



Inspiring good practices: Rainhof, a case study in the Italian alps

eurac
research

Daniel Herrera, Ph.D.

daniel.herrera@eurac.edu

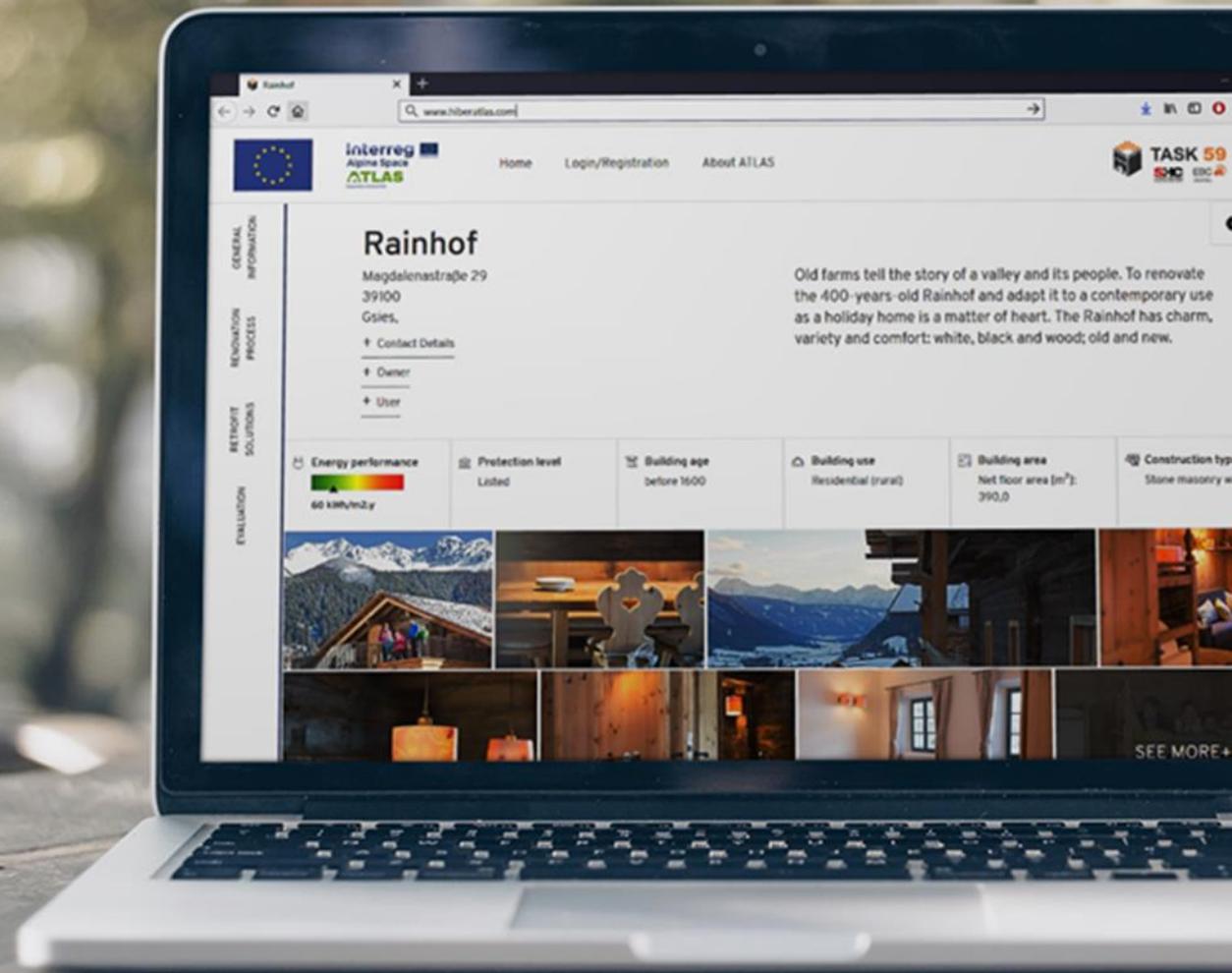
28th January 2020

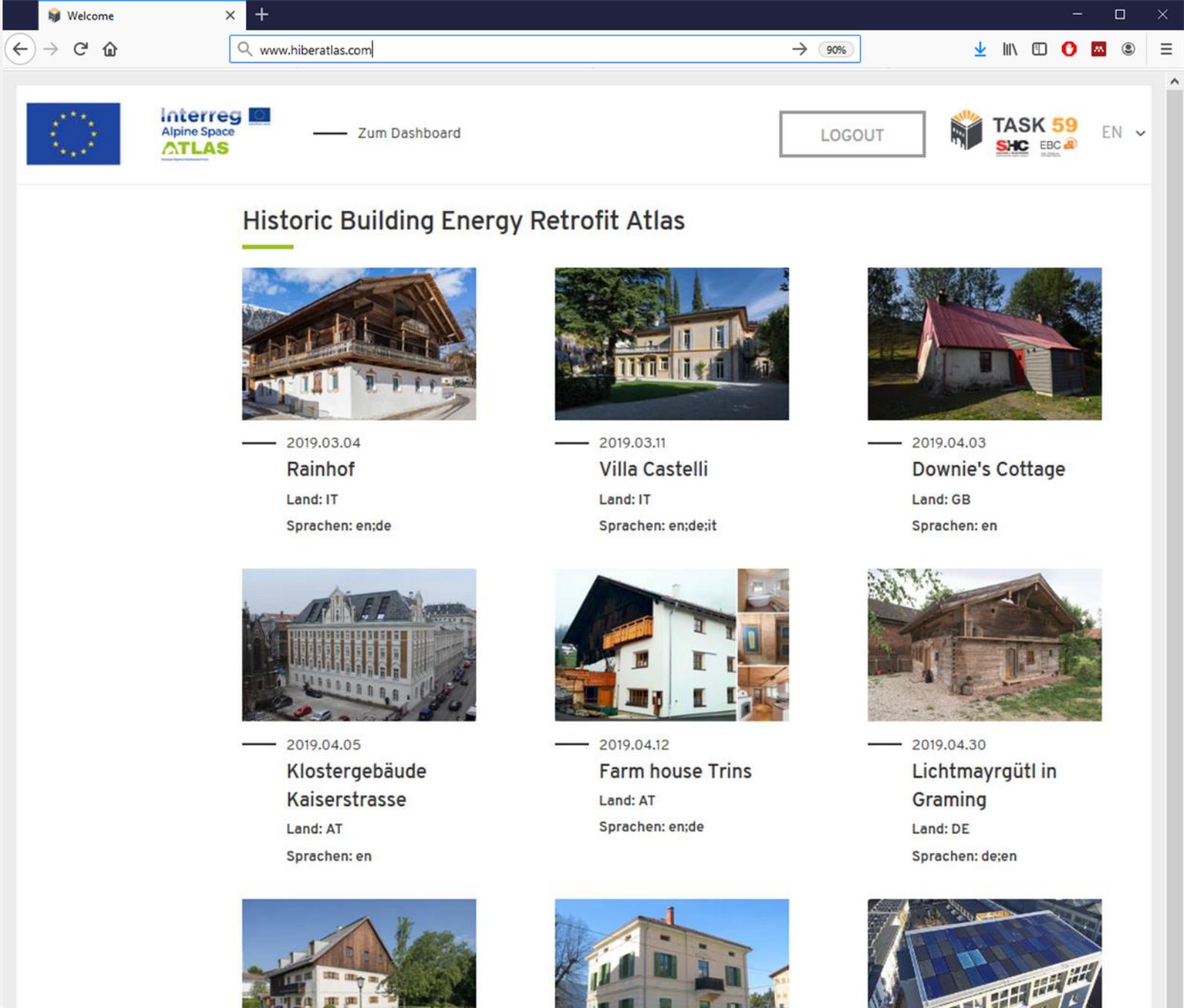
IEA SHC Solar Academy: Renovating Historic Buildings towards Zero Energy - Task 59



A BEST PRACTICE DATABASE FOR **ENERGY EFFICIENT** RENOVATION OF **HISTORIC BUILDINGS**

The Historic Building Energy Retrofit Atlas compiles cases of building renovation that are exemplary both in terms of heritage conservation and energy efficiency in order to inspire and foster energy retrofits.



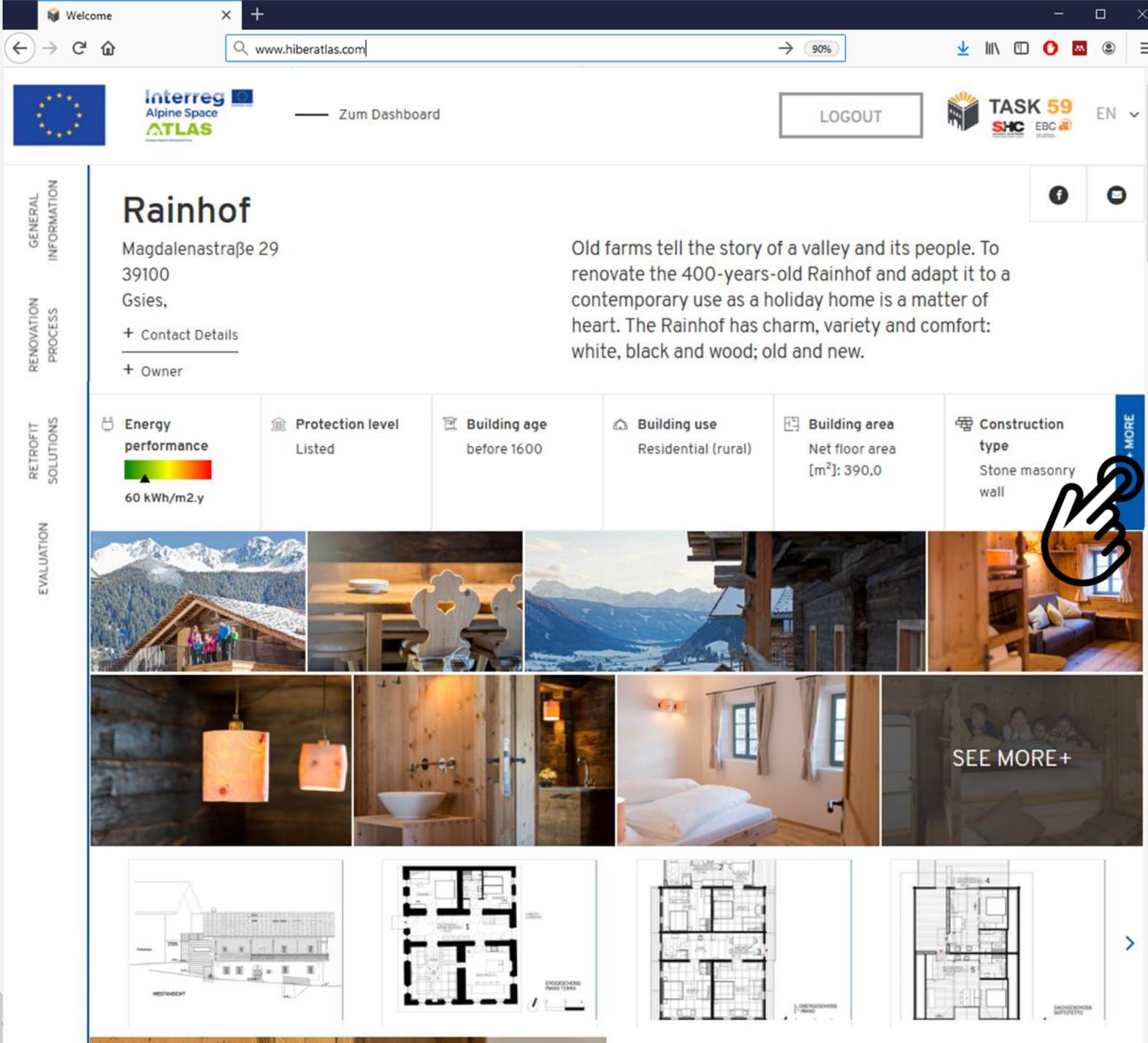


WHAT is documented?

The Rainhof is a **farmhouse built around the 16th century** in Santa Maddalena (Bolzano, Italy). This case study was one of first projects to be documented in the best-practice database and is presented here following the structure described before.

GENERAL information

Buildings included in the best-practice database are first described following a series of predefined parameters in order to improve the comparability among case studies and to enable a filter function that will allow narrow down the amount of buildings to those of specific interest to the user.



Welcome | www.hiberatlas.com | 90%

Interreg Alpine Space ATLAS | Zum Dashboard | LOGOUT | TASK 59 SHC EBC | EN

GENERAL INFORMATION
Rainhof
 Magdalenastraße 29
 39100 Gsies,
 + Contact Details
 + Owner

Old farms tell the story of a valley and its people. To renovate the 400-years-old Rainhof and adapt it to a contemporary use as a holiday home is a matter of heart. The Rainhof has charm, variety and comfort: white, black and wood; old and new.

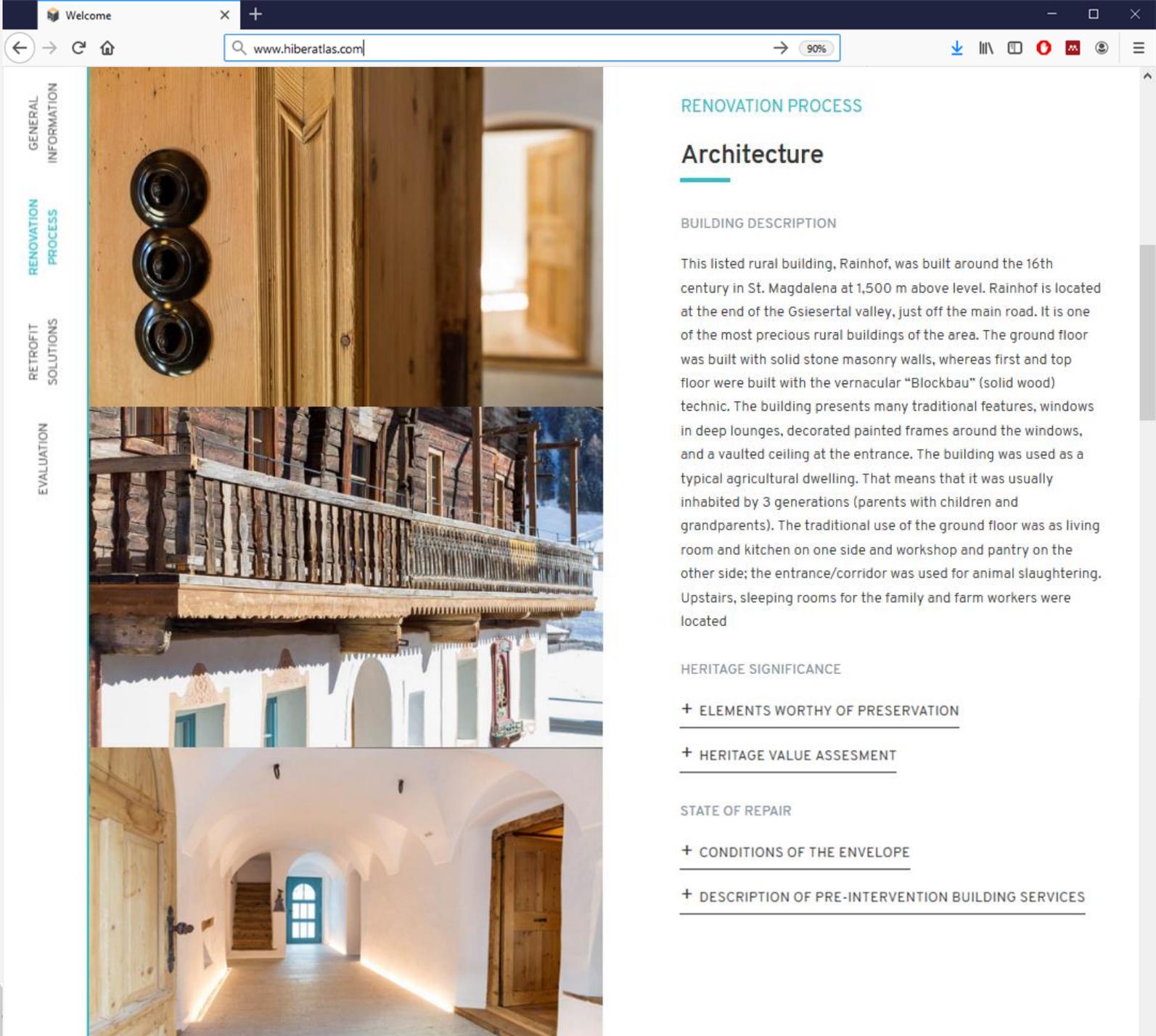
RETROFIT SOLUTIONS  Energy performance  60 kWh/m2.y	 Protection level Listed	 Building age before 1600	 Building use Residential (rural)	 Building area Net floor area [m ²]: 390,0	 Construction type Stone masonry wall
--	---	--	--	---	--

EVALUATION

SEE MORE+

Renovation PROCESS

- Building description**
- Heritage significance
- State of repair
- Aim of retrofit



Welcome | www.hiberatlas.com | 90%

GENERAL INFORMATION
RENOVATION PROCESS
 RETROFIT SOLUTIONS
 EVALUATION

RENOVATION PROCESS

Architecture

BUILDING DESCRIPTION

This listed rural building, Rainhof, was built around the 16th century in St. Magdalena at 1,500 m above level. Rainhof is located at the end of the Gsiesertal valley, just off the main road. It is one of the most precious rural buildings of the area. The ground floor was built with solid stone masonry walls, whereas first and top floor were built with the vernacular "Blockbau" (solid wood) technic. The building presents many traditional features, windows in deep lounges, decorated painted frames around the windows, and a vaulted ceiling at the entrance. The building was used as a typical agricultural dwelling. That means that it was usually inhabited by 3 generations (parents with children and grandparents). The traditional use of the ground floor was as living room and kitchen on one side and workshop and pantry on the other side; the entrance/corridor was used for animal slaughtering. Upstairs, sleeping rooms for the family and farm workers were located

HERITAGE SIGNIFICANCE

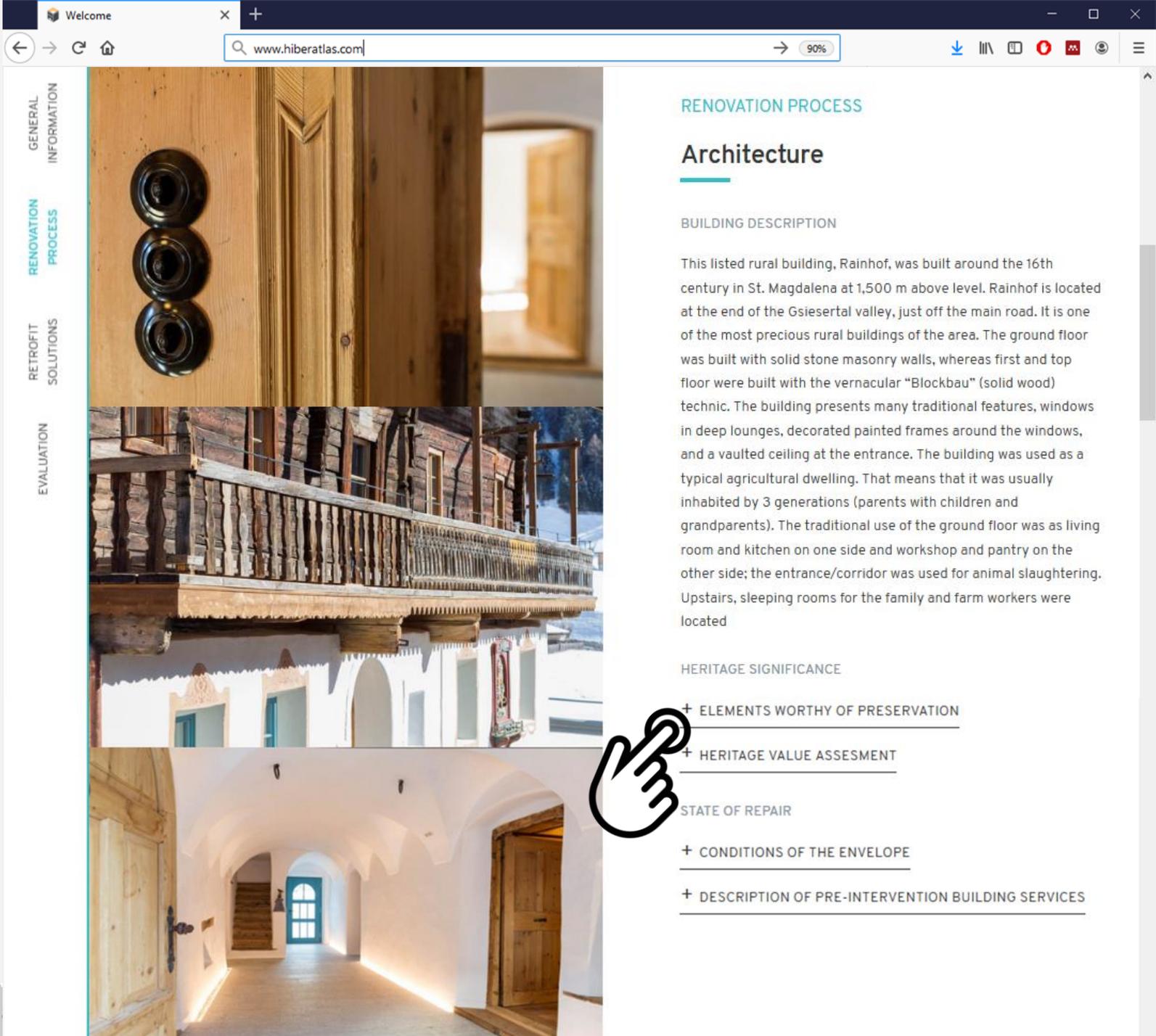
- + ELEMENTS WORTHY OF PRESERVATION
- + HERITAGE VALUE ASSESSMENT

STATE OF REPAIR

- + CONDITIONS OF THE ENVELOPE
- + DESCRIPTION OF PRE-INTERVENTION BUILDING SERVICES

Renovation PROCESS

- Building description
- Heritage significance**
- State of repair
- Aim of retrofit



www.hiberatlas.com

90%

GENERAL INFORMATION

RENOVATION PROCESS

RETROFIT SOLUTIONS

EVALUATION

Architecture

BUILDING DESCRIPTION

This listed rural building, Rainhof, was built around the 16th century in St. Magdalena at 1,500 m above level. Rainhof is located at the end of the Gsiesertal valley, just off the main road. It is one of the most precious rural buildings of the area. The ground floor was built with solid stone masonry walls, whereas first and top floor were built with the vernacular "Blockbau" (solid wood) technic. The building presents many traditional features, windows in deep lounges, decorated painted frames around the windows, and a vaulted ceiling at the entrance. The building was used as a typical agricultural dwelling. That means that it was usually inhabited by 3 generations (parents with children and grandparents). The traditional use of the ground floor was as living room and kitchen on one side and workshop and pantry on the other side; the entrance/corridor was used for animal slaughtering. Upstairs, sleeping rooms for the family and farm workers were located

HERITAGE SIGNIFICANCE

- + ELEMENTS WORTHY OF PRESERVATION
- + HERITAGE VALUE ASSESSMENT

STATE OF REPAIR

- + CONDITIONS OF THE ENVELOPE
- + DESCRIPTION OF PRE-INTERVENTION BUILDING SERVICES

Retrofit SOLUTIONS

- a. *External Walls*
- b. *Windows*
- c. *Other solutions*
- d. *HVAC*
- e. *Renewable Energy Systems*

Welcome

www.hiberatlas.com 90%

GENERAL INFORMATION

RENOVATION PROCESS

RETROFIT SOLUTIONS

EVALUATION

RETROFIT SOLUTIONS

External Walls

GROUND FLOOR - EXISTING STONE WALL

GROUND FLOOR - EXISTING STONE WALL "STUBE"

GROUND FLOOR - EXTENSION

In most part of the ground floor (except "Stube" and "Labe") the exterior wall in natural stone is insulated from the inside with a thin layer (4-6 cm) of insulating plaster (Calcetherm 0,068)

The insulating plaster is lime-based. Unlike a insulativo panel, the thin layer can follow the uneven historical wall surface in order to have a similar appearance to the original plaster.



U-value (pre-intervention) [W/m2K]: 2,39 W/m²K

U-value (post-intervention) [W/m2K]: 0,87 W/m²K

[More Details](#)

Windows

ALL WINDOWS

Substitution of all windows. The windows were made by a furniture maker. The aim was build a two-sash window with two glazing bars each, which on the one hand fulfils the demand on energy efficiency and which is on the other hand of high aesthetic quality.

In order to preserve the original appearance of the windows in the façade, the original window was used as a model for the new window in terms of proportions and profile widths. As glazing an insulating glass unit was installed.



Existing window U-value Glass [W/m2K]:

New window U-value Frame [W/m2K]:





EVALUATION

- a. *Energy Efficiency*
- b. *Internal Climate*
- c. Costs
- d. Environment

www.hiberatlas.com

GENERAL INFORMATION

RENOVATION PROCESSES

RETROFIT SOLUTIONS

EVALUATION

Energy Efficiency

- ENERGY PERFORMANCE
- ENERGY USE
- MEASURED PARAMETERS

Internal Climate

- TEMPERATURE
- INDOOR AIR QUALITY
- DAYLIGHT
- ACOUSTIC COMFORT
- ARTIFACT CONSERVATION

Costs

- FINANCIAL ASPECTS
- INVESTMENT COSTS
- RUNNING COSTS

Environment

- GREENHOUSE GAS EMISSIONS
- LIFE CYCLE ANALYSIS
- WATER MANAGEMENT
- TRANSPORT AND MOBILITY

Footer Navigation title

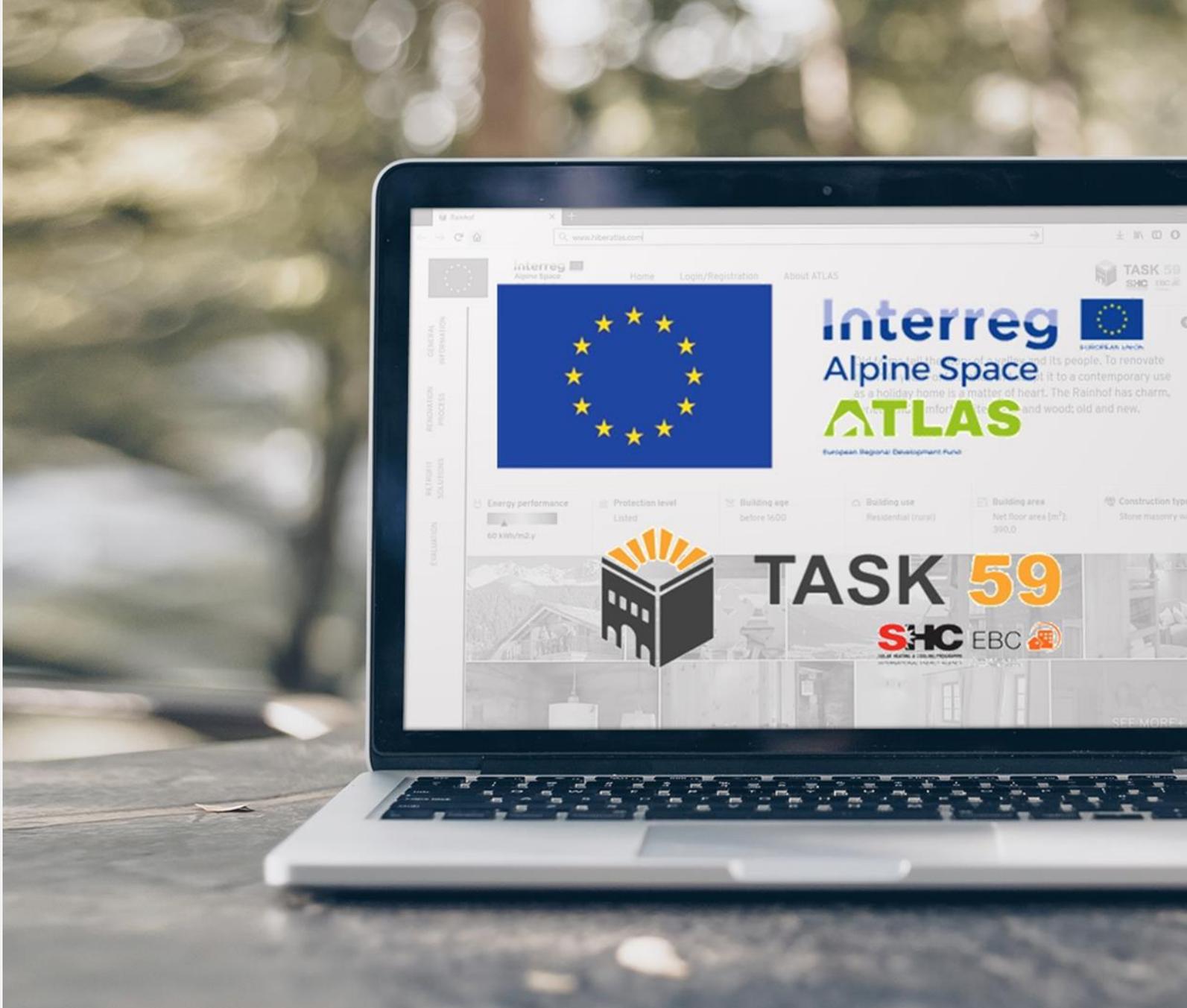
- Contact
- Privacy
- Impressum

Footer second column title

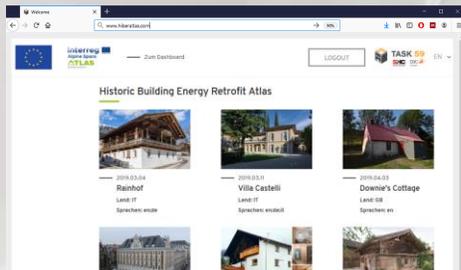
Brennerstraße 16B,
39100 Bozen,
Montag -Freitag von 8:00 bis 17:00
info@teamlau.com

CONCLUSIONS

The goal of the best-practice database is to communicate this decision-making process in a way that is engaging, and persuading, for owners of historic buildings that are considering a renovation. In addition to that, the best-practice database allows presenting more detailed information (such as retrofit solutions, construction details or even evaluation results) so they can be of use for the other parties involved in the design of the renovation (architects, energy consultants, engineers, etc.).



THANKS FOR YOUR ATTENTION!



www.iberatlas.com



<http://task59.iea-shc.org/>

