SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

Knowledge transfer and dissemination

Final Report on Communication and Dissemination - Summary of Activities, Outcomes and Analysis

IEA SHC TASK 59 | EBC Annex 76
Renovating Historic Buildings Towards Zero Energy

SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

TASK 59
RENOVATING HISTORIC BUILDINGS TOWARDS ZERO ENERGY

EBC
Energy in Buildings and Communities Programme

Knowledge transfer and dissemination

Final Report on Communication and Dissemination - Summary of Activities, Outcomes and Analysis

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SHC Task 59 | EBC Annex 76 | Report D.D3
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IEA SHC Task 59 | EBC Annex 76: Deep renovation of historic buildings towards lowest possible energy demand and CO_2 emission (NZEB)

Solar Heating and Cooling Technology Collaboration Programme (IEA SHC)

The Solar Heating and Cooling Technology Collaboration Programme was founded in 1977 as one of the first multilateral technology initiatives ("Implementing Agreements") of the International Energy Agency.

Our mission is *"Through multi-disciplinary international collaborative research and knowledge exchange, as well as market and policy recommendations, the IEA SHC will work to increase the deployment rate of solar heating and cooling systems by breaking down the technical and non-technical barriers."*

IEA SHC members carry out cooperative research, development, demonstrations, and exchanges of information through Tasks (projects) on solar heating and cooling components and systems and their application to advance the deployment and research and development activities in the field of solar heating and cooling.

Our focus areas, with the associated Tasks in parenthesis, include:

- Solar Space Heating and Water Heating (Tasks 14, 19, 26, 44, 54)
- Solar Cooling (Tasks 25, 38, 48, 53, 65)
- Solar Heat for Industrial and Agricultural Processes (Tasks 29, 33, 49, 62, 64)
- Solar District Heating (Tasks 7, 45, 55)
- Solar Buildings/Architecture/Urban Planning (Tasks 8, 11, 12, 13, 20, 22, 23, 28, 37, 40, 41, 47, 51, 52, 56, 59, 63, 66)
- Solar Thermal & PV (Tasks 16, 35, 60)
- Daylighting/Lighting (Tasks 21, 31, 50, 61)
- Materials/Components for Solar Heating and Cooling (Tasks 2, 3, 6, 10, 18, 27, 39)
- Standards, Certification, and Test Methods (Tasks 14, 24, 34, 43, 57)
- Resource Assessment (Tasks 1, 4, 5, 9, 17, 36, 46)
- Storage of Solar Heat (Tasks 7, 32, 42, 58, 67)

In addition to our Task work, other activities of the IEA SHC include our:

- SHC Solar Academy
- *Solar Heat Worldwide*, annual statics report
- SHC International Conference

Our members

Australia
Austria
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For more information on the IEA SHC work, including many free publications, please visit www.IEA SHC.org.

Energy in Buildings and Communities Technology Collaboration Programme (IEA EBC)

To reach the objectives of SHC Task 59 the IEA SHC implementing Agreement has collaborated with the IEA EBC Implementing Agreement at a "Medium Level Collaboration", and with the IEA PVPS Implementing Agreement at a "Minimum Level Collaboration" as outlined in the SHC Implementing Agreement's Policy on Collaboration

Contents

List of Partners

ABBREVIATION	PARTNER	COUNTRY
AAU	Department of the Built Environment, Aalborg University (formerly SBi)	Denmark
BBRI	Belgian Building Research Institute	Belgium
CARTIF	CARTIF Technology Centre	Spain
Cerema	CEREMA	France
CIEMAT	Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas	Spain
DU	Drexel University	United States of America
e7	e7 Energy, Innovation & Engineering	Austria
EURAC	EURAC Research	Italy
FHA	Flanders Heritage Agency	Belgium
Fraunhofer ISE	Fraunhofer Institute for Solar Energy Systems	Germany
HES	Historic Environment Scotland	United Kingdom
ICOMOS	ICOMOS Ireland	Ireland
IIT	Izmir Institute of Technology	Turkey
PoliMi CHPC	Politecnico Milano University, Cultural Heritage Planned Conservation	Italy
PoliMi IETB	Politecnico Milano University, Innovative Energy Technologies for Buildings	Italy
SUPSI	University of Applied Sciences and Arts of Southern Switzerland	Switzerland
Tecnalia	Tecnalia	Spain
UCL	University College London	United Kingdom
UIBK	Universität Innsbruck	Austria
UniCt	Università di Catania	Italy
Uni Fer	Università di Ferrara	Italy
Uni G	Università di Genova	Italy
Uni Lou	Université catholique de Louvain	Belgium
UU	Uppsala University	Sweden

1 Event Activity

1.1 Covid-19 and Online Events

While this heading should not dominate the report, the impacts of COVID-19 on the delivery of many aspects of the project need to be stated, especially as 2020 was the core year for partners and stakeholders to progress on many fronts with full familiarity of the project work. The effects of COVID-19 and its restrictions have been varied, but as the project was well established, with existing relationships developed, the effects could have been much worse. While in mid-2020 there was a pause in activities, and partners readjusted their businesses and operations to the new conditions, by Autumn 2020 most were familiar and active with digital means of communication. Once adopted, the change to online working for all participants has allowed a quicker and easier exchange of information, and meetings were better attended. Most of the outreach and engagement work was able to happen digitally, and it can be argued that dissemination was facilitated in most areas by these circumstances. The utility of the touring exhibition however was curtailed. There is a comment in each area as to where better progress was made than in others. It could be said that the COVID-19 circumstances, as in many areas, re-enforced existing trends and positions that were already in progress. With this shift in working there has been some reallocation of activity headings; online webinars have become another way of addressing project business or delivering knowledge within the headings below.

1.2 Project Partner/Expert Meetings

Core to the running of the project, and all the subtasks, were the six-monthly project meetings. These were hosted by various partners at their host institutions or associates. There were generally held in the larger cities in mainland Europe and lasted 3 days; such a grouping is shown at Figure 1. The list of Expert Meetings is below in Table 1. In each of these meetings were parts of the day allocated to subtask business. Subtask D was part of this, with reports made by the subtask leader. As described above, for the first 2/3 of the project these dialogues were in person; from early 2020 they were virtual meetings organised by EURAC; see a representative attendance at Figure 2. Attendance was normally 15-20 partner organisations, with supporting staff as required. The host partners usually also organised activities around the meeting, such as visits to heritage projects where energy upgrade work had been done. In many cases, a stakeholder event was held the afternoon before where local professionals were able to meet partners, discuss and present their own solutions and projects and become familiar with the project and the people involved.

NUMBER & LOCATION	HOST PARTNERS	DATE	MEETING FOCUS
1ST – EDINBURGH	HES	23-25 Oct 17	Kick off meeting
2ND – DUBLIN	ICOMOS	01 March 18	Various aspects of refurbishment
3RD – VISBY	UU	27-29 Sept 18	Details of the framework activities and webtool
4TH – COPENHAGEN	AAU	08-10 April 19	Work packages of SHC Task 59
5TH – VIENNA	e7	14-15 Oct 19	
6TH – ONLINE	EURAC	23-24 April 20	Work packages and reporting
7TH – ONLINE	EURAC	19-21 Oct 20	Event planning and final reports
8TH – ONLINE	EURAC	31 May-01June 21	Final meeting

Table 1. List of project partner meetings to date.

Figure 1. Meeting and networking in Copenhagen. © HES

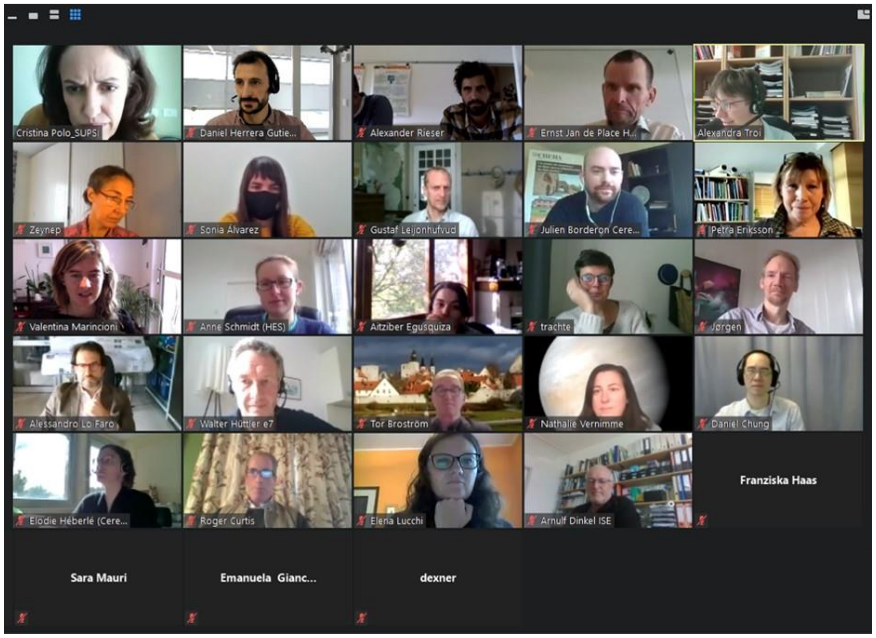


Figure 2. Coronavirus required a change in the normal meeting pattern. Here is the online zoom meeting of the 6th partner meeting. © EURAC

1.3 Policy Level Events

One of the objectives of the project was to inform and influence building energy policy at national and regional level. This was achieved by some events being targeted above the technical level, looking at economic and other factors in large-scale refurbishment. These are aimed at regional or national level planners and policy makers. By their nature, such events are smaller, and sometimes were workshop type events. Many partners attended a range of such activity, contributing their own expertise and introducing the SHC Task 59. The objective with this type of event was to inform planners at municipal level what the art of the possible looked like (with examples from the SHC Task 59 case studies) and considerations on how such work could be delivered as part of a regional or national level programme. Figure 3 shows an image of such an event held at Canobbio, with a speaker from SUPSI discussing the retrofit of historic modernist era properties and the contribution of solar technologies. Availability of officials and timings sometime obliged a policy level contribution at more technical events. For example, at the HES 2 day conference in Stirling, the first day was policy matters. Scottish Government gave their retrofit policy intention

and plan, with related organisations such as the Energy Savings Trust speaking on how it would be implemented. The second day was focused on technical level matters. Table 2 shows the list of these events.

Figure 3. Image of the 'Solar architecture: energy in Dialogue' event in Canobbio, organised by SUPSI. © SUPSI

EVENT	PARTNER	DATE	EVENT THEME OR PRESENTATION TITLE	AUDIENCE
City Exchange Vienna-Zagreb, Zagreb	e7	28 Nov 17	Innovative Refurbishment of Historic Buildings – Case studies Vienna	80
Il Risanamento di edifici storici verso nZEB. Il progetto IEA SHC Task 59 e la nuova norma EN 16883:2017	EURAC	22 Feb 18	Workshop about the theme of restoration towards nZEB	10
7th European Congress on the Use, Management and Conservation of Buildings of Historical Value	e7	14-15 Nov 18	Networking in order to prepare the cooperation of IEA SHC Task 59 with BHÖ for the 2019 event	
Seminar on Retrofitting Traditional and Historic Buildings	HES	22 Nov 18	Various retrofit presentations: comment on area-based schemes	
IEA SHC Task 59/Interreg ATLAS joint meeting on retrofit solutions	UIBK	03 Dec 18	Discussion with all participants	27
Planning Seminar	HES	13 March 19		
All-Energy and Decarbonise 2019 Conference	HES	14-16 May 19	Wider approach to refurbishment	
The 2019 STBA-SPAB Conference & EXPO	HES	11 June 19	Initiatives for improving sustainability of older buildings in Scotland	
Solaris #03, Solar architecture: Energy in Dialogue, Canobbio	SUPSI	05 July 19	Integration of photovoltaic in historic buildings and protected heritage areas	50
Renovate Europe Day	EURAC and others	08 Oct 19	Development of the ATLAS project database	120

EVENT	PARTNER	DATE	EVENT THEME OR PRESENTATION TITLE	AUDIENCE
Scotland Europa Exhibition	HES	08 Oct 19	HES Sustainability work and case studies	120
BHÖ 8th European Congress on the Use, Management and Conservation of Historic Buildings	e7, EURAC and others	16-17 Oct 19	8 presentations by various project partners and participation in panel discussions	100
Webinar Sustainable Heritage SURE2050	FHA	13 Oct 20	"Striving for a sustainable management of heritage buildings" by FHA	100
Energy Efficiency Conference, Stirling	HES, EURAC & Cerema	06-07 Feb 20	Various	100

Table 2. Table of policy level events held under the project.

1.4 Professional Level

This level of engagement sought interaction with designers and specifiers of energy improvements. This might include architects, surveyors and municipal design and planning officers. This was often achieved by partners putting on, or contributing to, national level professional associations' CPD programmes. For example, HES worked with the Royal Incorporation of Architects in Scotland (RIAS) on a CPD for local chapters in Aberdeen and Glasgow in 2020 and 2021. There was similar activity with the Royal Institute of Chartered Surveyors (RICS) in Scotland. This type of interaction was concerned mainly with technical and design details, compliance with national and European standards and publicising the newsletter and the best practice database. Sometimes the activity was concerned with dialogues and options on a specific project or technology in a building. For example, HES showed the retrofit measures of their case study building Holyrood Park Lodge to architects (Figure 4). Figure 5 shows a discussion organised by SUPSI concerning a solar array on a church in Lugano.

Figure 4. Architects CPD event at Holyrood Park Lodge, Edinburgh. © HES

Figure 5. Image from the meeting and worktable for construction of a solar plant in a historic church in Lugano, organised by SUPSI. © SUPSI

Some events favoured a speakers' panel at the end of each session, where there could be a discussion of specific points, as at Figure 6. A list of these events is presented in Table 3.

Figure 6. Fair of Cultural Heritage discussion panel. © AAU

EVENT	PARTNER	DATE	PRESENTATION TITLE	AUDIENCE
WTA colloquium "Energetic interventions in monuments: a sustainable story!?"	FHA	17 Nov 17	Organization (with WTA Netherlands-Flanders) and president of colloquium	150
Ecobuild Conference, Excel Centre London	HES	08 March 18	'Frugal innovation' and the refurbishment of traditional buildings	150
STBA-SPAB 2018 conference, London	ICOMOS	07 June 18	Standard EN 16883 and SHC Task 59	
Energy Efficiency in Historic Buildings	UU	26-27 Sept 18		140
EuroSun 2018	EURAC	12 Oct 18	Solar Renovation of Historic Buildings	350

EVENT	PARTNER	DATE	PRESENTATION TITLE	AUDIENCE
'European Wise Event', Interreg VIOLET	EURAC, Tecnalia	24 Oct 18	2 expert presentations	110
EEHB 2018	Various	26-27 Oct 18	18 presentations from task experts	150
International Urban Energy Systems Conference	EURAC	08-09 Nov 18	Integration of Solar Energy Applications on Historic Buildings	
Fair of European Innovators in Cultural Heritage	BBRI, AAU	15-16 Nov 18		100
Formation for architects "energy-consultants specific for heritage buildings/ linked to project Heritage energy consultants (Flemish climate fund)	FHA, BBRI	5 days in 2018		95
Vienna Business Agency	e7	15 Jan 19	With the power of the sun: Integration of PV in Historic Buildings	50
WTA-PRECOMOS symposium "Preventive conservation: from climate- and damage monitoring to an integrated systematic approach", Leuven	FHA	05 April 19	"The role of European standardisation in the dissemination of systemic (preventive) conservation strategies"	150
European Heat Pump Forum 2019	EURAC	16 May 19	Villa Castelli: Towards the nZEB renovation of a historic building	150+
Solar Update Svizzera italiana 2019, Bellinzona	SUPSI	24 May 19	'BiPV meets History' Lecture during the "Solar Days" in Switzerland addressed solar professionals and Swissolar associates to introduce the topic related to the integration of solar systems in historic buildings	70
IEA SHC National Day	EURAC, UIBK	05 June 19	Deep renovation of historic and listed buildings towards lowest possible energy demand and CO_2 emission Panel discussion	
Meeting and worktable for the construction of a solar plan in a historic church, Lugano	SUPSI	27 June 19	Meeting attended by representatives of the Cantonal Institutions, the Office of Cultural Heritage, and members of the Industrial Companies of Lugano (AIL), of the production and energy efficiency sector.	12
FERRARA – salone internazionale del restauro	EURAC	19 Sept 19	Sostenibilità ambientale e uso circolare delle risorse nell'intervento sugli edifici storici	100
Solaris #03 Event	SUPSI, EURAC	05 July 19	L'involucro attivo nell'esistente, tra timori e dialogo, tutela e Innovazione Nuove tecnologie per il risanamento dell'edilizia storica	22
BHÖ 8th European Congress on the Use, Management and	Various	16-17 Oct 19	Session dedicated to IEA SHC Task 59	20

EVENT	PARTNER	DATE	PRESENTATION TITLE	AUDIENCE
Conservation of Buildings of Historical Value				
National Library, Vienna	e7	9 Oct 19	Innovative Solutions for Historic Building Retrofit	10
25th Edition du salon International	Cerema	24-27 Oct 19	Retrofitting of Traditional Buildings	
14th Conference on Advanced Building Skins	SUPSI	28-29 Oct 19	Presentation of BIPV Status Report 2020 "Building Integrated Photovoltaics: A practical handbook for solar buildings' stakeholders". 2020. SUPSI, Becquerel Institute. “BIPV in dialogue with history” article part of the chapter 1	150
Edinburgh Architects tour of HES refurbishment project	HES	22 Jan 20	Energy refurbishment in Trad buildings & tour	20
Solar Academy webinar (Online)	EURAC, e7, UU, UIBK	28 Jan 20	Renovating Historic Buildings towards Zero Energy	185
Conservation Architects tour of HES refurbishment project	HES	30 Jan 20	Workshop on historic building refurbishment	10
Monumento Fair	EURAC	05-07 March 20	Touring Exhibition	
Pocket Mannerhatten Online-Workshop, Vienna	e7	24 Sept 20	Climate neutral retrofit of historic buildings	15
REHABEND 2020	Various	28-30 Sept 20	8th Euro-American Congress Construction Pathology, Rehabilitation Technology and Heritage Management 3 papers were presented	150
Certificate of Advanced Study (CAS) in regenerative materials, ETH Zürich	UCL	05 Oct 20	Seminar on the sustainable retrofit of traditional buildings	15
Hygrothermal Risk Seminar, Edinburgh Architects Association	HES	07 Oct 20	Seminar on retrofit and hygrothermal risk	70
HERITECH Florence	EURAC/ SUPSI	14-16 Oct 20	A conceptual framework on the integration of solar energy systems in heritage sites and buildings	40
Southern Uplands Partnership: Energy Efficiency in Traditional Buildings (Online)	HES	21 Oct 20	Presentation on traditional building retrofit	20
Renovate Europe Webtalk, Vienna	e7	27 Oct 20	Seminar on Innovative Retrofit Approaches	35
Workshop: Responsible Restoration of Old Buildings (Online)	Cerema, EURAC	17 Nov 20		
RIAS Aberdeen CPD: Thermal Upgrades in Traditional Buildings (Online)	HES	25 Nov 20	Presentation on Traditional building retrofit	70

EVENT	PARTNER	DATE	PRESENTATION TITLE	AUDIENCE
Fabric Monitoring in Traditional Buildings (Online)	HES	26 Nov 20		25
RIAS Aberdeen CPD: Hygrothermal Matters and HES Case Studies (Online)	HES	19 Feb 21	Hygrothermal Matters and HES Case Studies	64

Table 3. Table of professional level events

1.5 Trade and Practitioner

Trades (those who do the work), are a hard-to-reach group in all countries but are important as in many projects there are no architects or designers, and the work is done in agreement with the homeowner and those doing the installation. Towards the end of the project, these events were held mostly online, with a partner speaking in a virtual platform using slides. During these presentations, partners were able to describe the work of the SHC Task 59, and the online database of examples. The opportunity was also taken to get attendees to sign up for the newsletter, through links and QR routes as shown on a HES presentation slide (Figure 7).

Figure 7. The final slide on a HES energy efficiency retrofit presentation. © HES

The appeal to sign up to the newsletter was successful and after two virtual presentations by HES in October and November 2020 there were 10 sign ups to the newsletter. Where there was the right space and equipment partners could interact with models to show the audience technical aspects, as shown by HES at an event in Stirling. This worked well with trades who prefer to see and touch the materials and techniques being described, and the measures can be seen in context. The model shown in Figure 8 was one of three rigs showing appropriate interventions in walls, windows, floors and roof spaces. Table 4 lists these kinds of events.

Figure 8. A model of a historic timber window made by HES at the Engine Shed being used in trade outreach © HES.

EVENT	PARTNER	DATE	PRESENTATION TITLE	AUDIENCE
EBC Annual Conference: Energy efficiency in historical buildings: what role for SMEs and craftsmen?	BBRI, EURAC	29 June 18	Best Practices for energy efficiency historical buildings	
Refurbishment Seminar	HES	23 Jan 19		10
Building Professionals Training Seminar	HES	09 March 19		20
SHC TASK 59 Stakeholder Event	AAU	08 April 19		
Thermal Refurbishment Seminar	HES	22 May 19		
Stadt der Zukunft Themenwoche, Innsbruck	EURAC, e7	25 Sept 19	Renovating historic buildings towards Zero Energy Fragerunde fuer Praktiker	100
Imbersago-Giornata della Collaborazione Europea	EURAC	26 Sept 19	Solar laboratory	1000
Renovation Day 2019	EURAC	03 Oct 19		
The European Week of Regions and Cities	EURAC	08-10 Oct 19		
Multifunctional dry building envelopes Briefing Sessions	SUPSI	09-16 Oct 19	Two seminars and communication sessions across the territory, in Ticino, together with some SME of the building sector and companies active on solar energy	59
CREBA National Conference	CEREMA	21 Nov 19		
CIBSE Build2Perform	HES	28 Nov 19		
Moisture Research Centre Information Day	UU	28 Nov 19	RIBuild	

EVENT	PARTNER	DATE	PRESENTATION TITLE	AUDIENCE
Infoday – BIPV meets History	EURAC/ SUPSI	5 Dec 19	BIPV meets History - project presentation BIPV digital platform	100
PLANFenster	EURAC	5-11 June 20	Energy restoration of historic windows	
Energy Renewal of the historic building: a 'Sustainable Issue' for debate (Online)	SUPSI	02 Dec 20	Relationship between conservation and sustainability safeguarding - in a sustainable key - the historical and cultural heritage, to foster the energy retrofit of historic buildings and the integration of renewable energy and solar energy promoting a theoretical-critical debate with stakeholders.	25
Briefing session with Public authorities	EURAC	27 Jan 21	La legislazione nazionale e locale per l'integrazione dei sistemi fotovoltaici	20
Briefing session with Heritage Authorities	EURAC	17 Feb 21	Architettura solare in contesti di pregio: il Progetto BIPV meets history	20
SBE'21 workshop	EURAC	14 April 21	Balancing heritage preservation, local RES potential and BIPV technology exploitation	28 (10 countries)

Table 4. List of trade and practitioner events.

1.6 Public Outreach

The subtask was required to deliver, or manage provision of, a series of outreach events for the public in the partner countries as part of the SHC Task 59 project. This means homeowners and potential clients – those who own the assets and want to commission work. The events were aimed at raising awareness of the project among such owners and giving confidence as to the feasibility of energy upgrade works to historic and traditional buildings.

Where partners were presenting information on recent topics, they often mentioned SHC Task 59 as a related piece of work, even if the main pitch was on something else. An example is when HES was speaking about climate change adaptation, the SHC Task 59 project was mentioned as it allowed attendees to get a link to information on a related topic, with emerging online content.

EVENT	PARTNER	DATE	PRESENTATION TITLE	AUDIENCE
Home Energy Scotland Event, Melrose	HES	19 April 18	Homeowner Seminar	20
Home Energy Scotland Event, Kilmarnock	HES	03 Oct 18	Homeowner Seminar	20
Stakeholder Event, Stirling	HES	22 Nov 18	Energy Efficiency Seminar	80
Wester Ross UNESCO Biosphere	HES	11Jan 21	Community outreach – energy efficiency and sustainability	20

Table 5. List of public outreach events.

1.7 Touring Exhibition

A touring exhibition was one of the Subtask D deliverables. One of the project partners, EURAC, led on the design and print of 12 pull up banners to showcase the work of partners across the project area. This was completed in Year 2 of the project, and a schedule of locations was agreed with EURAC and partners at the expert meeting in Munich. They were used to support other outreach activity organised by partners and associated organisations. Their positioning was generally in the hall or foyer space of a venue, where attendees could circulate among the banners; an example of such a placing is at Figure 9, where the banners were used to support the HES event at the Engine Shed in Stirling, Scotland. By late 2019 the exhibition had been moved to five locations (see table 6 for the schedule) but the onset of restrictions in Spring 2020 obliged it to be returned to EURAC. In addition to the events where the banners were used, the list below shows the potential events where banners were planned to be present, which had to either be cancelled or held online due to the restrictions.

Figure 9. The pull up banners at the Engine Shed in Stirling, Scotland during an outreach event. © HES

LOCATION	EVENT	DATE	NOTES
VIENNA, AUSTRIA	BHÖ Conference	16.10.2019 -17.10.2019	
LAS CONDES, CHILE	Solar World Congress SWC2019	04.11.2019 - 09.11.2019	
COBURG, GERMANY	Coburg University	06.01.2020 - 31.01.2020	
STIRLING, UNITED KINGDOM	Energy Efficiency Seminar	06.02.2020 - 07.02.2020	
SALZBURG, AUSTRIA	Monumento	01.03.2020 - 08.03.2020	
VIENNA, AUSTRIA	WTA	March 2020	Cancelled
LOUVAIN-LA NEUVE, BELGIUM	6th SHC Task 59 Expert Meeting	April 2020	Event held online
LUGANO, SWITZERLAND	ATLAS public event	04.05.2020 – 08.05.2020	Event held online
ROVERETO, ITALY	Annual congress of Trentino-Alto Adige architects chamber	15.05.2020 – 16.05.2020	Event held online
PLYMOUTH, UNITED KINGDOM	Plymouth City Council		Postponed, date TBC
ATHENS, GREECE	EuroSun	01.09.2020 – 04.09.2020	Cancelled
ORKNEY, UNITED KINGDOM	Energy Pathfinder	Sept/Oct 2020	Cancelled
EDINBURGH, UNITED KINGDOM	Energy Pathfinder	Sept/Oct 2020	Cancelled
GRAZ, AUSTRIA	ISEC 2020	14.10.2020 – 16.10.2020	Postponed, date TBC

LOCATION	EVENT	DATE	NOTES
IZMIR, TURKEY	7th SHC Task 59 Expert Meeting	October 2020	Event held online
LEIPZIG, GERMANY	Denkmal & WTA	05.11.2020 – 07.11.2020	Cancelled
VALLADOLID, SPAIN	AR&PA	12.11.2020 – 15.11.2020	Cancelled
BOLZANO, ITALY	SBE21 Heritage	14.04.2021 – 16.04.2021	Event held online
BENEDIKTBEUREN, GERMANY	EEHB 2020	Postponed to 2022	

Table 6. List of locations where the touring exhibition was shown.

2 Learning Opportunities

The SHC Task 59 project enabled a number of learning opportunities for students and those in the early parts of their career (Table 7). Real life learning opportunities are a great addition to those studying in the subject and at the start of their career, as it enables them to get understand the workings of these kinds of projects. This was particularly the case for the HiBERatlas, where students and interns prepared the case studies and helped to input the information. In this way, they became familiar with the case studies themselves as well, providing real life examples of retrofit projects.

LEARNING OPPORTUNITY	PARTNER	TASK
Student Internship	HES	Preparing case studies and inputting into HiBERatlas website
Student Internship	UCL	Documenting wall solutions and inputting them into HiBERatlas website
Full year Internship	HES	Involvement in project as partner, including social media and meetings
Teaching course	EURAC	"Teaching by consideration of examples" – Preparing case studies, inputting into HiBERatlas website and public presentation
Guest lecture in postgraduate course	FHA	"Energy Efficiency Services" at Hogeschool PXL, Hasselt Belgium
Master Theses	e7	Supervision of several Master Theses on FH Campus Vienna and FH Technikum Vienna
PhD Thesis	UU	PhD Thesis *'Balancing Building Conservation with Energy Conservation - Towards differentiated energy renovation strategies in historic building stocks',* in line with the SHC Task 59 objectives

Table 7. Learning opportunities enabled by the SHC Task 59 project.

3 Publications

This section will describe some of the publications which have been part of the SHC Task 59 project, mainly publications written by our partners and published in a variety of formats and places. The ease by which the various media could be accessed and the familiarity with the different publication routes varied. The large number of journal articles reflects the academic contribution of universities and institutes to the project. Some areas, such as trade level publications, proved harder to reach.

3.1 Trade Journals

The trade journals provide an important sector for informing those working on buildings. This aspect of the task proved harder to achieve in some countries. This partly due to the nature of the trade magazine sector, which is

quite heavily product based, and focusses on large current projects, and links with such publishes. Some landlord organisations were interested in the issue however, and a dialogue was established.

Additionally, information about the HiBERatlas website was collated in an article and offered to publications in the different partner countries. This resulted in trade journal publications in several countries, as listed below (Table 8). The articles were published in the different partner languages, and the titles here are shown in the original language.

ARTICLE	PARTNER	DATE	JOURNAL/PAPER
Sustainability and Climate Change	UK	Spring 19	Business Insider Magazine
Energy Efficient Scotland	UK	Sept 19	Scottish Land and Business Magazine
Staatspreis für Architektur und Nachhaltigkeit verliehen (Project Mariahilfer Straße 182)	Austria	Oct 19	a3 Bau (print/online), Der Standard etc.
Når energiforbruget I historiske bygninger skal reduceres	Denmark	Feb 20	Energi Forum Danmark
Hvordan kan energiforbruget13educerss I historiske bygninger?	Denmark	Feb 20	Bygge-&Anlægsavisen
Når energiforbruget i historiske bygninger skal reduceres	Denmark	Feb 20	Energi Forum Danmark
Hvordan kan energiforbruget reduceres i historiske bygninger?	Denmark	Feb 20	Bygge-& Anlægsavisen
Efficienza energetica negli edifici storici: le strategie per ridurre i consumi	Italy	Feb 20	Info Buildenergia
¿Cómo reducir el consumo energético en los edificios históricos?	Spain	Feb 20	SolarNews
¿Cómo reducir el consumo energético en la rehabilitación histórica?	Spain	March 20	CARTIF website
Ejemplos de buenas prácticas en la rehabilitación de edificios históricos mediante la plataforma HiBERatlas	Spain	April 20	Construbile
Online Plattform für gelungene Sanierungsobjekte	Austria	May 20	Handwerk+Bau
Come ridurre i consumi energetici negli edifici storici?	Italy	May 20	Rinnovabili.it
Altbau-Sanierungs-Altas	Austria	May 20	Building Times
Projekte mit Vorbildwirkung	Austria	June 20	Die Bauzeitung (p 24)
Energieverbrauch in historischer Substanz senken	Austria	Sept 20	a3 Bau
Wie lässt sich der Energieverbrauch in historischen Gebäuden senken?	Austria	Aug 20 (4/20)	Umweltjournal/Online Magazin Umwelttechnik, Energie und Abfallwirtschaft
Wie lässt sich der Energieverbrauch in historischen Gebäuden senken?	Austria	Aug 20	Umweltjournal/Online Magazin Umwelttechnik, Energie und Abfallwirtschaft
Risanamento energetico del patrimonio storico	Switzerland	Aug 20 (004/20)	Archi magazine. Publisher: espazium. ISSN 1422-5417
Il Castello di Doragno, Restauro e sostenibilità energetica	Switzerland	Aug 20 (004/20)	Archi magazine. Publisher: espazium. ISSN 1422-5417
Hygrothermal performance of traditional buildings	UK	Winter 20	SPAB Magazine
How to maintain your traditional tenement flat and communal areas	UK	July 20	Scottish Construction Now

ARTICLE	PARTNER	DATE	JOURNAL/PAPER
BIPV in dialogue with history	Switzerland	Nov 20	BIPV Status Report 2020 "Building Integrated Photovoltaics: A practical handbook for solar buildings' stakeholders". 2020. SUPSI, Becquerel Institute. Editor: SUPSI
Pacchetto Ambiente: Soluzioni Pratiche e tecniche per RI-construire una società rinnovabile, sostenible e futurible	Switzerland	Winter 20	Tutto Green magazine, Ed. n°2-2020 (editor: Edimen SA)
Vidtgående renovering af historiske bygninger mod lavest muligt energibehov og CO2 udledning	Denmark	June 21	HVAC Magasinet

Table 8. List of trade journal articles, including those about the HiBERatlas.

3.2 Journal Articles and Conference Proceedings

The nature of many partners meant that there was a good variety of academic contributions to this area of Subtask D. During the project, partners contributed 18 academic articles to 10 different journals, shown in the table below (Table 9). Titles varied from a case study of sustainable church heating to the analysis of thermal and hygrometric simulation of historical buildings. Some of these articles were produced as part of Subtask C, where individual building elements were given considered at with particular scrutiny and focus. There are also 15 articles published in conference proceedings (Table 10). These conferences took place in the different partner countries and show the variety of presentations given. A great majority of the scientific articles were published in English, with some exceptions. This is the norm for academic publications. The audience of these articles and proceedings are members of universities and research centres, for which the lingua franca is mostly English to help general communication across borders. The papers presented at the final conference are not included in this count and are reported in Section 6.1 of this report.

JOURNAL ARTICLE	PARTNER	DATE	JOURNAL/ISSUE
Investigation of indoor microclimate of historic libraries for preventive conservation of manuscripts. Case Study: Tire Necip Pasa Library, Izmir-Turkey	IIT	April 17	Sustainable Cities and Society, Volume 29, 66-78 https://www.sciencedirect.com/science/article/abs/pii/S2210670716303225
Applying Underfloor Heating System for Improvement of Thermal Comfort in Historic Mosques: The Case Study of Salepçioglu Mosque, Izmir, Turkey	IIT	Oct 17	Energy Procedia, Volume 133 https://www.sciencedirect.com/science/article/pii/S1876610217344818
The effect of spatial interventions on historic buildings' indoor climate (Case Study: Tire Necip Paşa Library, Izmir-Turkey)	IIT	Oct 17	Energy Procedia, Volume 133 https://www.sciencedirect.com/science/article/pii/S1876610217344533
Microclimatic monitoring of the Duomo (Milan Cathedral): Risks-based analysis for the conservation of its cultural heritage.	PoliMi IETB	2019	Building and Environment, Volume 148 https://www.sciencedirect.com/science/article/abs/pii/S0360132318307108
Impact of Climate Change on Indoor Environment of Historic Libraries in Mediterranean Climate Zone	IIT	July 19	Int. J. Global Warming, Volume 18/3-4 https://www.inderscienceonline.com/doi/abs/10.1504/IJGW.2019.101083
Deep renovation of historic buildings: The IEA SHC Task 59 path towards the lowest	Various	Oct 19	International Journal of Building Pathology and Adaption

JOURNAL ARTICLE	PARTNER	DATE	JOURNAL/ISSUE
possible energy demand and CO2 emissions			https://www.emerald.com/insight/content/doi/10.1108/IJBPA-12-2018-0102/full/html
Categorization of South Tyrolean Built Heritage with Consideration of the Impact of Climate	EURAC PoliMi IETB	Dec 19	Climate 2019, 7, 139; doi:10.3390/cli7120139 https://www.mdpi.com/2225-1154/7/12/139
Dynamic thermal and hygrometric simulation of historical buildings: critical factors and possible solutions	Various Subtask B (B5)	Feb 20	Science Direct, Volume 118 https://www.sciencedirect.com/science/article/abs/pii/S1364032119307178
Validation of dynamic hygrothermal simulation models for historical buildings: State of the art, research challenges and recommendations	Various Subtask B (B5)	Aug 20	Building and Environment, Volume 180 https://www.sciencedirect.com/science/article/abs/pii/S0360132320304601
Coloured BIPV technologies: methodological and experimental assessment for architecturally sensitive areas	EURAC	Aug 20	Energies 2020, 13(17) https://www.mdpi.com/1996-1073/13/17/4506
What Are the Implications of Climate Change for Retrofitted Historic Buildings? A Literature Review	EURAC PoliMi IETB	Sep 20	Sustainability 2020, 12(18), 7557; https://www.mdpi.com/2071-1050/12/18/7557
A conceptual framework on the integration of solar energy systems in heritage sites and buildings	EURAC / SUPSI		IOP Conference Series: Materials Science and Engineering, Volume 949, International Conference Florence Heritech: the Future of Heritage Science and Technologies, 14-16 oct 2020, Online Edition. IOP Publishing, IOP Conf. Series: Materials Science and Engineering 949 (2020) 012113, doi:10.1088/1757-899X/949/1/012113949 (2020) 012113. https://iopscience.iop.org/article/10.1088/1757-899X/949/1/012113/pdf
Integration of energy efficient ventilation systems in historic buildings – review and proposal of a systematic intervention approach	Various Subtask C	Feb 21	Sustainability – Special Issue https://www.mdpi.com/2071-1050/13/4/2325
How can scientific literature support decision making in the renovation of historic buildings? An evidence-based approach for improving the performance of walls	Various Subtask C	Feb 21	Sustainability – Special Issue https://www.mdpi.com/2071-1050/13/4/2266
Conservation-compatible retrofit solutions in historic buildings: an integrated approach in SHC Task 59 project	Various Subtask C	March 21	Sustainability – Special Issue https://www.mdpi.com/2071-1050/13/5/2927
Risk-benefit assessment scheme for renewable solar solutions in traditional and historic buildings	SUPSI / EURAC / HES	May 21	Sustainability – Special Issue https://www.mdpi.com/2071-1050/13/9/5246
Photovoltaic BIPV Systems and Architectural Heritage: New Balance	SUPSI / UNICT	May 21	Sustainability – Special Issue

JOURNAL ARTICLE	PARTNER	DATE	JOURNAL/ISSUE
between Conservation and Transformation. An Assessment Method for Heritage Values Compatibility and Energy Benefits of Interventions			https://www.mdpi.com/2071-1050/13/9/5107/htm
Co-creation of local eco-rehabilitation strategies for energy improvement of historic urban areas	Tecnalia	2021	Renewable and Sustainable Energy Reviews, Volume 135 https://www.sciencedirect.com/science/article/pii/S1364032120306201

Table 9. List of journal articles submitted as part of SHC Task 59.

CONFERENCE PROCEEDINGS	PARTNER	DATE	CONFERENCE
WTA colloquium "Energetic interventions in monuments: a sustainable story!?", editors	FHA	Nov 17	WTA colloquium "Energetic interventions in monuments: a sustainable story!?"
Life cycle assessment in improving the sustainability of existing buildings: Some issues in historic buildings	EURAC	July 18	The XII Italian LCA Network Conference
Historic Building Atlas: Sharing best practice to close the gap between research and practice	Various	Sept 18	EEHB Conference proceedings
Decision support tool for the innovative and sustainable renovation of historic buildings (HISTool)	e7	Sept 18	EEHB Conference proceedings
Effect of intervention strategies on seasonal thermal comfort conditions in a historic mosque in the Mediterranean climate	IIT	Sept 18	EEHB Conference proceedings
Energy savings due to internal façade insulation in historic buildings	AAU	Sept 18	EEHB Conference proceedings
Wooden windows in the historic alpine architecture: balancing energy and conservation needs.	EURAC	Dec 18	PLEA2018. Hong Kong
The role of European standardisation in the dissemination of systemic (preventive) conservation strategies.	FHA	April 19	WTA-PRECOMOS symposium "Preventive conservation: from climate- and damage monitoring to an integrated systematic approach" Leuven
Assessing the impact of climate change on energy retrofit of alpine historic buildings: consequences for the hygrothermal performance.	EURAC / POLIMI IETB	Oct 19	Sustainability in the built environment for climate change mitigation: SBE19, Thessaloniki, Greece
Climate change impact on hygrothermal performance of energy- retrofitted historic buildings: numerical simulations of internally insulated masonry walls in South Tyrol	EURAC / POLIMI IETB	May 20	Adapting historic places to climate change. Proceedings of the international virtual conference of the project Adapt Northern Heritage

CONFERENCE PROCEEDINGS	PARTNER	DATE	CONFERENCE
Dissemination of best-practice in energy retrofit of historic buildings. Rainhof, a case study in the Italian Alps	EURAC	Sept 20	Conference proceedings of REHABEND 2020
Acceptance of building integrated (BIPV) in heritage buildings and landscapes: potentials, barrier and assessment criteria	SUPSI / EURAC	Sept 20	Conference proceedings of REHABEND 2020
3D-GIS models to support the co-creation of energy efficient strategies for historic urban environments	Tecnalia	Sept 20	Conference proceedings of REHABEND 2020, SHC TASK 59 was collaborating entity of this conference
Guidelines for internal insulation of historic buildings	AAU	Sept 20	Nordic Symposium on Buildings Physics (NSB) 2020 (nsb2020.org)
Ponti termici nell'edilizia storica in ambiente mediterraneo: valutazioni e proposte di intervento (Thermal bridges in Mediterranean built heritage: evaluation and intervention)	UNICT	Oct 20	Colloqui.AT.e 2020, Nuovi orizzonti per l'architettura sostenibile
A conceptual framework on the integration of solar energy systems in heritage sites and buildings	SUPSI	Nov 20	HERITECH 2020 Materials Science and Engineering, Volume 949
Our heritage is the unique factor that can reduce carbon emissions	HES	Dec 20	

Table 10. List of conference proceedings submitted as part of SHC Task 59.

4 Online

4.1 SHC Task 59 Project Website

The website is hosted by the parent organisation IEA SHC and has been used to give an introduction to the project, give details about the project partners and serve as repository for the different outreach activities and publications. It has also been used to provide links and reference material for the events and activities mentioned in this report. As such, it is the repository of the work that the SHC Task 59 has done.

The website included information about the project, such as background, deliverables and highlights. This included profiles of the different partners as well as their contact details. Partner profiles were updated as they were passed on to the Subtask D lead partner. Other information included was a description of any news, events and activities. The newsletter had a dedicated area, where all past newsletters can be accessed via links. The publications completed by partners and relevant to the project and any reports written were included in another part of the website.

A number of other resources were also included. These included external publications which were considered to support the work of the task, as were images and a calendar of dates of the touring exhibition. A direct link to the Best Practice Database was also included. The blog, also listed in this part of the website, is discussed below.

The website was updated regularly, and information was checked for accuracy. This was particularly important for events and news. The events particularly are a repository of activities undertaken by our partners, and these were split into upcoming and past events. As events predominately moved online over the year 2020-2021, recordings were increasingly available after the events, which meant that these could be added to the website afterwards. As such, this part of the website continues to be a useful source of information.

The website was supported externally. The underlying design of the website was updated during the project. This required some adjustments, as not all content was migrated entirely and correctly. Regularly checking and maintenance of the website was necessary.

Based on google analytics information, the homepage was the most popular part of the site, followed by the publications section and the information about the partners. There was a total of 22,050 visits to the website up to the 28 February 2021, though it should be noted that these are not unique hits. The number of visits rose slightly from an average of 15 in August 2018 to just over 30 in February 2021. Across the whole time, the average number of visits a day was 23. Looking at a day to day number of visits, it is clear that a mostly professional audience was reached, as visits were three times more likely to happen during the week (average of 29 visits per day) compared to the weekend (average of 7 visits per day). Spikes in the numbers are sometimes close to specific events and meetings. For example, on the 28/01/2020, the date of the IAE SHC Solar Academy, there were 298 visits, with a further 181 the day after. Similarly, visits during dates of the expert meetings rose. However, this is not always consistent. There is no clear trend connecting the page visits to social media posts or newsletters, also because this could result in visits over several days with people visiting when they see the content.

4.1.1 Blog

An important part of the website was the SHC Task 59 blog, available on https://task59.IEA SHC.org/blog. This was published approximately monthly, starting in November 2019. Partners had the chance to write a blog about an area of research, announcement or similar. The blogs were also promoted via social media as well as the newsletter. A full list of the blog posts can be found in Table 11.

BLOG TITLE	PARTNER	DATE	AUTHORS
The effect of climate change on retrofitted historic buildings: thermal mass, natural ventilation and overheating risk	EURAC	Nov 19	L. Hao, D. Herrera, A. Troi
Reporting on national French conference on responsible retrofitting of historic buildings	Cerema	Dec 19	J. Borderon, E. Héberlé
Dynamic thermal and hygrometric simulation of historical buildings: Critical factors and possible solutions	PoliMi IETB	Jan 20	F. Leonforte
Decision support tool for innovative and sustainable renovation of historic buildings (HISTool) summary	EEHB2018	Feb 20	W. Hüttler, D. Bachner, G. Hofer, M. Krempl, G. Trimmel, I. Wall
The ROP ERDF Sicily 2014/2020 for planning the energy retrofit of 106 public historic buildings	PoliMi CHPC	March 20	A. Buda, V. Pracchi, R. Sannasardo
RIBuild guidelines for internal insulation of historic buildings	AAU	April 20	E.J. de Place Hansen
A spatial-based approach for enhancing the energy renovation of historic settlements	EURAC	June 20	E. Lucchi, A. Troi
Sweden launches a new stage of the national research program on energy efficiency in historic buildings	UU	July 20	T. Broström
Old buildings can't be energy efficiency, right?	HES	Aug 20	L. Angelaka
SBE21 heritage Conference, the final event of SHC Task 59	EURAC	Oct 20	D. Herrera, A. Troi

BLOG TITLE	PARTNER	DATE	AUTHORS
Embedding thermal comfort into retrofitting design	UCL	Nov 20	A. Petsou
Thermal performance of historical masonry structures: experimental data and numerical modelling	UniCt	Dec 20	A. Lo Faro, V. Constanzo, G. Evola, F. Nocera
BIPV in dialogue with history	SUPSI	Jan 21	C.S. Polo López, P. Corti, P. Bonomo
Brightly coloured solar modules for building facades: State of development of MorphoColor® technology	Fraunhofer ISE	Feb 21	T. Kroyer, A. Dinkel
Webtool to help owners and design professionals to characterize the qualities and needs of historical residential buildings with heritage value	Uni Lou	March 2021	D. Stiernon, S. Altomonte
Non-destructive techniques and tools for the thermal characterisation of historic buildings	CARTIF	April 2021	S. Álvarez-Díaz
SBE21 Heritage: Final conference key messages	EURAC	TBC	A. Troi, D. Herrera

Table 11. A list of the blogs published on the website as part of SHC Task 59.

4.2 Social Media

This will list the social media channels that were used as part of the SHC Task 59 dissemination, namely Twitter, Facebook and Linked In. The social media has had regular posts, with good interaction over the project duration. Linking to different partner organisations has enabled a linking of issues and relevant topics.

4.2.1 Twitter

The twitter account linked to SHC Task 59 was 'Renovating Historic Buildings Towards Zero Energy' @HistoricNZEB (https://twitter.com/HistoricNZEB). Over the time of the project, 285 tweets were posted, which had 94.6K so called impressions in total. This number represents a total of the times the tweets have been seen in the timelines of the followers. At the time of writing this report, the twitter account has 212 followers. This has been the most impactful social media site. The tweets ranged from notices about events, publications and the newsletter to introductions to the task partners and HiBERatlas case studies. This platform was also used to live tweet significant events, such as the Sustainable Building Heritage conference in April 2021. This resulted in increased numbers of interactions over these days. An illustrative tweet is shown at Figure 10.

Where possible, the tweets were linked to the profiles of our partners and affiliated organisations. Hashtags have been used to group the posts together and to mention important themes of the post. The most commonly used hashtags were #HistoricNZEB, #Task59, #BestPracticeBuildings, and #HiBERATLAS. Hashtags associated to specific events were used as well, such as #APTNT2020, linking to the Adapt Northern Heritage event in April 2020 and #SBE21Heritage linking to the Sustainable Built Heritage conference in April 2021.

The possibility of tagging partner organisations as well as connecting via hashtags have enabled more interaction between affiliated projects as well. For example, the hashtag #SolarHeat was often picked up and retweeted by the IEA SHC account, increasing the publicity of the posts.

Figure 10. A typical tweet post, promoting one of our blog posts, and linking to the SHC Task 59 website.

4.2.2 Facebook

The account linked to the project was titled 'Renovating Historic Buildings Towards Zero Energy', found under @HistoricNZEB (https://www.facebook.com/HistoricNZEB). Since the start of the project, there have been 172 posts on Facebook, which have reached 4300 people. This represents the number of views of the posts. The account is liked by 46 people and followed by 59, significantly less than the number of twitter followers. The posts were mostly the same across the social media platforms, these ranged from information about activities and publications, as well as the newsletter, to the introduction of task partners and HiBERatlas case studies. The same hashtags were included in the Facebook posts, however, they did not result in significantly more interactions.

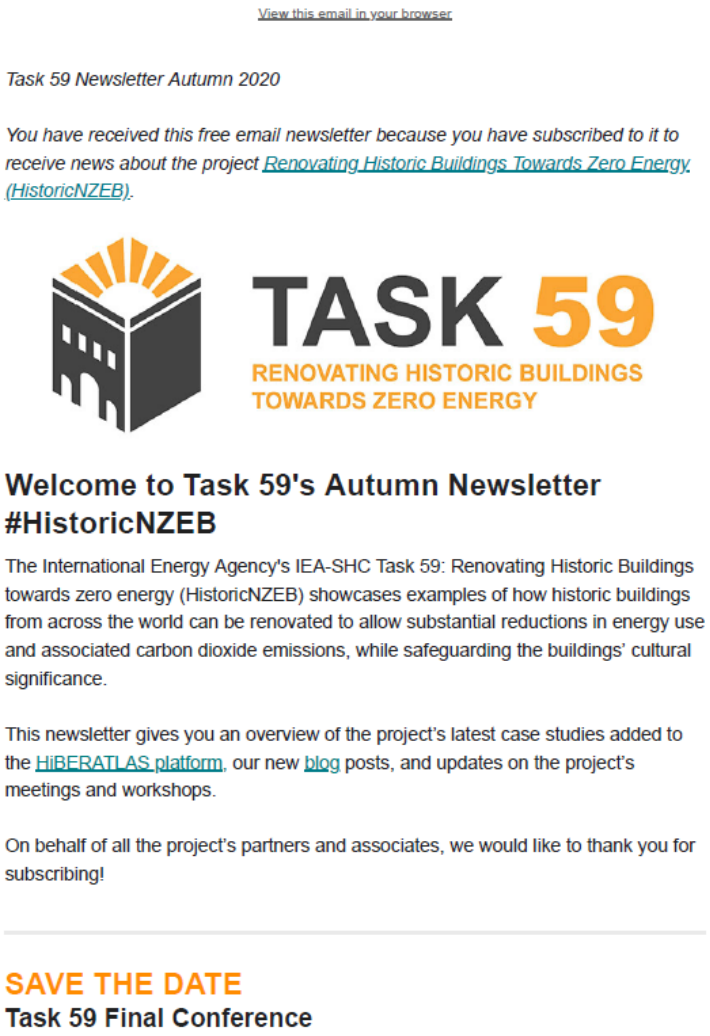
Again, where possible, partners were linked in the posts. Less partners and organisations had active media accounts on Facebook, and therefore linking was not possible as often. Generally, Facebook does not allow for as much interaction between accounts. The news feed was often not quite as relevant, and it was more difficult to distinguish the functionality from the posters personal account, to which the SHC Task 59 account needed to be linked. However, the Facebook posts reached a good number of people and the use of it can therefore be considered successful and useful.

4.2.3 Linked In

Linked In posts have been organised by our Danish partners, Department of the Built Environment, Aalborg University (formerly SBi). Since this social media platform is aimed to be a network of professional contacts, the audience and therefore the posts were of a slightly different nature than the other posts and are not publicly accessible.

4.3 Newsletter

The newsletter has been published from 2019 to 2021, resulting in 9 issues. The newsletter has 101 subscribers at the time of writing this report. The first newsletter was published in Spring 2019, which gave an introduction to the project and described the partner meetings and activities which happened until then. Subsequent newsletters gave updates about the project meetings, the partner organisations as well as events and activities. Features included information about the expert meetings, publications and external events. As an example, a front page of the Newsletter from 2019 is shown in Figure 11.



View this email in your browser

Task 59 Newsletter Autumn 2020

You have received this free email newsletter because you have subscribed to it to receive news about the project Renovating Historic Buildings Towards Zero Energy (HistoricNZEB).

TASK 59
RENOVATING HISTORIC BUILDINGS
TOWARDS ZERO ENERGY

Welcome to Task 59's Autumn Newsletter #HistoricNZEB

The International Energy Agency's IEA-SHC Task 59: Renovating Historic Buildings towards zero energy (HistoricNZEB) showcases examples of how historic buildings from across the world can be renovated to allow substantial reductions in energy use and associated carbon dioxide emissions, while safeguarding the buildings' cultural significance.

This newsletter gives you an overview of the project's latest case studies added to the HiBERATLAS platform, our new blog posts, and updates on the project's meetings and workshops.

On behalf of all the project's partners and associates, we would like to thank you for subscribing!

SAVE THE DATE
Task 59 Final Conference

Figure 11. The front page of the Autumn 2020 Newsletter.

The subscription has increased steadily. Each publication of a newsletter was accompanied by a social media post, inviting those who are following to subscribe to the newsletter.

Building and sending the newsletter via Mailchimp was very convenient, with the help of a design templated created at the start of the project. Content and images could easily be placed into the template and links included. The design was able to adapt to different devices, such as mobile devices and computers, and could also be viewed in browser. This makes the newsletter very accessible for the user. This website also managed the subscriptions and analytics, including any people who many wanted to unsubscribe. All of this happened automatically without input from the partners.

The inbuilt analytics of Mailchimp showed that over 60% of subscribers were moderately or highly engaged with the content. This included opening and reading the newsletter as well as interacting with the content, such as links. Every new campaign also results in an increase in subscribers, meaning that people were interested in the content and were interested in finding out more about the project in the future.

5 Online Database

The online Best Practice Database created as part of SHC Task 59 was called HiBERatlas (https://www.hiberatlas.com/en/welcome-1.html). Hosted on its own website, it includes refurbishment case studies by the partners and from countries throughout Europe. The online database is an important output of the SHC Task 59 project, and the detail of it is covered elsewhere. However, its dissemination will be an important part of getting it out into the sector and therefore its dissemination is covered here. Directly linked to this repository, the decision guidance tool HiBERtool provides support to building owners and practitioners in identifying the most suitable solutions for their retrofit. Both are a joint development between IEA SHC Task 59 (Subtask C) and the Interreg AlpineSpace ATLAS project.

The touring exhibition served as an introduction to the project and gave an overview of the planned information stored on the website. This was the first method of dissemination at the beginning of the website building, when most of the case studies were not visible yet. This has been very well received at those events where the touring exhibition was shown.

Another important part for the dissemination was the social media posts, an example of which is shown in Figure 12. Many of the posts in 2020 linked back to the case studies. As the case studies were finalised and available online, they were publicised via a social media post. Features, such as the geographic search, were also mentioned via social media, to show the full range of functionality of the database. The posts served as a hook to invite followers to find out more about the case studies as well as the database as a whole.

Figure 12. A social media post highlighting one of the HiBERatlas case studies, linking to the partners responsible as well as the #SolarHeat hashtag.

Lastly, the case studies and information about the database were also included in the newsletters. In earlier newsletters, the design concept and layout were introduced, in a similar way to the touring exhibition. In later newsletters, 2-3 of the new case studies were mentioned and links were included. The number of online cases was also updated, giving subscribers a good idea of the progress made since the last newsletter.

Next to these tools, two others should also be mentioned, both of which were also sponsored by the Interreg IT-CH BiPVmeetsHistory project. This is looking particularly at BIPV systems and provides an interactive map (https://www.bipvmeetshistory.eu/mappa-interattiva-bipv-meets-history/) and two other databases complemented the information on case studies in Switzerland (www.solarchitecture.ch) and in Italy (https://bipv.eurac.edu/it) of photovoltaic systems used in heritage contexts.

6 Sustainable Built Heritage 2021

The Sustainable Built Heritage 2021 was successfully delivered online from the 14th to the 16th April 2021. The event represented the final conference for three projects, namely SHC Task 59, ATLAS (Interreg Alpine Space) and HyLAB. The conference was attended by about 150 people.

The three keynote speakers greatly enriched the conference with their insights and thoughts about the subject. Dr. Ege Yildirim, an independent consultant and scholar focusing on urban planning and heritage conservation, started the conference with thoughts about how historic buildings can be the basis of sustainable development and a more resilient world. She stressed the importance of international cooperation and conversation about this subject and the connection to the ICOMOS 2030 Sustainable Development Goals. On the second day, Ir. Arch. Stijn Cools, founder of aNNo architects and visiting Professor at the University of Leuven, proposed that heritage buildings should be preserved to create spaces and communities. For this, the two case studies showed 'heritage as a process', where function sometimes evolved as the project progressed, and communities and spaces were created. On the third day, Prof. Harald Garrecht, Professor at the Institute of Construction Materials (IWB) and Director of the Materials Testing Institute, University of Stuttgart, presented on a district wide retrofit methodology employed in Germany, using an innovative new technology. These inspiring presentations guided the conference and were touched on by many of the presentations.

The conference consisted of speakers introducing real life case studies as well as considerations of monitoring, outreach and new technologies. Particularly noteworthy was the focus on 'Research meets Practice', an opportunity for dialogue and discussion between academic researchers and practitioners about projects and approaches. This ended in a roundtable discussion with experts from different countries considering the role of historic buildings in new European policies. The full programme is available on the SBE21 Heritage website (https://sbe21heritage.eurac.edu/agenda/).

Due to the conference having to be held online, networking was made possible using Airmeet. Here, participants could meet at virtual tables for discussions and questions for the speakers. This proved to be popular with many of the delegates and made wide-ranging discussions possible.

6.1 Papers presented by SHC Task 59 Partners

SHC Task 59 partners submitted a number of papers to the conference. These were about a range of topics and are listed below in Table 12. Particularly notable are the case studies, which introduced the best practice buildings also included in the HiBERatlas, as well as results from the Subtask C investigations.

PAPER TITLE	PARTNER	PRINCIPAL AUTHOR
Deep renovation of an old single-family house including application of a water repellent agent – a case story	AAU	E.J. de Place Hansen
Comprehensive energy renovation of two Danish heritage buildings within IEA SHC Task 59	AAU	J. Rose
Energy efficiency for a historic market: the case study of the Mercado del Val	CARTIF	J. Antolín-Gutiérrez
Assessment of Void Insulation Panels for innovative thermal insulation of apartments in heritage buildings	Cerema	J. Borderon
Building integrated photovoltaic in heritage contexts award: an overview of best practices in Italy and Switzerland	EURAC	A. Durante
Making deep renovation of historic buildings happen – learnings from the Historic Building Energy Retrofit Atlas	EURAC	F. Haas

PAPER TITLE	PARTNER	PRINCIPAL AUTHOR
Water absorption characterisation of historic plasters. Comparison of different methodologies in a case study in Tyrol, Austria	EURAC	E. Leonardi
Teaching experience with the Historic Building Energy Retrofit Atlas – HiBERatlas	EURAC	A. Troi
Raising awareness and training professionals to assess climate risks to historic buildings and commence adaptation planning - Experiences from Adapt Northern	HES	C. Hermann
Thermal upgrades in traditional buildings – a multi factored approach	HES	R. Curtis
Comfort based investigation on historic libraries for user satisfaction and preservation of paper-based collections	IIT	G. Gökçen Akkurt
High-performance materials and technological solutions to improve the thermal performance of historic buildings	PoliMi CHPC	S. Mauri
Swiss case studies examples of solar energy compatible BIPV solutions to energy efficiency revamp of historic heritage buildings	SUPSI	C.S. Polo Lopez
Strategies and tools for potential assessment of Renewables (RES) in Alpine Space areas valid for historic buildings and sites.	SUPSI	C.S. Polo Lopez
Towards an integrated moisture-safe retrofit process for traditional buildings in policy and industry	UCL	V. Marincioni
Assessing the role of simulation tool selection for the evaluation of heat and moisture balance in historic buildings	UCL	V. Gori
Educating about sustainability in Cultural Heritage: 'hard' and 'soft' sciences in comparison	Uni G	G. Franco
Experimental measurement of materials' drying coefficient for internal insulation: new approaches for laboratory testing	UIBK	A. Rieser
A new decision guidance tool for the adoption of energy retrofit solutions in historic buildings	UIBK	A. Rieser
The dynamic thermal energy simulation of a historic building in Mediterranean climate: knowledge and simplification	UniCt	A. Lo Faro
The power from above - A novel church heating system	UU	T. Broström
Assessing and enhancing EN 16883:2017	UU	G. Leijonhufvud
Data-driven and community-based resilience and climate adaptation of historic areas: Shelter project	Tecnalia	A. Equsquiza

Table 12. Papers presented at the SBE21 Heritage conference by SHC Task 59 partners.

7 Subtask D Legacy

Many of the outcomes of the SHC Task 59 have a long-term benefit in informing the sector. As such, its legacy is an important consideration. This is especially true in areas where COVID-19 has impacted the work of the Task, as for example the touring exhibition and where outreach has been restricted for much of 2020 and 2021. This section will look at how the legacy of the SHC Task 59 will be ensured.

To start with the touring exhibition, it was agreed that this will be available after the end of the SHC Task 59. Since so many of the events in 2020 and 2021 were cancelled or moved online, this gives an opportunity to spread the information in the same way, albeit after the fact. As it promotes the HiBERatlas database, the touring exhibition will raise the profile of the database as well as the completed SHC Task 59 more generally. This will be organised similarly as before. The organisers of the event will receive the posters for free, and they can be put up for an agreed time. They then pay for the posters to be sent on to the next location. It is anticipated that EURAC will be the co-ordinating body for the programming of the posters.

As the website is hosted through the IEA SHC, it will remain in its last state, and therefore the legacy of the information hosted on the website is assured. This means, the resources, information and publications gathered here will still be accessible in the future. This also means that information and links to external scientific publications will remain, as long as these stay the same on external websites. Additionally, the reports produced by the subtask will be available through the website, giving more information about the final outcomes. The HiBERatlas website will continue to be maintained by EURAC as a resource for the sector. This will ensure that the knowledge gathered continues to be available and can even be expanded. During the final partner meeting, EURAC invited partners to keep sending case studies to be added to the database.

It was also decided at the last SHC Task 59 meeting that the twitter account, which has managed to gain a good number of followers, will be used by the ICOMOS ISCES group. This is due to the very similar aim of the group, looking at energy efficiency and sustainability in places of heritage. In order to facilitate this, a last tweet will be sent explaining to the followers the change. The handle will also be changed to something else, to fit in with the priorities of the ISCES group.

A bid has been made for a follow-on project HiBERoutreach (2021-2022). This is awaiting funding decision by the Interreg programme for the Northern Periphery and Arctic looking at Historic Building Energy Retrofit Outreach. It combines a number of projects in this area and would include this project as well as the ATLAS (Interreg Alpine Space) project associated to it. This includes two partners also involved in SHC Task 59.