



SBE21

Sustainable Built Heritage

14-16 April 2021,
Online conference

DRAFT PAPER

This version is intended for personal use during the conference and may not be divulged to others

The SBE21 Heritage Conference is co-financed by:



International co-promoters:



Under the patronage of:



In collaboration with:



Socioeconomic Reflections on Historic Buildings Renovations: A Portrait of Rural Alpine Municipalities

A Khoja^{1,4}, O Danylenko², CS Polo Lopez³, A Davis and N Essig¹

¹ Munich University of Applied Sciences (MUAS), Karlstrasse 6, 80333 Munich, Germany

² EU Business School, Theresienhoehe 28, 80339 Munich, Germany

³ University of Applied Sciences and Arts of Southern Switzerland (SUPSI), Via Francesco Catenazzi 23, CH-6850 Mendrisio, Switzerland

⁴ Corresponding author, Khoja@hm.edu

Abstract. The renovation of historic buildings (regardless of their preservation status) has an overarching socioeconomic impact that goes beyond the environmental or economic benefits. These benefits can be seen as public goods. Within the ATLAS project, a survey covering over 35 rural alpine municipalities was launched to gather information about the municipalities' motivation and interest in renovating their heritage building stock based on its contribution to local economy, social and environmental aspects. Moreover, the research inquired on how the municipalities define their role in the renovation process and the obstacles they face. This paper provides a summary of survey results with the aim to contribute to the understanding of the underlying considerations of rural municipalities in the Alpine region when renovating their historic building stock.

Keywords: Historic building retrofitting, socioeconomic impact, rural alpine municipalities

1. Introduction

The demand for sustainable buildings is rising due to increasing public awareness, governmental incentives, stricter building codes as well as the attractiveness of the sustainability image to investors. In the EU it is expected that about 85-95% of the existing building stock will still remain in use by 2050, with 85% of it being constructed before introduction of the first EPBD in 2002 [1]. In Europe, renovating the existing building stock is considered as the “*make or break*” element [2] in achieving the recently adopted Green Deal program goal of reaching a net zero GHG emission by 2050 [3]. The updated EPBD of 2018 recognizes for the first time the role of renovating the historic buildings in reaching this goal [4]. The renovation of the historic buildings is held back by a number of challenges spreading from the difficulties in the decision making process and financing obstacles to the complexity of planning and lack of qualified craftsmen in the implementation phase [5]. The historic buildings are by design ill-suited to address modern user and market performance expectations of smart, sustainable and healthy buildings [6] as they were designed and constructed under a totally different paradigm. This fact and the costly renovation investments required to elevate the performance of the old structures, contribute to the risk of abandoning these unique buildings and leaving them to a slow but certain decay. Having a large number of abandoned historic buildings can have harming consequence that impact whole communities. The historic buildings stand as a living exhibition of the culture, habits, values, crafts and lifestyle that shaped a region over many years; they fulfil a unique function of being recollection silos for their communities.

The renovation of historic buildings (regardless of their preservation status) has an overarching socioeconomic impact that goes beyond purely environmental or economic benefits. These benefits

can be seen as public goods and as such, the local municipalities play a key role in the preservation of the historic building stock and in integrating it in their spatial and sustainable development plans. Therefore, within Interreg Alpine Space project ATLAS, a survey was launched to gather information from Alpine rural municipalities about their motivation and interest in renovating the existing historic building stock. The survey used a questionnaire to inquire about the local municipalities' views and experiences regarding the overarching socioeconomic impacts associated with renovating the historic building stock such as contribution to local economy, energy poverty, elevating the quality of life and environmental aspects. Moreover, the questionnaire asked about the opportunities, funding options and barriers that the rural alpine municipalities face when they engage in historic retrofitting projects. Officials from over 35 Alpine rural municipalities representing six nations responded and provided their views and experience. This paper summarizes the survey and research results with the aim to contribute to the understanding of the underlying considerations of rural municipalities in the Alpine region when they are planning to engage in renovation of their historic building stock.

2. Methodology

2.1. Scope

Between the years 2018 and 2019, a survey questionnaire was devised as a part of the EU funded ATLAS project to gather information from Alpine rural municipalities about their motivation and interest in renovating the existing historical building stock and the associated socioeconomic impacts. The questionnaire was distributed to officials working in municipalities representing 6 counties: Austria, Germany, France, Italy, Slovenia and Switzerland.

Table 1. Summary of the surveyed municipalities

	Municipalities responded	Prevailing type of historic buildings
Austria (AT)	10	Agricultura building, guesthouses, farmhouses
Germany (DE)	7	Farmhouses, residential and commercial buildings
France (FR)	4	Military, religious and civil buildings, residential houses
Italy (IT)	6	Multi-family houses, old farmhouses or manors
Slovenia (SI)	5	Residential building houses, administrative buildings
Switzerland (CH)	4	Civil and religious buildings, small private buildings



Figure 1. Map showing the geographical distribution of the surveyed municipalities

2.2. Survey design

The survey is composed of two main parts: In the first part the municipalities are asked to evaluate the impact of renovating their historic buildings based on the following socioeconomic aspects:

- Local economy (employment, Small and medium-sized enterprises (SMEs), local government revenues, etc.)
- Social aspects I (energy poverty reduction) / Social aspects II (quality of life, city/settlement attractiveness, etc.)

- Environmental footprint I (air/water pollution, emission levels, etc.) / Environmental footprint II (energy efficiency)

For each of the Likert-scale questions, a municipality can choose a value between 1 and 5 to indicate the relevance of the topic in their municipality, with 1 indicating a low and 5 indicating a high relevance. The 5 points Likert-scale dimmed appropriate because it offered a quick, universally understandable, easy to comprehend and interpret scale. To overcome the shortcomings of the 5 points Likert-scale, open-ended questions were provided to discover the underlying rationale for the indicated relevance.

The second part of the questionnaire contains a series of open-ended questions to reveal challenges, opportunities, funding options and barriers that the rural alpine municipalities face when they engage in historic retrofitting projects and covered the following aspects:

- Type of available financial mechanisms for retrofitting heritage buildings;
- Energy efficiency is a criterion in the financing mechanisms;
- Availability of public consultancy to support the historic buildings retrofitting projects;
- Availability of certification scheme for retrofitted heritage buildings;
- Perception of the role of a municipality in the retrofitting process of historic buildings;

3. Socio-economic impact of historic buildings renovation: evaluation of survey results

3.1. Employment and local government revenues

The positive influence of historic buildings renovations and heritage preservation contribute not only to the employment opportunities, but also to the creation of high qualification and high paid jobs needed to implement labour intensive and complicated restoration works that historic buildings require [7]. From the macroeconomic perspective, the investments in building renovations can generate higher tax income to municipalities and reduce unemployment. It is estimated that for each €1 million invested in the energy renovation of buildings between 11 to 19 new jobs are being created [8]. Moreover, a study by Copenhagen Economics estimates that the energy efficiency renovation can reduce outlay on government subsidies as well as increase annual net revenue gains to the EU public finances by €30 – 40 billion by 2020 [9].

The results of the survey showed that the potential positive impact on employment and local government revenues is highly evaluated in the investigated municipalities in Italy and France and to a medium to high degree in Austria and Slovenia (figure 2). In Austria and Italy, the importance for the local economy was enhance by the interest of municipalities in development of small local and regional handicraft enterprises and in France - by the interest in tourist attraction. The topic appeared to be of less importance in both the Swiss and the German Alpine Municipalities. This can be due to the relatively small number of heritage buildings in their urban stock. However, almost all the respondents highlighted the positive expected impact on the local SMEs, improving the tax revenues, infrastructure and real estate prices.

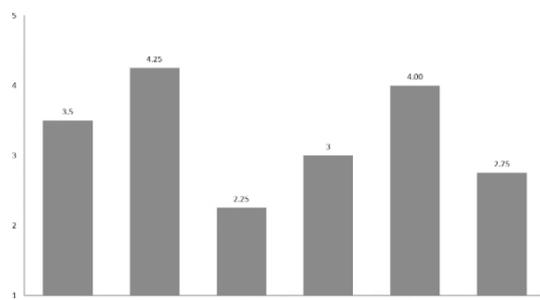


Figure 2. Evaluation of the impact historic buildings renovation on employment and local government revenues in Alpine Regions

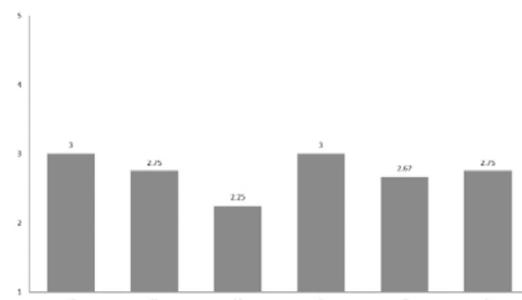


Figure 3. Evaluation of the impact of historic buildings renovation on energy poverty risk in Alpine Regions

3.2. Energy poverty and energetic gentrification

Energy poverty is generally defined as ‘the inability to keep the home adequately warm at an affordable cost’ [10]. Eradication of energy poverty and improving quality of life have a strong connection. Deep renovations are often associated with high renovation costs and contribute to increased commercial value of the property and the level of rents. Such upgrade of properties can expose low-income residence to the risk of an energetic gentrification. In this respect, it is important that the energy savings outweigh and be able to finance the increase in rent, which will mean that the renovations will have a neutral effect [11].

The survey results showed that fuel poverty in historic buildings does not represent a great risk in the Alpine region. All municipalities rated the fuel poverty risk with a medium to low importance value as displayed in the figure 3. This result can be attributed to the fact that most people in these rural municipalities have access to ‘free’ biomass energy resources on their land, and thus, have access to a free energy resource. The other contributing factor, as explained by the respondents from Austria, is that the renovation of historic buildings is usually a cost intensive task that is more likely to be implemented by high income owners, who can afford high construction, running and investment costs. Finally, some municipalities indicated that those historic buildings, that are not adequately supplied with energy systems or have high running costs, are already vacant or are very lightly used.

3.3. Pollution, emissions and well-being

It is widely acknowledged that the deep renovation of the existing building stock has multiple positive effects that go beyond the energy and emissions aspects and extend on users’ health and comfort aspects [1, 12]. By improving the energy performance and the indoor climate conditions, fewer sick leaves, fewer hospitalisations and improved worker productivity can be observed. Less air pollution and a better indoor climate, also lead to reduced local government expenditure on mitigating the air pollution side effects and improved revenues due to increased productivity. Although health benefits are difficult to estimate, there is a growing recognition that they make significant contribution both to the well-being of the building occupants and to the municipalities (from the public finance perspective). According to estimates, the annual permanent net revenue gains to public finances from renovating the existing building stock can exceed €40 billion in 2020 as a result to reduced outlay on government subsidies, reduced energy bills, and less hospitalisation need [9]. Moreover, the gains can be doubled in 2030 if investments in energy efficient renovation of buildings go beyond 2020 [9].

Impact on pollution, emissions and user wellbeing is given low to medium priority in almost all investigated municipalities, except for those located in Slovenia (figure 4). However, almost all the feedback highlighted the positive expected impact and the potential health and environmental benefits. The low priority in this aspect can be explained by the relatively small share of historic buildings in the total building stock to make a significant impact in this sphere. In Austrian municipalities the low priority stems from the fact that in most cases, a low-emission heating system is installed.

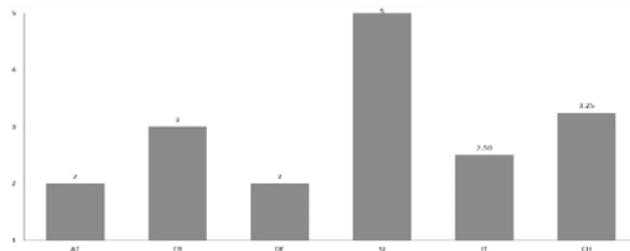


Figure 4. Evaluation of the impact of historic buildings renovation on pollution, emissions and user wellbeing in Alpine Regions

3.4. City attractiveness and quality of life

The preservation and use of historic buildings bring additional benefits that are stemming from their role in the development of a sense of identity for the local community and in encouraging tourism and investment [13]. Indeed, tourism is one of the main economic activities in the alpine region and for many small municipalities it might be the only one. Tourist and visitors highly appreciate the combination of man-made and natural landscapes that shape the Alpine space and gives it its unique

all year-round identity. Though many might think of the Alps as a winter and ski resort in the first place, the analysis of the hotel accommodation patterns in the German Alps revealed that the summer months witness in average a higher hotel occupancy rates than the winter months. Historic city centres of the alpine cities are one of the most important elements of the European and local cultural heritage and a major tourist attraction. Therefore, it is difficult to treat the renovation of historic buildings from purely cost-benefit analysis perspective as there are far reaching non-price benefits associated with the recreation and amenities. In the context, of economic and cultural globalization, the communities that preserve their local identity can achieve economic competitiveness [7].

The importance of the historic building stock in the attractiveness of the whole city is clearly evident in the responses of selected municipalities. The impact of the historic buildings on the city attractiveness and on the improved city revenues were the only two topics that had an average rating exceeding 3 points (figure 5), thus indicating their importance for the alpine municipalities. The rationale for high prioritization of this aspect include preservation of the uniqueness of the area.

3.5. Energy efficiency

Over a quarter of the European building stock is classified as 'historic' with vast majority of it concentrated in the rural areas [14] and are in need for deep renovation. In essence, there is no conceptual difference in energy renovation of historic buildings that are declared cultural assets from non-listed buildings [15]. Energy savings in the result of energy renovation of buildings often exceed the investment costs, which makes them attractive investment projects. Renovation of building stock can generate different levels of energy savings and contribute to targeted energy performance improvement, depending on the level of intervention. In addition, this results in reduction of the emissions and benefits from lower energy costs.

The energy efficiency aspects were given low to medium priority in almost all investigated municipalities other than the ones located in Slovenia (figure 6), which can be explained by the restrictions, complexity and high renovation costs required to bring the old structure to modern energy requirements. The interest in the energy efficiency in the Slovenian case can be better explained in the context of the post-earthquake recovery programs from 2004 onwards that gave the renovation of historic buildings a special attention. Given that even with high-quality retrofitting, the values of a newly built nearly zero energy building are not always achieved, which may explain why the renovation of historic building stock from the energy efficiency perspective was not highly ranked. Adopting a mass retrofitting strategy can help overcome this obstacle as it allows to use highly efficient district energy system and to exploit the benefits of the economics of scale [16].

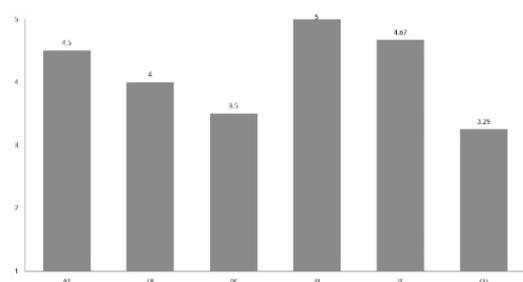


Figure 5. Impact of historic buildings renovation on the city attractiveness in Alpine Regions

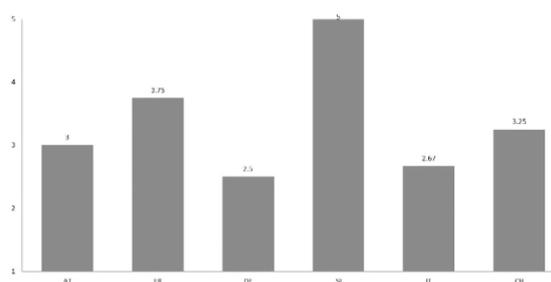


Figure 6. Impact of historic buildings renovation on municipal energy efficiency goals in Alpine Regions

4. Evaluation of the municipalities' access to funds, public consulting service and availability of certification scheme for historic buildings renovation

Financial instruments are an integral part of the policy framework to support the renovation of the building stock. The financial instruments can be divided in the following broad groups: traditional (grants and subsidies, tax incentives and loans), tested and growing (such as energy efficiency obligations, energy services companies (ESCO)), and new and innovative (such as energy efficient mortgages, energy efficiency feed in tariffs, incremental property taxation, crowdfunding, etc.) [17].

Although the variety of funding or co-funding as well as consultancy services are available on the national and regional level (table 2), there is a recognition from most of municipalities that there is a need for complex consultancy on a municipal level in order to raise the awareness of the private owners about the benefits of historic building renovation and funding opportunities. The survey results showed that in most cases, there is a strong national or regional strategy that supports public interest in historic buildings renovation, however, the strategy on the level of municipalities is often missing, except for France, where the local strategy is connected with the project to support residents renovating their houses and ‘rental license’ connected to the real estate law. Municipalities have also confirmed that there is no special certification scheme for heritage/historic retrofitted buildings. It can be concluded, that financing of renovation of historic buildings is based mostly on the traditional financial instruments that are offered for existing buildings with no heritage significant and lack innovative, market-based or multi-actor approach involving collaboration between state, local authorities, public, and investors or ESCOs.

Table 2. Access to funds and availability of consultancy service for historic building retrofit

	Availability of consultancy service	Examples of available financing
Austria	Yes, through Federal Government	Federal funding, subsidies, co-financing by a bank or a non-profit property developer
Germany	Yes, district and regional level	State funding
France	Yes, public consultancy	Public funding, tax reductions
Italy	No, available in some cases on municipal level	State funds, cubage bonus, acquisition through the municipality
Slovenia	Yes, via Energy Advisory Network (ENSVET), state funded	State grants, loans with favourable interest rates, incentives for households
Switzerland	Yes	Contribution to the construction

5. Discussion: Challenges and Opportunities

5.1. Evolving user requirements and criteria

It is evident that the rapid digitalization and the outfall of the COVID-19 pandemic strengthened the demand for new generation of buildings – Healthy Building 5.0 – that goes beyond sustainability and builds upon the requirements of indoor air quality, indoor air hygiene, toxic free environment, thermal, acoustic and visual comfort and absorbs advantages of the Industry 4.0 innovations to optimize the building performance [6]. The updated Energy Performance of Buildings Directive (EPBD) has already set a vision to address the issues of healthy indoor climate conditions, digitalization of building sector, integration of ‘smart-ready buildings’ to ‘promote digitally friendly renovations’ [1, 4]. ‘high health and environmental standards’ together with ‘the twin challenges of the green and digital transitions’ are listed among the key principles for building renovation towards 2030 and 2050 [1]. Historic buildings must undergo a deep renovation to meet these new requirements. The challenge here is to balance achieving today's standards for comfort and energy with the cost and preservation of the authenticity of cultural and historical values, which was confirmed by the survey results. Additional challenge can be connected with the lack of high-skilled technicians, engineers and architects specialising in historic buildings renovations as well as the lack of trained craftsmen and holistic strategies that guide the change at the local level. Municipalities in Italy and France mentioned these challenges in particular. Moreover, the absence of comprehensive sustainability certification scheme or decision support tools that address the historic buildings undermine the non-listed historic building from reaching their full potential when renovated. The key preference indicators for the sustainable renovation of historic buildings and decision support guidance tool developed within the ATLAS project can be seen as pioneering effort to closing this gap[18,19]

5.2. Cost-benefit perspective and financing

The decisions on the scale of renovation are often depend on cost-effectiveness of the investment. In case of historic buildings cost-benefit analysis is complex as there are a number of social and cultural benefits that are challenging to quantify. The survey showed that various financial mechanisms for retrofitting buildings are available, however, most of municipalities admit that there is insufficient financing and point it out as one of the main challenges they face. Most of the programs stem from national or federal programs target primarily listed buildings. Sometimes, a cooperative model based on co-financing by a bank or a non-profit developer is planned or is available. Although energy efficiency is mentioned as a prerequisite for most of the financing schemes of refurbishment by the state or federal programs, however, to exploit the full potential of renovating historic buildings a comprehensive sustainably assessment should be in in conjunction with the energy efficiency requirements. As demonstrated in Vorarlberg [18]

5.3. Multi-actor decision-making process and the role of municipalities

As the whole decision-making and financing process in case of historic building renovations can involve actors from different groups (municipalities, building regulations, building owners, investors, public), handling such multi-actor renovations is seen as an obstacle as it involves higher risks. The survey results confirm a high public interest in Alpine region to retrofit historic buildings as they are the foundation of local identity and shape landscape. Moreover, there is an additional interest to conserve traditional handcraft knowhow. At the same time, due to the high proportion of private ownership, the public sector has limited direct control. The owners lack information about possible renovation options and lack access to the expertise. Moreover, as highlighted by the Austrian municipalities there is lack of subsidies and funding in this regard. From the investor perspective, the specific requirements for listed properties, difficulty to convert historic buildings to other use due to building code and fire protection requirements lead to such projects having higher opportunity costs. In this respect, municipalities in Italy mentioned a scheme when a municipality acquires old buildings, retrofit and re-sale them. Most surveyed municipalities underlined their main role in the spheres of financial incentives, raising awareness and informing citizens. Some Austrian municipalities pointed out to their role in establishing the contact with the building owners and providing guidance. Adopting an integrated design and management approach can help overcome some of these challenges.

6. Conclusion

The results of the survey demonstrated that Alpine municipalities have a strong preference to renovate the historic structures. The main reasons for the municipalities to engage in historic buildings' renovation is their interest in increasing city attractiveness and to boost economic activity. Energy poverty and energy efficiency were not given a high priority by most of the surveyed municipalities either because this cost intensive renovation is more likely to be implemented by high income owners or due to relatively easy access to 'free' biomass energy resources on their land. However, it has been shown that inexpensive and well-defined interventions can greatly improve the energetic and comfort performance of such buildings. The survey revealed that financial issue and lack of adequate financial and technical support represents one of the biggest challenges they face. Although there is a variety of financing schemes available through regional or national programs, they lack innovative financing options tailored for heritage buildings. In addition, it was confirmed that certain consultations (especially in regard to energy efficiency or legal issues) are available to the building owners. However, due to the heritage protection laws and the complexity of historic building renovations, lots of owners prefer to keep the intervention to the bare minimum. The surveyed municipalities confirmed that retrofitting the historic buildings is a challenge as the community has to convince the owners to restore and not replace the buildings with new ones.

Acknowledgments

The Authors wish to acknowledge the help of the colleagues: Tobias Hatt (Energieinstitut Vorarlberg), Tobias Listl (MUAS), Massimo Mobiglia (ISAAC SUPSI), Charlotte Beneteau and Lo  Desvignes (SCRF), Jana Podgornik and Miro Kristan (PRC) and Dagmar Exner (EURAC), and the municipal

staff that participated in the survey. The research leading to these results received funding from the European Regional Development Fund, as part of the Interreg Alpine Space Programme ID: ASP644

References

- [1] EC 2020 Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives COM/2020/662 final
- [2] Oroschakoff K 2019 Buildings will 'make or break' the EU's Green Deal. Politico.eu)
- [3] EC 2019 Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. The European Green Deal. COM/2019/640 final
- [4] EC 2018 Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency Official Journal of the European Union 156
- [5] Venelina Varbova, Astrid Severin and Zhechkov R 2020 Built Cultural Heritage Integrating heritage buildings into contemporary society.
- [6] Khoja A and Danylenko O 2020 Real Estate 5.0: Synthetizing the Next Generation of Buildings ON RESEARCH 50-61
- [7] Grazuleviciute-Vileniske I and Urbonas V 2011 Architectural heritage as a socioeconomic opportunity for revitalization of historic urban centers: a global perspective Arhitektūra un pilsetplānošana = Architecture and urban planning 5 27-37
- [8] Meijer F, Visscher H, Nieboer N and Kroese R 2012 Jobs creation through energy renovation of the housing stock NEUJOBS Working paper D14.2
- [9] 2012 Multiple benefits of investing in energy efficient renovation of buildings: impact on public finances. (Copenhagen: Copenhagen Economics)
- [10] EPEE 2009 EPEE project: European fuel Poverty and Energy Efficiency.
- [11] Wolff A and Weber I 2017 Case Study: Analyzing the outcome of energetic retrofit from a tenant's point of view – who bears the costs? LoPa Working Paper No. 2
- [12] Dean B, Dulac J, Petrichenko K and Graham P 2016 Towards zero-emission efficient and resilient buildings: Global Status Report. Global Alliance for Buildings and Construction
- [13] Garrod G, Willis K, Bjarnadottir H and Cockbain P 1996 The non-priced benefits of renovating historic buildings: A case study of Newcastle's Grainger Town Cities 13 423-30
- [14] Troi A 2011 Historic buildings and city centres—the potential impact of conservation compatible energy refurbishment on climate protection and living conditions. In: International Conference Energy Management in Cultural Heritage,
- [15] Šekularac N, Ivanović-Šekularac J, Petrovski A, Macut N and Radojević M 2020 Restoration of a Historic Building in Order to Improve Energy Efficiency and Energy Saving—Case Study—The Dining Room within the Žiča Monastery Property Sustainability 12
- [16] Khoja A, Stjelja D, Jämsén T and Essig N 2019 Urban Retrofitting: A Progressive Framework to Model the Existing Building Stock IOP Conference Series: Earth and Environmental Science 294 012019
- [17] Bertoldi P, Economidou M, Palermo V, Boza-Kiss B and Todeschi V 2021 How to finance energy renovation of residential buildings: Review of current and emerging financing instruments in the EU WIREs Energy and Environment 10 e384
- [18] Khoja A, Essig N, Erber S, Kristan M, Hass F, Davis A. 2020 Assessment Scheme Including KPI for the Assessment and Benchmarking the Sustainability of Historic Buildings. ATLAS [Internet]. 2020; Available from: <http://rgdoi.net/10.13140/RG.2.2.34213.73445>.
- [19] Khoja A, Eber S, Hatt T, Hass F, Polo C, Davis A, et al. 2020 ATLAS Decision-Support Methodology (DS) for Sustainable Retrofitting of the Heritage Building Stock. ATLAS [Internet]. 2020; Available from: <http://rgdoi.net/10.13140/RG.2.2.14081.07528>.