Cultural Heritage and Climate Change Symposium

How can cultural heritage contribute to the green transition?

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Content

VALTICE CASTLE one of the sites of the symposium was Valtice Castle. A historical monument managed by the Czech National Heritage Institute. Photo: Martin Čerňanský

Foreword

The Cultural Heritage and Climate Change Symposium, held in Valtice, Czechia and Piešťany, Slovakia in October 2023, aimed to explore the role of cultural heritage in the green transition, and share knowledge between the three participating countries, Czechia, Norway and Slovakia.

Climate change is the major challenge of our time, and it is an important topic within cultural heritage management. Cultural heritage is part of the solution to climate change, but green transition can have negative effects on cultural heritage values. A well-considered approach is therefore needed to find solutions that balances the goals of mitigating climate change and safe-guarding cultural heritage values.

The Symposium was a collaboration between the Czech National Heritage Institute, the National Trust of Slovakia, and the Norwegian Directorate for Cultural Heritage (Riksantikvaren). It was financed by the EEA and Norway Grants in Czechia and Slovakia.

EEA and Norway Grants represent the contributions from Iceland, Liechtenstein and Norway to reducing economic and social disparities in Europe, and the strengthening of bilateral relations between Norway and the 15 EU countries in Central and Southern Europe that receive the grants. The grants are used to fund projects within fields such as the environment, climate, health, research and cultural heritage.

Cultural heritage is an important resource for local and regional development. Projects such as the restoration and maintenance of cultural heritage monuments and sites, can create jobs and contribute to increased tourism and beneficial business conditions. They also create social meeting places. Bilateral initiatives can provide important platforms for professionals in the cultural heritage field to meet and exchange knowledge, methods, and ideas.

Iceland Liechtenstein Norway grants

Norway grants

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Main messages

FROM THE ELEKTRARNA, PIESTANY.
Photo: Andreas Skauen Pedersen

These are the main messages from the symposium, which the participants kept coming back to:

- **Cultural heritage management is part of the solution**, but we need to spread the word. There are still many widespread misconceptions about the role of cultural heritage in the green transition. Correcting these misconceptions can contribute to both lowering climate gas emissions and safeguarding cultural heritage values.

- **Not all buildings are created equal.** Listed buildings and monuments are valued and are, as a rule, entitled to the best treatment. But what about all the historic buildings that *do not* have formal protection? They may have cultural-historical values, and they can play a role in reducing carbon emissions. For this to happen the buildings need the correct treatment. And all buildings are not created equal. The expertise of cultural heritage professionals and craftsmen familiar with traditional methods is crucial in solving this challenge.

- **Requirements for the energy efficiency of historic buildings** are important, but they must be proportional to the building – not all old buildings can reach new building requirements. Some historic buildings have exemptions from the requirements for energy efficiency. On the one hand, this is positive because it saves the buildings from extensive measures. On the other hand, it can be negative because it leaves no incentive for the academic community or craftsmen to build expertise in energy efficiency of historic buildings.

- **Abandon the "all or nothing"-approach.** Case studies indicate that historic buildings can reach better energy efficiency if they receive an extensive energy upgrade. But energy efficiency measures in historic buildings come at a cost. When considering the right measures, as small an upgrade as possible must be the goal. It is a question of finding the tipping point between the measures that have a good effect on energy efficiency, without harming the integrity of the historic building. Which measures are appropriate to achieve the effect you need?

- **The role of the skilled craftsman** cannot be underestimated. Today, fewer young professionals have the opportunity to learn the techniques required to take care of older buildings. The building technology of the modern age (after 1950) differs from the methods and materials used historically. Therefore, we need to treat older buildings differently – regardless of conservation status. The craftsmen must know how to approach this type of building when restoration, adaptive reuse and energy efficiency is concerned.

Heritage and Circular Economy

by Ola Fjeldheim

The keynote for the symposium was Ola Fjeldheim, Secretary General for National Trust of Norway. His presentation, entitled "Heritage and Circular Economy", went to the essence of the topic, and set the scene for the symposium.

The world is currently experiencing several crises at once, with the climate and nature crises being the most pressing. Our unsustainable use of the planet's resources has a devastating impact on biodiversity and will render the planet unhospitable if not checked. It is important to act now, as the cuts to climate gas emissions made now will have a much higher impact on climate change than cuts made in the medium and long term.

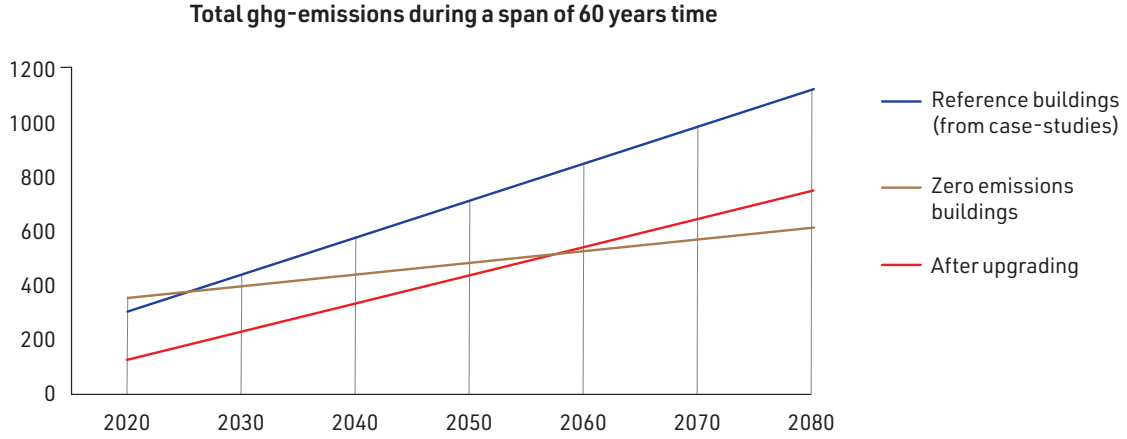
For the cultural heritage sector, the biggest potential for contributing to the green transition lies within the building sector. The building sector accounts for an important part of climate gas emissions, and in Norway 70% of the sector's emissions come from production of building materials, while 30% come from heating and use. With a broad perspective on what can constitute a building with heritage values, the heritage sector has the potential to provide solutions for lowering climate gas emissions from the building sector. Studies show that in most cases upgrading and using an old building is better for the climate than demolishing it and building a new one.

> *"We need to reduce emissions now, by keeping the buildings we have already built working for as long as possible."*

From a circular economy perspective, *not producing* something is the preferable option. Next comes *reusing* something that has already been produced, where the climate gas emissions have already occurred. If reuse is not possible, reprocessing, recycling, energy recovery and disposal are the alternatives, with disposal being the least preferable. Taken together this leads to an approach of careful upgrading of existing buildings, with a focus on circularity and a small eco footprint, making sure that emissions are lowered now rather than later. Such an approach also leads to fewer losses of heritage values.

In addition to working towards environmental sustainability goals, the cultural heritage sector is also well-placed to consider social and economic goals. Cultural heritage is important for the identity of local communities, and involving people in maintenance of their own heritage strengthens social sustainability. The local economy also stands to benefit from a focus on maintenance, as the jobs will most often be done by local craftspeople.

The process of maintaining already existing buildings helps to create a culture for maintenance, repair, and sustainability.



Status – Cultural heritage and climate change in the three countries

CZECH REPUBLIC

The National Heritage Institute (NPÚ) is the state-funded institution established by the Ministry of Culture, as the professional and research organisation of built heritage conservation. The Strategy on Adaptation to Climate Change of the Czech Republic came into force in 2015 and was approved in the Government Resolution that year. Nevertheless, the cultural heritage as one of the impact areas is only part of its first update in 2021.

The National Heritage Institute is intensively involved in these issues since the participation of its representative in the EU Open Method of Coordination group of Member States´ and associated countries´ experts, titled "*Strengthening cultural heritage resilience for climate change. Where the Green Deal meets cultural heritage*".

In relation to this engagement and activity, two working groups were set up, specifically the working group for climate change and cultural heritage, and the working group for the use of photovoltaic and other renewable energy sources in protected areas and on cultural monuments.

SLOVAKIA

Slovakia comparing to other European countries belongs to the countries with the low portion of historic buildings built up to 1945, and so their contribution to the climate change and climate gas emissions is quite low. Even according to the Energy Efficiency Directive from 2012 these buildings don´t need to fulfil the requirements of this Directive, the energy efficiency of historic buildings is still a very interesting issues from the economic point of view of their owners.

As historical buildings are exempted from the obligation to meet the energy performance parameters they are partially protected from the incorrect application of simplified insulation and the risk of faulty implementations. On the other hand, Slovakia, unlike other developed countries, lacks more experience in improving their energy performance. Another reason for the lack of experience is the small construction market and the general shortage of specialists with the knowledge of monument restoration. Special energy-saving measures were implemented rather sporadically.

THE OFFICES OF the National Heritage Institute in Prague.
Photo: NPÚ

THE NATIONAL TRUST of Slovakia is working to preserve and find new use for Romer house in Bratislava.
Photo: National Trust of Slovakia

The Monuments Board of Slovak Republic has recently developed a new guideline with the title "Energy efficiency of historic buildings - improving the energy performance of listed buildings and buildings in conservation areas". The Monuments Board is also involved in more international projects like PRO HERITAGE or Erasmus+ project Education to save renewable energy sources, together with partners like The National Trust of Slovakia and Academia Istropolitana Nova and ArTUR civic association.

NORWAY

In Norway the cultural heritage sector has been working with climate change for more than a decade. But the work is in many ways still in its infancy. The Norwegian Directorate for Cultural Heritage has developed a *Climate strategy for cultural environment management* 2021-2030, which aims to show how cultural environments can help reduce greenhouse gas emissions and help the actors in the cultural heritage field to be better equipped to deal with climate change in the years to come. The strategy is not limited to the responsibilities of the directorate, but is meant as a tool for anyone working with cultural environments and climate change.

The directorate has prioritised practical guidelines to help owners and managers of old houses. Publications include: a manual on solar panels and a manual on heat pumps, with focus on placement and aesthetics, a manual on small and medium energy efficiency measures in old buildings, and an online collection of best practices with pictures and details informing the public about possible good solutions.

THE NORWEGIAN DIRECTORATE for Cultural Heritage is on the move to this protected building in Oslo. Photo: Lene Buskoven

Valtice Castle

Where is the door? A masonry heater or *kachelofen* uses a maze-like chimney to release smoke slowly, allowing the tiles to retain as much heat as possible. This traditional technology is still one of the most energy efficient ways to heat buildings with wood fuel. Used to heat the hundreds of rooms in the Valtice Chateau, these ornamental baroque stoves were often fired from the next room, keeping the living quarters clean and free from smoke, soot, and dust.

Valtice castle was the seat of the ruling prince of the Liechtenstein family from the end of the 14th century, until the post-war confiscation. The magnitude and splendour of Baroque decoration proves, even today, that it was the residence of one of the most powerful noble families in the Habsburg monarchy. Today, the entire castle area, including the landscape and the buildings in the neighbourhood, is inscribed on the UNESCO World Heritage List and managed by the Czech National Heritage Institute.

Photos: Andreas Skauen Pedersen

All photos: Andreas Skauen Pedersen

Photo: Hanna Lønning Gjerdi

Knowledge base

The first part of the symposium looked at what we currently know about cultural heritage and energy efficiency, with presentations covering different parts of the field.

After the opening speech, the participants were introduced to the current situation in all three countries. The status of Climate change and cultural heritage in Czechia was presented by Martin Čerňanský from the National Heritage Institute, the status in Slovakia by Pavol Ižvolt from the Monuments Board, and in Norway by Hanna Lønning Gjerdi from Riksantikvaren. Basic information was given during these lectures to keep a good track of general knowledge and practice in these countries. This overview included the main manifestations of climate change, accompanied by corresponding field examples. The interconnection of the issue with spatial planning and building codes was illustrated by national policies. Along with the national strategies on adaptation and action plans, related legislation was also mentioned.

In addition to this the following talks were given as a starting point for the symposium.

PRESERVE BUILDINGS – PRESERVE CLIMATE, A PROJECT IN INNLANDET COUNTY

Torill Skillingsaas Nygård is an archaeologist and head of the cultural heritage and building conservation section in Innlandet county. Nygård and her team have in recent years shifted their focus toward how cultural heritage management can contribute with its expertise in achieving important climate goals.

Since 2020 Innlandet county council has carried out the project "Preserve Buildings – Preserve Climate". The aim is to build expertise on the climate benefits of upgrading, restoring, and preserving buildings instead of demolishing and constructing new ones. A case study involving buildings of varying ages, sizes, functions, and conditions was conducted, with greenhouse gas calculations for specific energy efficiency measures. The results showed favorable outcomes for historical buildings, emphasising the significant impact small measures can have without compromising cultural heritage values.

As part of the project, analyses were also conducted on high-quality heartwood, which will be used as cladding for a new building. The goal has been to find a method to select weather-resistant timber, and, in collaboration with the forestry industry, facilitate the availability of documented high-quality timber capable of withstanding a wetter climate in the future.

> *"The worst you can do is to do nothing" – Torill Nygård talking about energy efficiency measures in old buildings.*

CONFLICTS OF INTEREST BETWEEN PRESERVATION AND USE OF MONUMENTS

Professor Christian Hanus is scientific director of the Research Lab Sustainable Cultural Heritage at the University of Continuing Education Krems (formerly Danube University Krems). His research focuses on building-physical, building-ecological and building-economic analyses of historical buildings, the reconstruction of destroyed historical centres after catastrophes as well as the preservation of the management of cultural sites.

Professor Hanus presented studies done comparing old and new domestic houses. The houses chosen were representative protected buildings and comparable new buildings for the same purpose. All the buildings were in Lower Austria. The simulations done showed several differences in the heating and cooling demands of the buildings studied, and included expected future changes in temperature due to climate change. It was found that over the next 50 years the heating energy demand of the old build-

ings will decrease disproportionately compared to the new buildings, while the cooling energy demand of the new buildings will increase significantly more than that of the historic buildings. He also stressed the consideration of the location of the buildings and the climate change scenario chosen as a basis for the simulations.

SUSTAINABLE ENERGY MEASURES IN OLD BUILDINGS

Marte Muan Sæther is an architect, graduating from Aarhus School of Architecture in 2006. She spent five years at Enerhaugen office of architecture, working with historic building preservation. From 2011 to 2023, she worked at the Municipal Office of Cultural Heritage in Oslo. Currently, Marte serves as an advisor in energy-saving solutions and circularity at the National Trust of Norway.

Striving for authenticity and preserving the physical condition of historic buildings while improving their energy efficiency is a balancing act. The European goals for decreasing carbon emissions in the coming years are ambitious and might mean extreme interventions in old buildings. In her talk, Marte presented small and medium measures that can be done in historic buildings to meet modern energy standards, without compromising the architectural and historical integrity. These measures, based on traditional "know-how" create far less waste than extensive measures, and can also be transferred to new buildings. Small to medium energy-saving measures are both environmentally and economically sustainable.

> *"At The National trust of Norway, we believe in taking small and medium measures based on old «know how» and traditional materials to reduce energy consumption."*

ECOCENTER IN HRUBÝ ŠÚR AND ITS ECOLOGICAL AND CRAFTSMANSHIP ACTIVITIES

Zuzana Kierulfová is an architect, running Createrra studio since 2004 which specializes in natural materials and passive building. As a craftswoman, she's trained in stove building and earth plastering. She co-founded the Institute for Energy Passive Houses, chairs the NGO ArTUR, and teaches at the Faculty of Architecture and Engineering of Slovak Technical University.

For over 20 years, the ArTUR association has worked to enhance awareness and education in sustainable construction and green renovation. Their recognised courses, accredited by the Slovak Ministry of Education and UNESCO, address the pressing challenges of climate change. Using a historic building as an example, ArTUR educates through workshops on proper restoration, insulation with renewable materials, and reducing carbon footprint, while at the same time preserving the cultural and historical architectural values. ArTUR offers workshops, exhibitions, and courses, but there is still a great need for professional networks for craftspeople, consultants, and architects.

Elektrarna Piešťany

Fuelling knowledge. The Piešťany Power Plant was completed in 1906 to provide electricity to the city of Piešťany and surrounding villages. At first, three diesel machines worked in the generator hall. Two more were added after a reconstruction in 1926. They burned heating oil, which was brought to the power plant by an underground pipeline from the railway station. After 1930 the plant was only used in periods of energy consumption peaks, and it was shut down in 1946. In 1995, Elektrárňa Piešťany was included in the list of Slovak national cultural monuments.

In 2009 the owner Západoslovenská energetika, a.s. decided to revitalise the power plant building for the public with the aim of sparking interest for science among children and youth. The winning project of the student architectural competition was done by Michal Ganobjak and Vladimír Hain from the Faculty of Architecture of the Slovak Technical University. Several energy efficiency measures were done in the reconstruction and added extension to suit its new purpose. Optimising the natural ventilation in the building and adding the solar gains of the glass facade allowed for opening the large generator hall without large heat losses. The adaptation was also done with respect to the authentic layout and architectural details in the building and has earned several nominations and awards.

All photos: Andreas Skauen Pedersen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Energy efficiency in practice – project cases

After the knowledge base, the symposium moved over to presentations on how the work should and is being done in practice. There are many good ongoing initiatives, and some were presented at the symposium.

PRESENTATION OF THE HORIZON EUROPE PROJECT, PRO-HERITAGE

Gerald Wagenhofer holds a master's degree in business administration from the Vienna University of Economics and Business and he graduated at the Higher Federal Technical, Teaching and Research Institute – Technologisches Gewerbemuseum. His experience in Cultural Heritage was developed by several EU funded projects, and today he is certified as Maintenance Manager, Energy Manager, Digital Manager, and Trainer for Cultural Heritage by The European Heritage Academy.

The PRO-Heritage project developed a programme to train and certify Energy Manager for Cultural Heritage by applying appropriate measures to refurbish historic/traditional buildings. These training courses were piloted in Austria, Slovakia, Spain, Portugal, and the United Kingdom. The European Heritage Academy is responsible for the roll-out in Europe, supported by a new project with Burghauptmannschaft Österreich, European Historic Houses, IVEM (Heritage Tribune), ECQA (Certification) and UBW.

THE SOLAR COLLECTORS on the roof of Stavanger swimming arena is hidden and does not interfere with the brutalist architecture of Gert Walter Thuesen og Jacob Grytten. Photo: Trond Isaksen

ADVISORY SERVICES ON ENERGY EFFICIENCY IN VIKEN COUNTY

Linn Marie Krogsrud is a heritage advisor with Viken country administration. She trained as an archaeologist and has been working with built heritage since 2016. She is currently working at Buskerud *bygningsvernsenter*, a building preservation centre providing training programs for carpenters and an advisory service for owners of historic properties.

In 2023, the Heritage department in Viken county administration started collaborating with the Climate department in the county concerning an advisory service for house owners. A project was set up to provide a free advisory service and seminars for owners of houses older than 1960. In collaboration with the National Trust of Norway, Akershus building preservation centre, Murbyen Oslo building preservation centre, and *Bygg og bevar*, a national advisory service on old houses and building techniques, more than 100 house owners have been visited in their property, and several open seminars have been organised.

MANUALS

Making buildings more energy efficient involves measures such as sealing air leaks, installing secondary windows, or installing heat pumps. These are measures that should be implemented before assessing the need to produce electricity or heat, using for instance a solar energy system.

General manual on energy efficiency in old buildings

In 2013, Riksantikvaren developed a manual on energy efficiency in old buildings. To combat climate change, we must reduce greenhouse gas emissions. It is about reducing energy consumption and the type of energy source we use. How we use our houses is also of great importance.

It is fully possible to improve the energy efficiency of buildings worthy of protection without destroying the building's character and history. It can often be done without large costs being involved, while at the same time reducing the cost of heating and improving comfort in the building.

Heat pumps

In 2022 The Directorate for Cultural Heritage published a manual with advice for homeowners looking to change their heating source to an air-to-air heat pump. These heating systems are a low-threshold measure that are beneficial when weighing cultural heritage interventions in relation to achieved energy effect. Although a reversible measure, the placement of the units poses different challenges in the interior and exterior of buildings. By being flexible and creative when it comes to placement, it is possible to find good solutions that ensure the heritage and aesthetic values are preserved.

Link to the Norwegian guideline on heat pump placement.

Solar panels

In recent years, the demand for solar energy systems has increased, and it is likely that this will be an increasingly important source of energy in the years to come. For heritage buildings this poses both an opportunity and a challenge. Solar panels are a local and renewable source of energy, and they can be fitted on many roofs of old buildings. However, solar panels can have a negative impact on cultural-historical values. It is therefore important that there are guidelines for when and how solar panels can be fitted on an old building.

Guidelines for solar panels on heritage buildings have been developed in Czechia, Norway and Slovakia. They have been developed independently from each other, but they provide similar advice about the assessments that should be done before deciding to establish solar energy systems on buildings that are listed and worthy of protection. The guidelines also give general advice regarding good visual adaptation, although aesthetic evaluations may differ from country to country.

Link to the Czech Guidelines for the assessment of photovoltaic and other solar installation projects on cultural monuments, protected heritage sites and in conservation areas and their buffer zones.

Link to the Norwegian guidelines on solar energy placement.

WORKSHOPS

The symposium was concluded with a workshop session at the Elektrárňa Piešťany. The participants were divided into three groups, with participants from all the three countries within each group. The groups were asked the following questions:

- What are your main take-aways from the presentations? What can you bring into your work?
- From your perspective, what are the main challenges in this field?
- Are there differences in challenges and solutions between our countries?

Out of the discussions, we summarised the main points and grouped them thematically. These are some key takeaways that came out of the discussions, under the headlines Knowledge, Communication, and Collaboration.

Knowledge

Preserving the integrity of heritage buildings while improving their energy performance requires a nuanced understanding of both conservation principles and modern sustainable technologies. Heritage managers, architects and construction companies need knowledge about new materials and methods. Owners need to know how to take care of their buildings and where to find the right information. There is also a lack of qualified craftspeople with special knowledge about traditional crafts and energy efficiency. We need to speak their case and make sure that there are education offers and jobs available.

An existing challenge in the field of energy efficiency in old houses lies in the reliance on data derived from new construction. Traditional buildings with their diverse materials and architectural styles, demand tailored approaches to revitalisation and reuse. This makes it difficult to collect and aggregate the data. Therefore, different approaches to calculate potential savings do not always work when considering reuse of old buildings instead of building new ones, and costly technical upgrades might be less beneficial than simple traditional measures. A more nuanced and comprehensive dataset that accounts for the uniqueness of historical architecture would make it easier to guide policymakers and owners of old houses.

Other takeaways from the workshop:

- There is a great need for more research and documentation on energy efficiency measures in old houses.
- More capacity building for professionals, through training programs, workshops and communication measures is needed.
- There is room for utilising the combined knowledge of heritage professionals better; a European database for traditional energy efficiency practices would be useful.
- Finding high quality materials for restoration also needs knowledge and a manual approach.

Communication

Adaptive reuse of cultural heritage can contribute to reducing climate gas emissions. Also, traditional practices within cultural heritage management help to build a more circular approach to how we build and how we live. Emphasising how the adaptive reuse of historical structures, energy-efficient renovations, and integration of traditional building methods contribute to reducing climate gas emissions – can show people that caring for cultural heritage is synonymous with taking climate action.

Outreach efforts should be directed towards informing owners of old houses, engaging the building industry, and influencing policymakers, utilising various communication channels, such as public events, educational programs, and digital platforms to tell the world about the positive impact of heritage preservation on the environment.

Heritage buildings often possess unique architectural and historical characteristics that require specialized knowledge for preservation. Creating and sharing manuals helps to offer a structured and accessible resource for implementing energy-efficient practices tailored to the specific needs of these structures.

Other takeaways from the workshop:

- Spend that extra time and effort in a project to communicate results. Make a communication or business strategy from the start of the project.

GOOD PLACEMENTS: The illustration shows an example of a dense urban situation with varied buildings. The blue rings highlight different variants of good solutions for placing the outdoor unit of a heat pump. The most important factor is to avoid placing a heat pump that faces streets and public spaces. This advice applies regardless, but it becomes especially obvious in dense residential areas if many people install heat pumps in clearly visible places. Photo: Romfarer Arkitekter AS/Stein Høglund

- Talk about the solutions that cultural heritage can offer, rather than the challenges. But don't be afraid to share both good and bad experiences!
- Talking about *old houses*, or even *already existing houses*, rather than *monuments* might get you off the ground quicker!
- Befriend a politician! They need to understand that cultural heritage can be a resource for their community.

Collaboration

Bridging the gap between the need to act now to stop climate change and preserving heritage values, is a big task where collaboration is key to success. Heritage advocates, government bodies, and cultural organisations can achieve greater impact by pooling resources, sharing expertise, and fostering closer cooperation.

This effort could involve facilitating networks, collecting and sharing data, making joint outreach campaigns, and partnering in international projects. Good practices and projects on energy efficiency already exist, yet the implementation is often small-scale. Upscaling these practices includes extending successful models to a broader range of cultural heritage sites, and closer collaboration across borders between cultural heritage actors.

Through collective initiatives, heritage actors can effectively convey the message that caring for old houses not only preserves cultural identity but also contributes significantly to reducing climate gas emissions. Other measures include:

- Work closely with environmental organisations to share knowledge
- Include historical and valuable buildings which are not listed in the discourse
- Continue to promote and facilitate networks where possible
- Invite the building industry to the conversation instead of vice versa

Valtice Castle. Foto Hanna Lønning Gjerdi

We participated in the Cultural Heritage and Climate Change Symposium:

Zuzana Kierulfová	ArTUR
Vladimír Hain	Faculty of Architecture and Design STU in Bratislava
Natália Ďurková	Ministry of Investments, Regional Development and Information of the Slovak Republic
Ladislava Cengelova	Ministry of Transport of the Slovak Republic
Pavol Ižvolt	Monuments Board of the Slovak Republic
Ján Tomčiak	Občianske združenie Kľačianske dvory
Jana Fedurcová	The National Trust of Slovakia
Veronika Panwar	The National Trust of Slovakia
Michaela Kubíková	The National Trust of Slovakia
Gerald Wagenhofer	UBW GmbH
Eva Tomšejová	Czech Ministry of Finance
Antonín Fejfar	Institute of Physics of the Czech Academy of Sciences
Martin Šolc	National Heritage Institute
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Ludmila Stará	National Heritage Institute
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