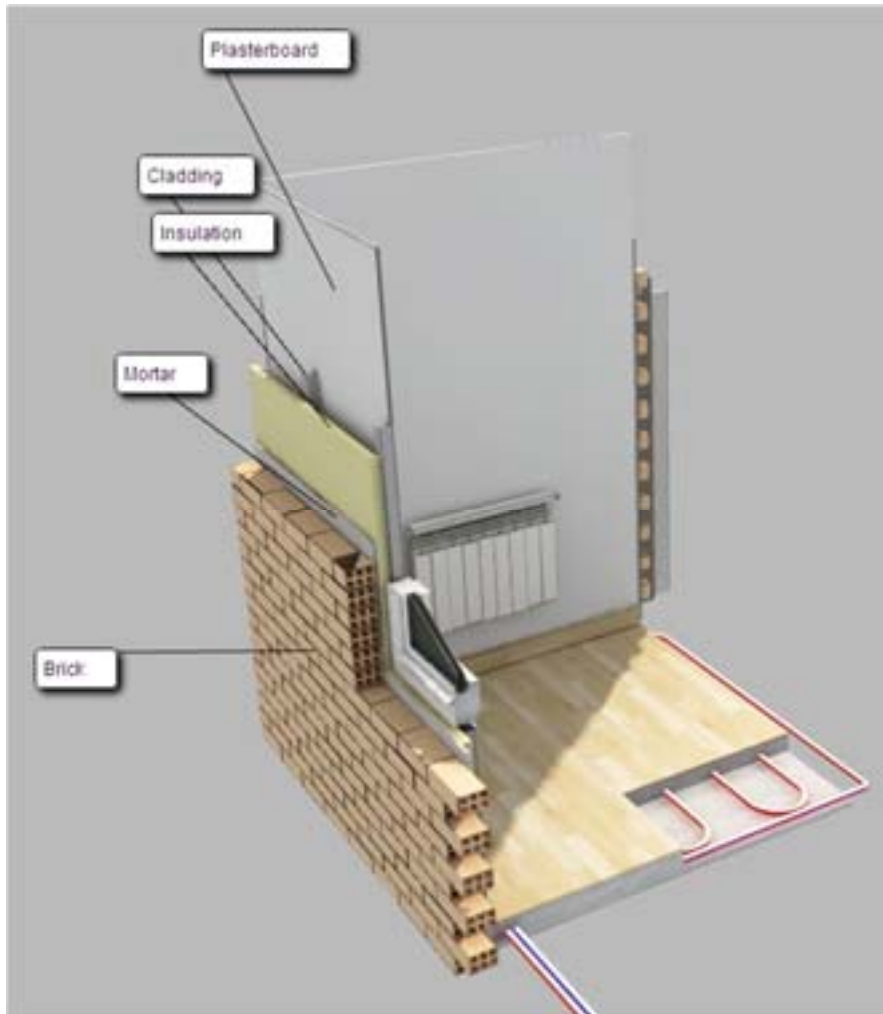


# Integrated application



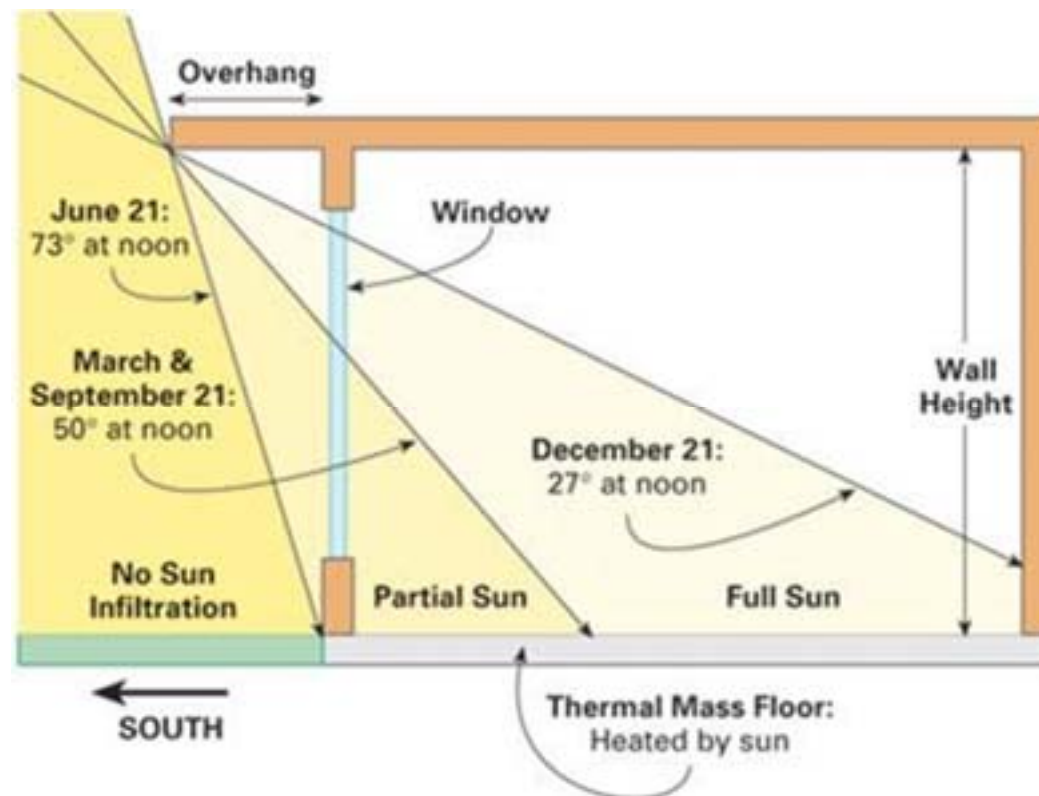


# Integrated application – Detailed walls



# Example: glazing in South orientation

- Module 5, section 2.5.2
  - Sun at noon in Winter enters room
  - Sun at noon in Summer should not enter -> overhang placed



# Example: glazing in South orientation

- Interactively seen



Winter noon



Summer noon



Summer noon + overhang

**You can see different optional installations for energy generation and for heating. An open section of the floor in the detailed room will let you see the hidden pipes for the radiating floor**



**You can turn lights on or off (or let them work automatically) and see their effect in consumption.**

**In short, you can see the building performing as a whole system and how some aspects affect others and where each installation fits.**



**VISIT US AT**

**WWW.ENEFF-PROJECT.EU**

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