

SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

Inspiration through successful case studies

IEA SHC Task 59 / EBC Annex 76

Case study database

Walter Hüttler, e7 energy innovation & engineering
Webinar, 28 Jan 2020



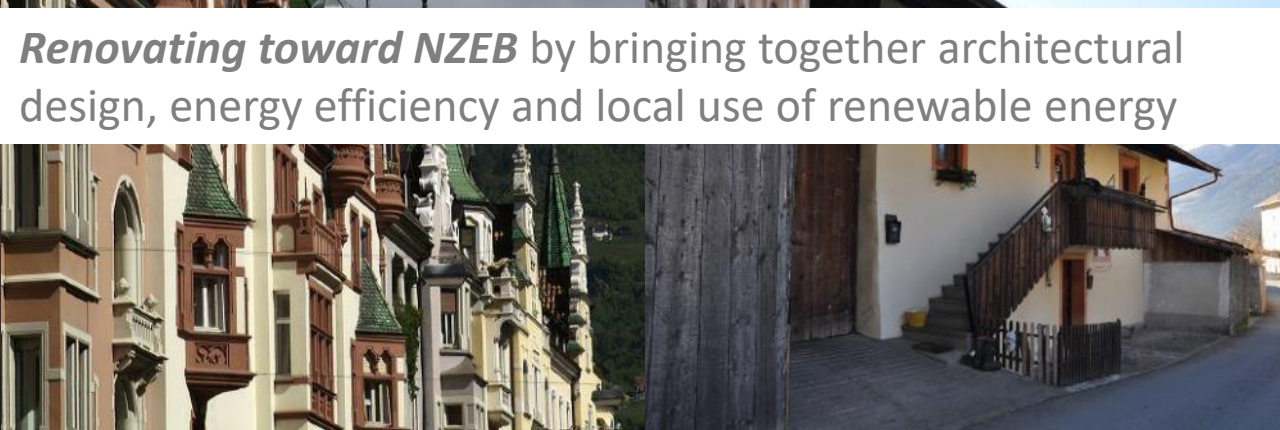
TASK 59
RENOVATING HISTORIC BUILDINGS
TOWARDS ZERO ENERGY

2018 
ANNO EUROPEO
DEL PATRIMONIO
CULTURALE
#EuropeForCulture

Historic buildings?

“*Historic buildings* according EN 16883 all buildings with elements “worthy of preservation”

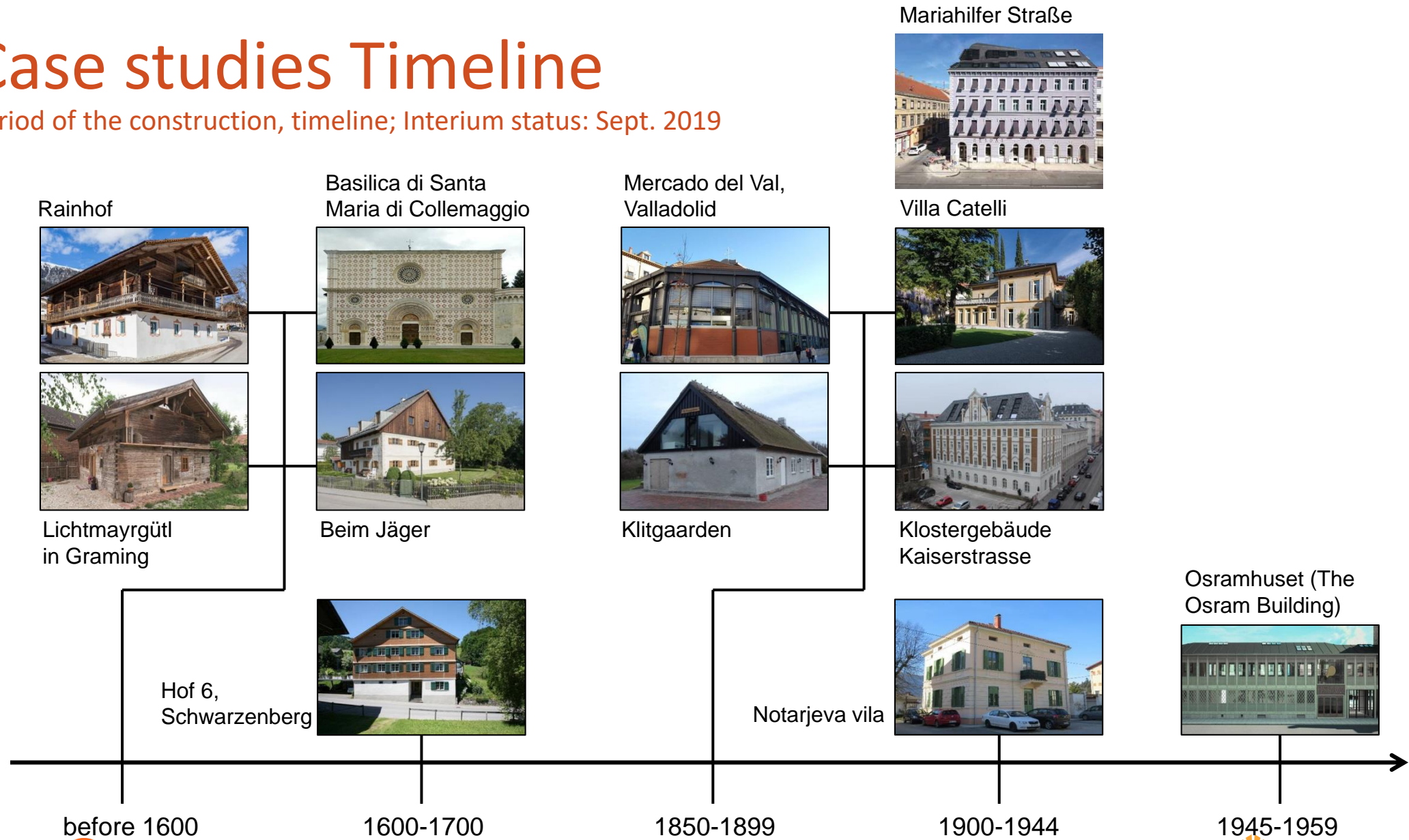
-> all types & ages, not just listed/protected buildings



Renovating toward NZEB by bringing together architectural design, energy efficiency and local use of renewable energy

Case studies Timeline

Period of the construction, timeline; Interium status: Sept. 2019



INSPIRATION

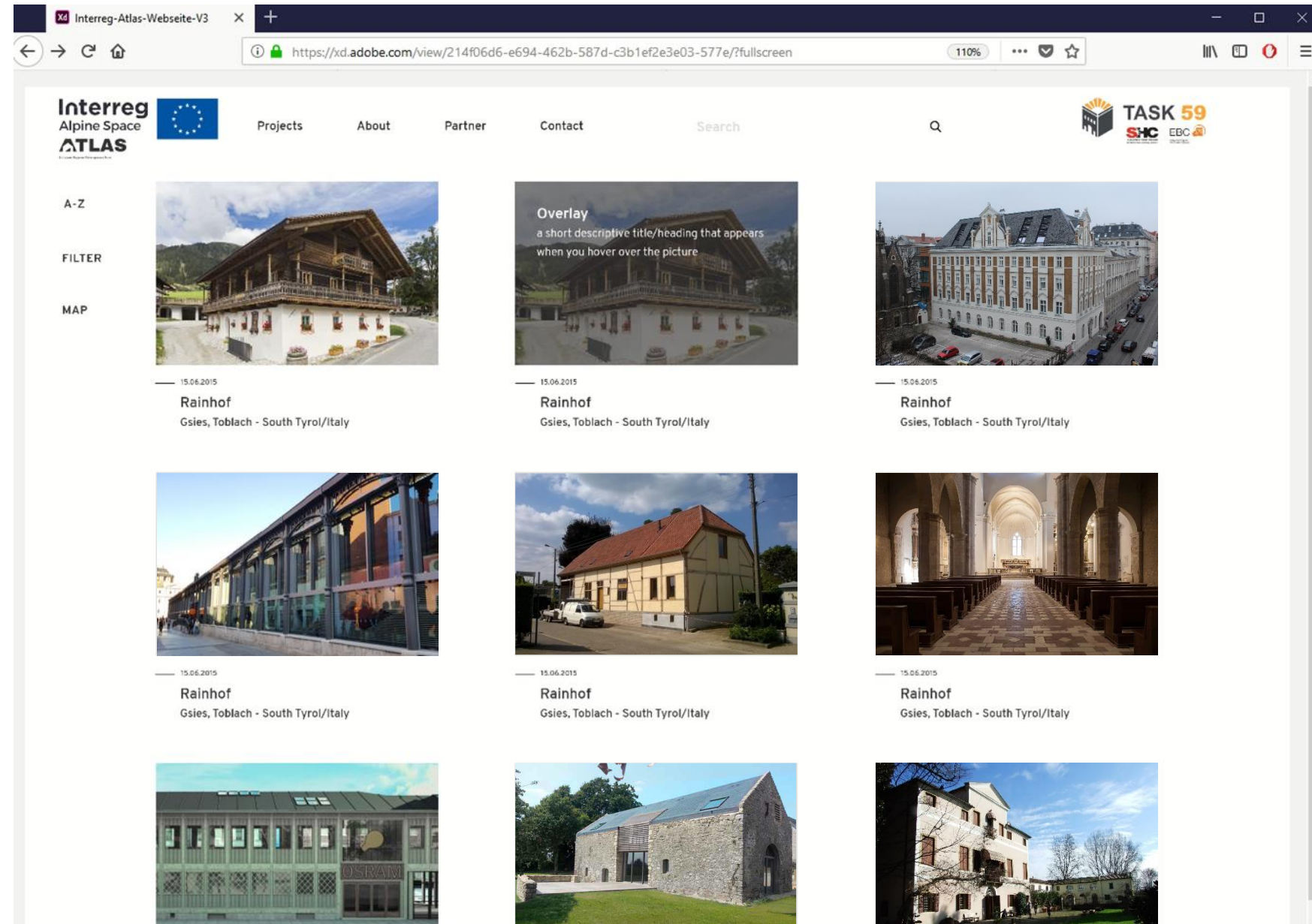
to trigger the demand

Focus on browsing experience

Visual information as a mean to reach end-users

Short and narrative texts, “magazine style”

Dynamic layout compatible with different screens: mobile, laptop, large screens



LEARNING

from the experience

A first level of data including enough information to describe the intervention:

- Basic contact details
- Short summary
- Images and plans
- General description of
 - building
 - aim
 - solutions

Interreg Alpine Space ATLAS

Projects About Partner Contact

Search

TASK 59 SHC EBC

Rainhof

Magdalenastraße 29, Gsies
39030 Dobbiaco South Tyrol - Italy

+ Contact Details

ulus mus. Donec quam felis, ultricies nec, pellentesque eu, pretium quis, sem. Nulla consequat massa quis enim. Donec pede justo, fringilla vel, aliquet nec, vulputate eget, arcu. In enim justo, rhoncus ut, imperdiet a, venenatis vitae, justo.

Energy performance A	Protection level Listed/not listed	Building age before 1600	Building use Residential (rural)	Surface area Net floor area [m ²]	Construction type Stone masonry wall
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GENERAL INFORMATION

RENOVATION PROCESS

RETROFIT SOLUTIONS

EVALUATION

+ MORE

DETAILS

for a deeper understanding

Second level of detail data and information:

- Contact details (including all agent involved)
- **Context: full explanation**
- Solutions: technical details and drawing
- Evaluation: Results and available data

GENERAL INFORMATION
RENOVATION PROCESS
RETROFIT SOLUTIONS
EVALUATION

Klostergebäude Kaiserstrasse

Kaiserstrasse 7
1020
Wien/Vienna
Austria
[+ Contact Details](#)

A multi-purpose used convent building in the heart of Vienna has been refurbished with particular attention to monument preservation and to a new solution for renovating Viennese-type box windows.

Energy performance <p>75,75 kWh/m2.y</p>	Protection level	Building age 1850-1899	Building use Residential (urban)	Building area Net floor area [m ²]: 2750,0	Construction type Brick masonry wall	+ MORE
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DETAILS

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GENERAL INFORMATION

RENOVATION PROCESS

RETROFIT SOLUTIONS

EVALUATION

RETROFIT SOLUTIONS

External Walls

PLASTERED FACADE WITH FACING BRICKS

EXTERIOR WALL OF EXTENSION

The existing facade was made of ceramic clinker tiles. Conservative measures such as substance-saving cleaning and repair of the facing brick surfaces, supplementing the historical clinker tiles and hydrophobing were made. The ceramic statue in the wall niche of the southern ornamental gable has been restored. The circular sandstone slabs, sandstone cross ornaments and sandstone coverings on the eastern and southern ornamental gables were cleaned, repaired and color-matched. Articulated facades and profiled plaster surfaces, such as cornices, window casings, window roofs and ornamented roof gable incl. figural representations were repaired and restored as follows: - Manual removal of various later lime-cement coating - Surface cleaning, mechanical manual exposure of various decorative elements - Stabilisation of the sanding surface, closing of cracks - Plaster additions with cement-free natural hydraulic finished products

Paint systems were used in consultation with the Federal Monuments Authority Austria according to the following procedure: - Etching the facade - Pore-filling lime mud for closing cracks and small bumps - Double silicate glass topcoat

U-value (pre-intervention) [W/m²K]:
0,917 W/m²K

U-value (post-intervention) [W/m²K]:
0,444 W/m²K



+ MORE

More photos



Windows

VIENNESE BOX WINDOW

SLANTED GLAZING IN MONUMENT PROTECTION

The outer wings of the box windows in listed facades were renovated and on the inside a new wooden window with special interior insulation was added. The solution sets the new inner wing completely flush with the inner wall and improves the thermal situation through internal insulation and reveal insulation. The sunshades are positioned between the wings in the lintel in existing roller blind niches. This layout represents a novel solution for old buildings.

Some parts of the window were maintained (e.g. frame)



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- Evaluation: Results and available data

The screenshot shows a web browser window with the URL <https://xd.adobe.com/view/214f06d6-e694-462b-587d-c3b1ef2e3e03-577e/?fullscreen>. The page is titled "External Walls" and features a navigation bar with tabs for WALL TYPE 1 through WALL TYPE 7. The "WALL TYPE 1" tab is selected, displaying the following content:

Did the renovation modify the wall?
Yes, 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)

Conservation compatibility
The insulating plaster is lime-based. Unlike a insulatio 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 U-value (post-intervention) [W/m2K]: 0,87

A "More Details" button is visible in the bottom right corner of the wall details section, with a hand cursor icon pointing to it.

The "Windows" section below features a navigation bar with tabs for WINDOW 1 through WINDOW 5. The "WINDOW 1" tab is selected, displaying the following content:

Did the renovation modify the windows?
Yes, Substituion 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.

Conservation compatibility
Window was replaced. In order to preserve the original appearance of the

The "WINDOW 1" tab content is partially cut off at the bottom of the screenshot.

DETAILS

for a deeper understanding

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- **Evaluation: Results and available data**

GENERAL INFORMATION

RENOVATION PROCESS

RETROFIT SOLUTIONS

EVALUATION

Energy Efficiency

- ENERGY PERFORMANCE
- ENERGY USE
- MEASURED PARAMETERS

Internal Climate

- TEMPERATURE

Costs

- INVESTMENT COSTS
- RUNNING COSTS

Footer Navigation title

- Contact
- Privacy
- Impressum

Footer second column title

Brennerstraße 16B,
39100 Bozen,
Montag -Freitag von 8:00 bis 17:00

DETAILS

for a deeper understanding

Second level of detail data and information:

- Contact details (including all agents involved)
- Context: full explanation
- Solutions: technical details and drawings
- **Evaluation: Results and available data**

The screenshot displays a web browser window with the URL <https://xd.adobe.com/view/214f06d6-e694-462b-587d-c3b1ef2e3e03-577e/?fullscreen>. The page is titled "Interreg-Atlas-Webseite-V3" and features a navigation menu on the right with a "+ MORE" button. The main content is organized into four sections: "Energy Efficiency", "Internal Climate", "Cost", and "Environment".

Energy Efficiency

- ENERGY PERFORMANCE
- ENERGY USE
- MEASURED PARAMETERS

Internal Climate

- TEMPERATURE
- INDOOR AIR QUALITY
- DAYLIGHT
- ACOUSTIC COMFORT
- POST OCCUPANCY EVALUATION

Cost

- INVESTMENT COSTS
- RUNNING COSTS

Environment

- GREEN HOUSE GAS EMISSIONS
- LIFE CYCLE ANALYSIS
- WATER MANAGEMENT
- TRANSPORT AND MOBILITY

A large hand cursor icon is positioned over the "Energy Efficiency" section, indicating an interactive element. A "+ More Details" button is located at the bottom right of the "Environment" section. At the bottom of the page, there is a link: "Discover some similar historic buildings".

CONNECTIVITY

Combining efforts - Linking online resources

Interreg Alpine Space ATLAS

21 observers

60 case studies

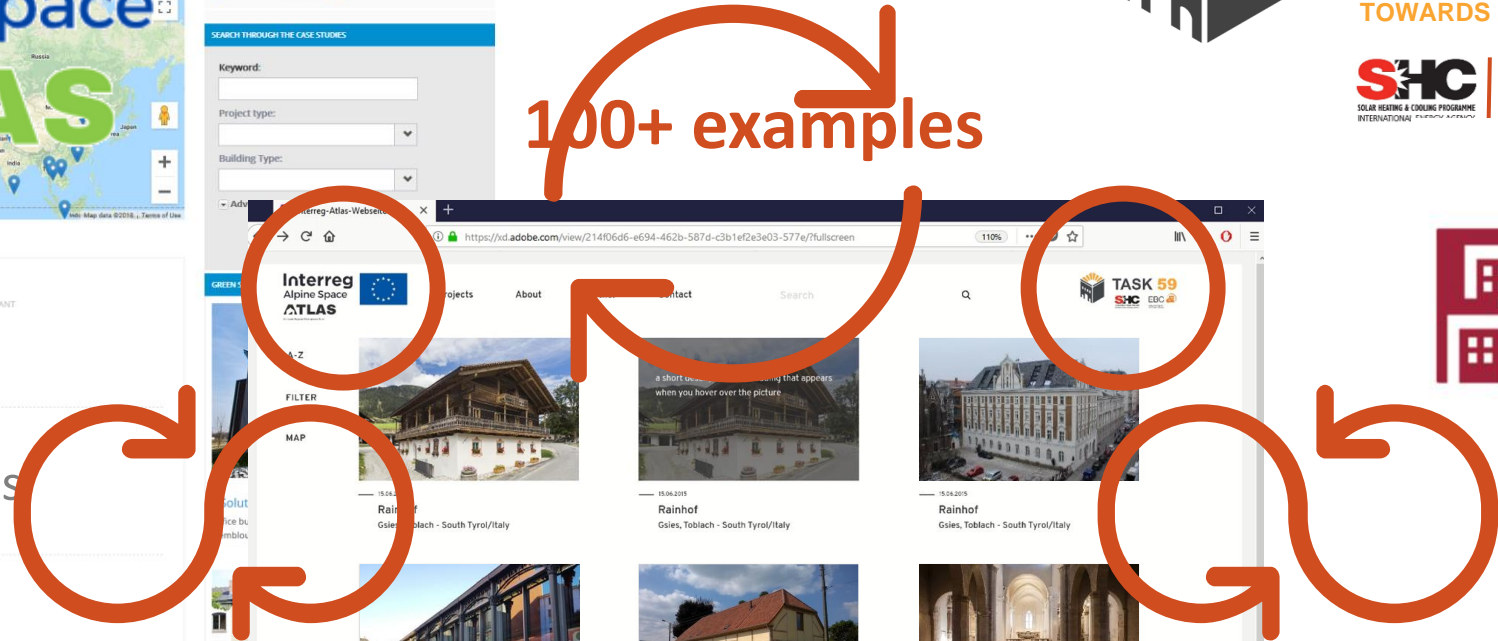
100+ examples

National platforms?



TASK 59

RENOVATING HISTORIC BUILDINGS TOWARDS ZERO ENERGY



DO YOU KNOW A
GOOD EXAMPLE?
GET IN TOUCH!

Task59@eurac.edu



Knowledge Base

Selection criteria for case studies

- Renovation of whole building
- Significant reduction of energy consumption (“better than business as usual”)
- Project has been implemented
- Heritage value assessed and respected
- Documentation of technical solutions & monitoring data (energy/costs) available

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www.iea-shc.org



SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

Overview on case studies

Interim status, Sept. 2019

Project	City	Country	Period of construction	Building use			Building area			Protection level			Intervention			Construction details				HVAC				Renewable energy source				Evaluation / Monitoring data			BGF				
				Residential (urban)	Residential (rural)	Non-residential	Small	Large	(Area)	listed / protected	conservation area	non-listed / non-protected	Renovation	Renovation + extension	Other	External walls	Windows	Roof	Ground floor	Heating	Cooling	Ventilation	Air conditioning	PV	Solar	Biomass	Geothermal	Energy efficiency	Costs	Internal climate		Environment			
Osrarhuset (The Osram Building)	Copenhagen	DK	1945-1959																																824,0 m ²
Rainhof	Gsies	IT	before 1600											plan																					390,0 m ²
Villa Castelli	Bellano	IT	1850-1899											plan	plan	plan																			564,0 m ²
Klostergebäude Kaiserstrasse	Vienna	AT	1850-1899											plan	plan																			2 750,0 m ²	
Klitgaarden	Hundested	DK	1850-1899																															221,0 m ²	
Basilica di Santa Maria di Collemaggio	L'Aquila	IT	before 1600																															2 140,5 m ²	
Lichtmayrgüt in Graming	Graming	DE	before 1600											plan	plan	plan	plan																	150,0 m ²	
Beim Jäger	Baierbrunn	DE	before 1600													plan	plan																	308,0 m ²	
Notarjeva vila	Tolmin	SLO	1900-1944																															412,2 m ²	
Hof 6, Schwarzenberg, Voralberg, Austria	Schwarzenberg	AT	1600-1700											plan	plan	plan																		300,0 m ²	
Mercado del Val, Valladolid (Spain)	Valladolid	ES	1850-1899																															3 936,0 m ²	
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