GrAT
Center for Appropriate Technology

Renew Building

Demonstration and Dissemination of Climate-friendly Renovation with Renewable Resources and Ecological Building Materials

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The Project

The **thermal renovation of old buildings** helps reaching climate protection targets and reducing heating costs. What is still known too little, though, is how to implement renovation measures in the most energy-efficient and ecological way.

How can we avoid additional **CO_2 emissions and waste** from using energy-intensive and hard-to-recycle insulation materials?

In the project Renew Building, buildings were renovated at **apprenticeship and demonstration sites** in Vienna, Lower and Upper Austria with renewable and ecological materials in an innovative way - from roof to walls to windows.

Newly developed as well as traditional, but forgotten **techniques and materials** were applied.

The apprenticeship site in Böheimkirchen, Lower Austria is open to visitors as a tangible **best-practice building** after the end of the project.

Natural building materials are recyclable and store CO_2 – renovated walls and roofs are able to store up to 125 kg of CO_2 per m^2 and thus remarkably contribute to climate protection.

Due to increased climate awareness as well as national and international energy-saving regulations, the demand for thermal renovation measures is growing strongly. Planners and architects possessing the demanded know-how will have a competitive advantage in this new market. The project Renew Building equipped them with the necessary knowledge in theory and practice and with the chance for exchange with other experts in the field through **on-site trainings**, an **e-learning platform** and a **lecture** at Vienna University of Technology.

A comprehensive, freely accessible **knowledge database** (via www.renew-building.eu) contains details and evaluation of various building components (e.g., reed and clay plaster for interior insulation) and shows best-practice buildings renovated in an ecological way. This allows future renovation project to transfer existing knowledge.

Examples of Renovation

In the project Renew Building ecological renovation was documented and demonstrated at various sites and buildings.

Main criterion for choosing a building was extensive use of renewable resources and ecological building materials. High architectural quality is also essential for an outstanding renovation.

Already renovated buildings were documented as well as on-going renovations.

▶ All documented renovations were included in the knowledge database at **www.renewbuilding.eu**.

Best-practice buildings

are exemplary renovated buildings which were documented and presented in an online database at www.renewbuilding.eu.

Apprenticeship sites

are training sites where building components were renovated with ecological materials during courses.

Craftsmen and planners were trained for ecological renovation at these apprenticeship sites. Together with the project team they produced prototypes for all relevant components such as foundation, wall, roof or windows.

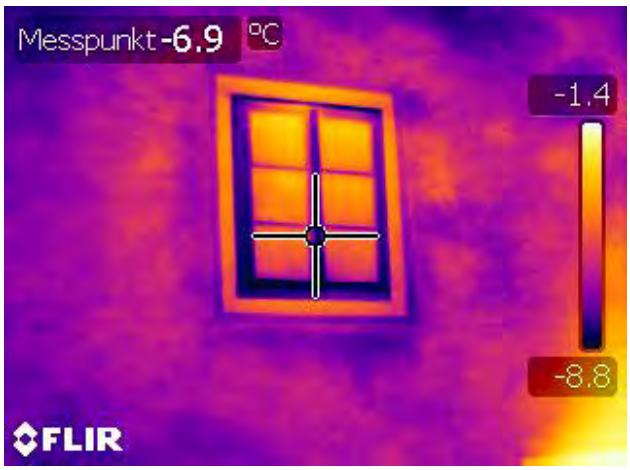
Only renewable resources (reed, hemp etc.) and recycling or other ecological materials were used. Surfaces were renovated with lime and clay.

Demonstration buildings

are building sites for ecological renovation which were consulted and documented by the project team.

The trainees from the apprenticeship sites were able to bring their new know-how into practice at their own building sites. The building which were renovated at their sites became demonstration buildings - they were documented and the building owners were consulted by the project team.

Consultation included thermographies: weak spots such as thermal bridges were made visible by these infrared pictures and could then be corrected.

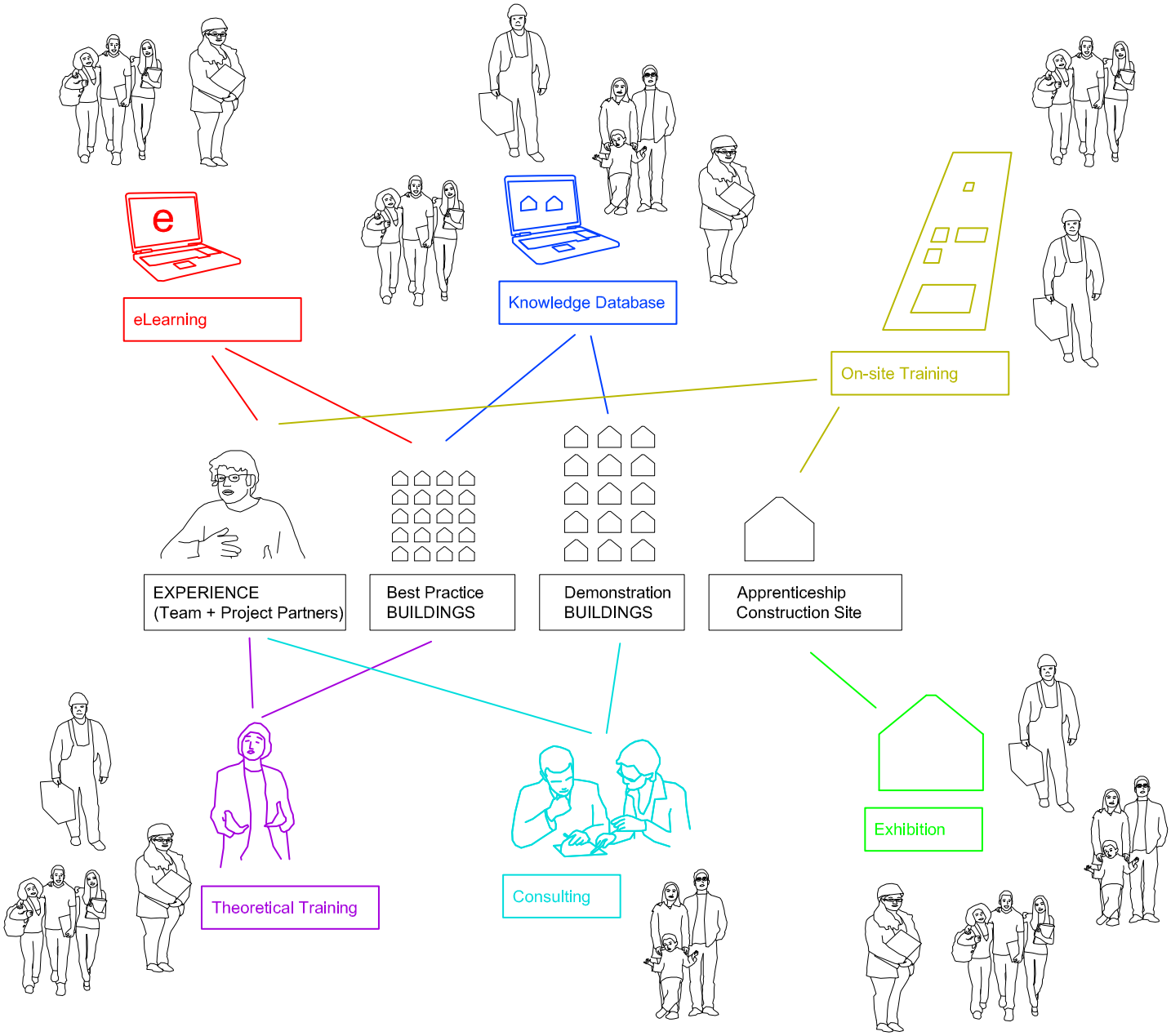


Individual Knowledge Transfer

eLearning.
eLearning was part of the „Blended Learning“ concept. Trainees and students were able to acquire knowledge whereever and whenever they needed to. Videos, online scripts and tests could be chosen according to invidual study plans.

Knowledge Database.
The knowledge database contains best-practice renovations with detailled information on materials and construction. Building components which have been renovated with ecological building and insulation materials are shown in detail and with building physical data.

Onsite Training.
Trainees and students were trained in renovation with ecological and renewable materials at apprenticeship sites. Practical instructions for implementation and processing complemented the hands-on training.



Theoretical Training.
Courses and lectures about the basics of ecological renovation – material properties, building physics, construction details, building standards etc. – were the basis of planning and implementing renovation projects.

Consulting.
Building owners who were planning to renovate their demonstration building ecologically were consulted during their project and had the chance to analyse their building with thermographies.

Exhibition.
A building which was renovated in Böheimkirchen, Lower Austria, is now a demonstration building and can be visited in guided tours.

Knowledge Database

Everyone interested in ecological renovations can have a look at the online database which shows best-practice renovations in detail. Pictures, construction details and description of the renovation measures show how various building stock can be insulated and renovated with renewable materials and the show the architectural quality of these buildings.

In addition to the best-practice building the database contains solutions for individual building components with construction details and calculations. This includes wall (exterior and interior insulation), roof, floor, foundation, top-floor ceiling, windows and doors as well as surfaces. Examples are a construction of reed and clay plaster for interior insulation, straw bales for the roof, hemp for the floor, or windows made from larch wood.

▶ The knowledge database is available via **www.renewbuilding.eu**.

eLearning

The eLearning platform allows trainees and students to acquire knowledge in an independent and flexible way. This gives working people with little time the chance to obtain basic knowledge prior to a course. The time spent in the course with trainers and colleagues can thus be used more efficiently for exchange of knowledge.

The eLearning platform provided five modules: 1. Ecological renovation, 2. Building physics and analysis, 3. Materials, raw materials and products, 4. Constructions and details, 5. Building standards and further education. For these five modules, videos, audio files, online scripts and various tests for self-assessment were made available.

Theoretical training

Lectures by experts from the building sector and from research provided essential knowledge about ecological renovation, about planning and implementation of own projects. The theory classes could be visited in addition to trainings or separately and were connected with the use of the eLearning platform. Essential part of the classes was a planning workshop where participants were able to discuss their own projects with experts.

At Vienna University of Technology lectures were offered for students of architecture and similar courses of study. They consisted of theory and practice classes, such as an excursion to a best-practice building and practical units an the apprenticehip site where students were able to learn how to work with renewable raw materials. The lecture was highly appreciated by the students.

Onsite Training

Trainings were visited by craftsmen and by students of Vienna University of Technology.

Goal of the training „Ecological Building and Renovating“ was to provide craftsmen with the basics of ecological renovation concepts.
Knowledge about building physics and material properties of natural materials was applied in practice on-site. The trainees were instructed in mounting insulation materials such as straw, reed or sheep wool, in addition to the topics „lime and clay as binders and building materials“.
The trainees together with the project team analyses the foundation and facade of buildings, identified and corrected or removed damaged plaster. Surfaces were corrected and flattened with lime plaster.
Trainees mounted an exterior reed insulation to the facade and plastered it with lime. For interior walls they applied various kinds of clay plaster.

Exhibition Böheimkirchen

Renovated „Villa“

An old building in the area of the S-HOUSE in Böheimkirchen (Lower Austria) became an apprenticeship site for the project Renew Building.
Craftsmen and planners got hands-on training for ecological renovation.
Various renovation prototypes for building components such as wall, roof, windows etc. were demonstrated at the „Villa“:

» Foundation: foam glass panels as insulation on renovated foundation, foam glass gravel for base plate
» Walls (exterior insulation): chopped reed, straw bales, hemp
» Interior insulation: reed panels, wall heating, clay plaster
» Ceiling: clay hemp fill on existing constrution, chopped reed fill
» Roof: straw bales, chopped reed
» Windows: revonation for various conditions
» Surfaces: lime and clay plaster, tadelakt for wet rooms, linseed oil for wood

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