

New Opportunities for Increasing the Renovation Rate of Buildings

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ABSTRACT: The paper focuses on the long-standing problem of too low renovation rates of existing buildings and on practice-oriented solutions. The European Commission has set the goal of at least doubling the renovation quota with "The European Green Deal" and published the "Strategy for a Renovation Wave for Europe - greening our buildings, creating jobs, improving lives" on 14 October 2020. As in previous years, technical specifications have been defined even more strictly and limit values for energy consumption have been further reduced with the aim to reduce CO₂ emissions. The high quality of the renovation measures is ensured within the European Union and its member states. However, this has not yet been the case in relation to the quantity of implemented renovation projects. The thesis investigates which factors were neglected or were not taken into consideration sufficiently in the past, and, because of that, countries like Austria could not achieve their goals with regard to the renovation rates. This is done by identifying, selecting and verifying both specific and potential conflicting goals. On the basis of the description and analysis of the background to these potential conflicts, the actual obstacles are identified and approaches to their solutions are defined. The formulated approaches should form the basis for future in-depth discussion and further development of specific detailed solutions. The implementation of these results in a comprehensive package with technical regulations such as the "Renovation Wave for Europe" and "The European Green Deal", opens up new opportunities for achieving the set goals. An increase in the renovation rate of existing buildings is the quantitatively measurable outcome.

KEYWORDS:

building heritage, renovation rate, population identification, revitalization, conflict of goals, CO₂ emissions, Renovation Wave

INTRODUCTION

The problem of vacant buildings and of the falling or constantly low renovation rate of existing buildings has been a fact of life for many years. In Austria, the rate of subsidized renovations fell to just 0.5 percent in 2018 [1]. In the single-family and multi-family house building sector, compared to other European countries, Slovakia is above average [2].

Both at the international and individual level, the 195 countries that ratified the Paris Agreement on Climate Change in 2015 [3] have put in a great effort, with a variety of plans and ambitious targets to significantly increase the number of renovations of the building stock. One of the strongest drivers of this is to be found in the climate protection targets defined for the individual countries or in the associated CO₂ fines that might be imposed if the set targets are not achieved.

The European Union has set the current renovation rate in the individual member states at 0.4 to 1.2 percent. *This quota should be doubled, at minimum, if the EU's energy efficiency*

and climate targets, as stipulated by "the European Green Deal" are to be achieved [4]. It was also announced that this topic would be promoted in the individual member states. As a result, on 14 October 2020, the European Commission published the "Renovation Wave Strategy" [5].

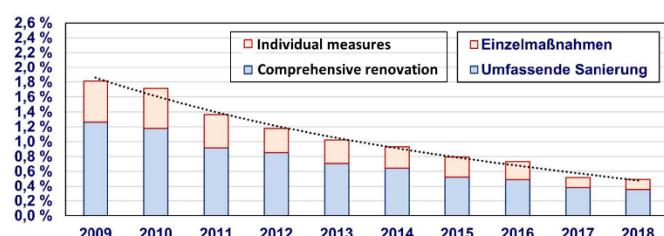


Figure 1: Renovation rate for subsidized buildings in Austria.

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A lot of effort has already been made in the past to increase the renovation rates, but the facts and figures show that the result is the opposite and thus unsatisfactory.

The energy strategy for Austria 2010, based on a one-percent annual renovation rate, aimed to increase the rate to 3 percent in 2020 [6]. As mentioned before, this has clearly been unsuccessful.

The new Austrian climate and energy strategy mission 2030 [7] has set the goal of increasing the annual renovation rate to an average of 2 percent in the period from 2020 to 2030.

The targets for energetic renovations have continuously been more and more ambitious and the values to be achieved have been set even higher.

The high quality of the renovations is thus ensured on a fundamental basis in accordance with international standards, at least within the European Union and its member states.

However, as the past has shown, this has not yet been the case with regard to the quantity of the implemented renovation measures. In retrospect, other factors obviously also need to be taken into account if a sustainable increase in the renovation rate is to be achieved with respect to the quantity. The aim of this paper is to verify these parameters.

Financial and legal issues have deliberately been given low priority in this paper, as their complexity requires a special discussion so that constructive steps can be successfully taken. The question arises as to which factors have to be activated in addition to the legally prescribed technical requirements so that the theoretical goals set by politicians based in Brussels can actually be achieved.

For this purpose, relevant results and findings from professional publications have been researched and analyzed over the last 50 years. Such priorities have been identified that have been discussed but have obviously not been given enough consideration in the development of strategies to increase the renovation rate. The focal points determined in this way are intended to serve as a basis for future specific strategy development and, if appropriately integrated in an overall package with the technical specifications of the legislature, pave the way to the desired increase in the renovation rate.

CLIMATE-RELEVANT ASPECTS

The aforementioned problem in the quantitative implementation of climate protection goals and remedial measures is currently further exacerbated by the global corona pandemic.

Monument protection and climate protection are areas that might clash or provoke a lot of tension. Approaches aimed at finding solutions and options for action need to be developed so that planners and builders can cooperate constructively in resolving these two issues that are currently especially important to the society [8].

On the one hand, the topic of climate protection adds an element of urgency to these renovation initiatives for the well-being and preservation of the existing buildings. On the other hand, this leads to several conflicting goals.

The building renovation and monument protection proponents want to preserve the existing buildings. However, the protection of environment and climate protection require property-related changes, the optimization of energy efficiency and constant reduction in energy consumption and CO₂ emissions.

Energy-efficient renovations make the implementation of building renovations more difficult and expensive. In the context of the application of monument protection regulations, a considerable number of the measures cannot even be implemented.

There is a need for such actions in the energetic renovation of buildings in which the values of building culture would be adequately taken into account. Dr. Claudia Schwalfenberg names three points that define the high-quality building culture and thus also the high-quality building renovation: living space design, involvement in cultural issues and cohesion within the society.

She also considers the building culture in connection with sustainability and resource-saving building materials to be an obvious, comprehensible fact; just like the greening of traffic, which not only improves climate protection but also the quality of life in village and city structures [9].

Existing properties are always part of the solutions with regard to climate protection, and they have their special advantages and qualities, which, unfortunately, often cannot be properly utilized.

The consideration of gray energy within the life cycle is to be rated positively. Energy expenditure for building construction, i.e. material production including transport, as well as demolition and disposal at the end of the life of the property are taken into account and put into perspective in relation to new buildings [10]. So, we have studied and researched a topic that can be used to show one of the advantages of old buildings. The first interim results of the research project "monumentum ad usum" of the Danube University Krems, which is conducted in Lower Austria and whose objective is to determine the potential of architectural heritage for non-profit developers indicate similar tendencies [11].

We have reached the point at which the maximization of the economic profit is no longer the top priority, and it happened a long time ago. There is a turning point in the priority setting in society [12]. This can also be seen as a positive fact for the appropriate approach with regard to the preservation and renovation of existing buildings in the future.

VALUE OF ARCHITECTURAL AND CULTURAL HERITAGE FOR THE SOCIETY

Alois Riegl sees the material archive of his own individual development history in an old building [13].

Old buildings remind us of our history, the history of our ancestors, of a bygone era, in which we all, the entire society, are rooted. And these roots must not be damaged or even cut off willfully or out of sheer ignorance.

Protected buildings and buildings worth preserving

What is to be understood under the category monument is defined in the national regulations (see the next sub-section "Listed Buildings"). If we look at the existing building stock, the question arises whether other objects should not be preserved as well.

Dr. Georg Mörsch, full professor of monument preservation for twenty-five years and the head of the Institute for Monument Preservation at the ETH Zurich, already in the 1980s comment-

ed on the limiting nature of the terminology used to define the monuments to be protected and the buildings worth preserving. He anticipated the possibility that all old architecture could one day be considered worthy of preservation for a monument conservator like him [14].

In view of the fact that, for example, about 30 percent of the building stock in Germany is particularly worthy of preservation, out of which only about 3 percent is under monument protection [15], the question arises as to how "what to do in the future with the building fabric that is not listed but is worth preserving" [16]. For example, the old town hall in Offenburg is not a listed building, but has a high potential for identification with the town, its appearance and its residents [17].

If old buildings that are not protected but are worth preserving are to be treated accordingly in the future, the number of buildings to be maintained will increase significantly. The associated effects require careful and comprehensive consideration in the development of adapted rehabilitation strategies. For the reasons mentioned above, both listed buildings and all other existing buildings are basically treated in the same manner in the paper.

Listed buildings

In the Republic of Austria, a comprehensive federal law has guaranteed the protection of architectural monuments since 1923. In the whole country, there are currently 38,367 [18] protected monuments. In §1 of the current Austrian Monument Protection Act (Österreichisches Denkmalschutzgesetzes, DMSG) [19] it is stated that immovable objects of historical, artistic or other cultural significance are defined as monuments if the preservation of their historical, artistic or cultural value is in public interest. Preservation is understood as the protection against destruction, alteration or displacement. The Bundesdenkmalamt (BDA, Federal Office for the Protection of Monuments) for the implementation of and compliance with the DMSG has existed in its current form since 1923.

Individual towns and cities also have the option of defining structural "protection zones" for their historic city centers. The primary concern is not the protection of individual objects, but rather the most comprehensive possible preservation of the entire historic town center area, including the so-called buffer zones as transitional areas between historic buildings worthy of preservation and the peripheral objects that are irrelevant with respect to the effect on the townscape to be protected.

In the Slovak Republic, similarly to the Republic of Austria, the protection of both "individual monuments" and ensembles is also specified by law. In Slovakia, there are approx. 14,995 [20] protected "cultural monuments", for which the Monument Office of the Slovak Republic, which has been in existence since 1951, is responsible. Since 1950, Slovakia has had the category of "protected historical monuments", which includes the historically most valuable town centers. The capital of Slovakia, Bratislava, was also declared an urban "protected monument area" as early as 1954. Clear parallels between the Austrian "protection zone" and the Slovak "protected monument area" are evident in terms of concepts, perception and definition of goals. In Slovakia, for more than thirty years, there has also been a "monument zone" category used to protect smaller ensembles of buildings with historical settlement structures.

The unused building

Due to the measures implemented in the recent past, buildings that have already been revitalized have a much better starting position compared to those that have not been renovated yet and will show either barely discernable effects on their existing structure over the next few years or no effects at all, even though the ravages of time are constantly gnawing at them.



Figure 2: A building structure in disrepair after 25 years of neglect (Austria). © Christian Hanus

It is different with uninhabited objects: the intensity of certain problems such as air humidity and vapor diffusion might be defused. Other substance-damaging influences, such as penetrating damp from the walls and various weather influences, often inconspicuously but steadily, affect the building fabric. "Worst case scenarios" can be described as those cases in which the listed buildings have been vacant for a long time, have not undergone any renovation for decades and have one or more damaged areas that need to be repaired as soon as possible. This may concern e.g. damage caused by moisture such as a leaky roof, broken roof tiles or gutters, penetrating damp from walls, missing window seals, etc. Due to the lack of residents, such cases of damage, which could otherwise be remedied with little effort, are not discovered or are discovered too late. It is not uncommon for the building fabric to be irretrievably destroyed.

If the building under protection is not used, i.e. if it is "vacant", this has ongoing negative economic effects:

- Need for substitute or alternative accommodation
- Loss of rental income
- Additional costs of necessary repairs and renovation

From economic perspective, existing living spaces and rooms should be made usable and kept usable for the reasons mentioned above.

Inanimate town and city centers

Guido Rebstock is of the opinion that a building does not stand on its own, but that the individual, sometimes urban environment must always be taken into account when renovation measures under consideration [21].

Hathumar Drost also sees the individual building as a building substance worth preserving although not as essential as the preservation of the urban structure it entails [22].

If there are more and more vacant buildings in town centers over time, the functionality of the local structures might be at risk, with possibly considerable losses from a cultural, economic and sociocultural perspective and the risk of ultimate collapse. This development in Austria can generally be observed since the 1980s. Most importantly, shops are empty, daily local supplies are no longer guaranteed and older people in particular can no longer get their daily supplies within walking distance.

If the number of households and the number of people living in the center of a village diminishes, the municipal revenues for the local government will also decrease. A far-reaching vicious circle might begin. Lower volumes of investment into their local centers (design, infrastructure, etc.) by the municipalities often mean that they are likely to be less attractive for (potential) residents and businesses.

Use of the existing buildings

As a society, we all have the duty to preserve a large number of historical objects worthy of protection and we benefit from the protection of the historical monuments by the responsible institutions and authorities, which is an achievement of inestimable value for all of humanity.

In connection with the renovation of existing buildings there is a conflict of interests [23] between the use and the protection of historic buildings that are worth preserving. Again, and again there are cases in which the client or planner tries to implement uses that turn out to be inadequate or inappropriate for the property in question.

Only if the historical building to be protected can be given the appropriate use and necessary maintenance it might actually be protected.



Figure 3: Adaptive reuse of the listed "Göttweigerhof" in Krems. It has been successfully adapted into a residential building (Austria).

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Theresia Görtler Berger warns of the danger of overusing a monument. This can happen as a result of both a continuously implemented and a short-term abrupt change in the method of use and it may ultimately lead to the collapse of the monument.

Overuse - the incompatibility of the new use with the potential of the existing building - bursts the structures of the property and drives the wear and tear of the materials and the relevant spatial structures. [24]

The sustainability of a use must be checked and guaranteed as a whole. Just looking at cost-effectiveness does not bring a long-term solution in terms of holistic sustainability.

Dipl. Arch. FH Giancarlo Serafin also describes a conflict of objectives in relation to the problem of historical buildings with new uses and the necessary infrastructure, using the two listed Federal Technical Universities in Zurich and Lausanne as an example. Some of them are historical objects that are worthy of preservation and that constitute landmarks in the townscape. However, he also sees new opportunities through the inclusion of interdisciplinarity in the solution-oriented approaches to be developed through the specification of building maintenance [25].

The "Gasometers" in Vienna Simmering are a good example of an extraordinary showcase project of the renovation of a listed facility.

The four round gas tanks with exposed brick wall cladding and subsequently added dome structures, which were put into operation in 1899, were adapted and revitalized as part of the largest construction project in Europe by four internationally renowned architects with the aim to create a total of more than 600 new apartments.

A 450-meter-long horizontal new building called "The Mall" connects the four listed individual objects over several floors. The retail space in it was originally planned for around 70 companies. However, the opening had to be rescheduled and the premises had to be adapted several times in the past, as the expected 20,000 customers per day never became reality [26]. The operating company slipped deeper and deeper into red numbers and was close to bankruptcy in 2009 [27].

After comprehensive and intensive renovation in 2013, the structure was adapted to a completely different usage concept. The former sales premises are now used for music productions and training courses or as event rooms and various music shops. The "Gasometer Music City" is Austria's largest training and youth development center that specializes in dancing, singing and drama with a focus on musicals. In recent years, the listed complex has gained recognition as a modern Viennese center of popular music.

It took a while and the area needed to be reinvented as a "Music City", including an academy, conservatory and private university, but ultimately the concept worked - the Gasometer in Simmering went from a dreary shopping center with no customers and a lot of vacancies to a very popular and successful entertainment and training center with a variety of food service establishments. [28]

Even with this extraordinary renovation project, the fundamental importance of preparing a necessary solution to the conflicting goals of use versus protection at the beginning of all considerations and decisions becomes clearly evident.

After all, the lavishly renovated cylindrical outer shells made of bricks have been substantially preserved to date. As long as the use of the protected monument is guaranteed from the investor's perspective, the substance and appearance are secured.

INVOLVING THE POPULATION

In European countries such as the Slovak Republic and the Republic of Austria, protected monuments are protected by the aforementioned laws. Unqualified, amateurish and inadequate solutions are generally effectively blocked.

The building culture affinity of a society is decisive for the active maintenance of existing buildings and structures. Legislators are aware of the importance of preserving the architectural heritage as unadulterated as possible for the society. Because of the insensitivity of the population, this is a matter of public interest of immense importance.

Georg Dehio already knew in his time (historicism, art nouveau and classical modernism) that *both the protection of and the danger to monuments come from people* [29].

In addition to the structural and economic disadvantages, the fact that old buildings are empty can have negative effects on the population, in many respects, both at conscious and unconscious level. The cited positive effects such as the historical roots and the bonding, the personal identification with a place and its residents and, in a broader sense, the awareness of a building or a site and the environmental and climate protection can quickly turn into the opposite if a historic building remains empty.

Daniel Ebeneth confirms from his experience of dealing with the building fabric worth preserving in historical locations in Offenburg that the population basically identified with the old building fabric. A more intensive discussion and external reaction only occur when there are significant changes in a familiar appearance. This might be true, for example, in the case of rapid demolition of an old existing building or extensive construction on a garden plot. Vacant building gaps, which are filled by new buildings that are too big for the location, also cause uncertainty and dissatisfaction [30].

In his examination of the subject of building culture, which studies the design of the human environment, Prof. Dr. Bernhard Furrer states that this should be taught at elementary schools at a very young age so that it reaches the population. This is confirmed by positive experience in Scandinavian countries such as Finland. In Bern, Switzerland, a document titled "Monument Preservation Goes to School" is used in classes [31].

Similarly to Mörsch and Ebeneth, Furrer also sees a major problem in the rapidly changing cityscape and townscape, which leads to uncertainty among the population. Existing buildings, on the other hand, are a place of identification for them and therefore essential for good building culture.

The necessary identification of people with the building stock encompasses the most varied strata of the population. In addition to the residents as users of the buildings, there are also the house owners.

The owner, who is responsible for the protection of the property, needs encouragement in the positive attitude towards the old building substance. There is *no systematic and reliable information for owners about the monument status of their buildings*. More communication and mediation is needed with regard to the important function of dealing with architectural heritage by the owner [32].

It is therefore necessary to integrate everyone involved in the project right from the start and to make the process as transparent and uncomplicated as possible. [33]

A potential conflict of interests can be identified between the homeowner and the tenant of an apartment. In Vienna, 76 percent of the main residences are rented, 20 percent are owned. Tenants can prevent renovation projects; thus, their involvement and cooperation are essential. The chances of a successful property renovation increase if the owner himself uses the building. With respect to redevelopment subsidies, house owners in Vienna are at a disadvantage compared to tenants [34]. In Vienna, about 30 percent of financially weaker people live in buildings that were built before 1960. *For renovation projects, this means that a higher proportion of people at risk of poverty can be expected in these older residential complexes.* [35]

Potential solutions for yesterday and tomorrow

In the search for goal-oriented approaches to solutions and specific action steps, the development of new concepts and research into previously unknown facts are essential. The experience and familiarity with previous activities, experiments, initiatives and projects from history should not be neglected. Particularly in the field of building renovation and town center revitalization, a look into the past might help to ensure a "clear view" of possible solutions for the future.

Dr. Georg Mörsch already stated in 1989 in the forward to his book "Aufgeklärter Widerstand – Das Denkmal als Frage und Aufgabe" [36], that with all of his many different interlocutors over time, the same fundamental questions on the subject of "Protection of monuments" are always asked. Excerpts from two of his statements that are still relevant:

- *Science often simply lacks the willingness to research the latest potential for monuments (...).* [37]
- *The fundamental problem of today's throwaway society can be transferred to the topics of monument preservation and the public: Care, maintenance and repair are becoming obsolete, the original substance is not accepted as an essential dimension of the monument.* [38]

Mörsch claims, on the assumption that "*sociological / urban planning expertise and political insight (...) strategies can be defined*", the population decline in town centers can be counteracted "*through return*". His comments that are most relevant to the subject matter are stated below: [39]

- *No radical changes in city characteristics, be it structural or functional (...)*
- *(...) no changes to the types of use and the distribution of uses that have proven their urban preservation functions.*
- *The old building stock must also be treated with care where it is written off from an accounting point of view and is historically uninteresting.*
- *If space is required for new uses, the existing usable old building stock must always be reviewed.* Mörsch stipulates the *condition not to automatically demolish buildings that are currently not in use, but rather to maintain them with reasonable effort.*

An outstanding example of the early approach of a medium-sized city to the problem of the renovation of historical buildings and the associated social revitalization of the town center is Krems an der Donau, which currently has around 25,000 inhabitants.

As early as 1655, 40 percent of the buildings in Krems were empty [40]. In 1959, the city of Krems started to take action against the dreary situation of the state of preservation of individual buildings, streets and structures [41]. The town of Krems granted interest-free loans for ten years. For example, only 30 percent of the renovations and the repair of facades had to be financed from people's own resources.

In the period around 1965, there was a massive boom in new construction, which pushed the topic of old town renewal into the background. Nevertheless, a symposium took place in Krems that year. Both the speakers and the content presented clearly indicated which problems were dealt with with what expertise. Harry Kühnel, head of the Krems cultural office, gave the first expert lecture [42]. He criticized the fact that in Krems *the once large buildings had not received any maintenance or significant improvement*. The main reason for the dreary urban situation he described could be found in the extremely bad economic and related cultural situation in that period.

At the beginning of his speech, Ewald Liepolt praised [43] the commitment of the town and described Krems as the first Austrian city that decided to take the step towards renewal. He sees a need for action in the intensification of *psychological and sociological research that might provide urban planners with more knowledge with regard to people and their behavior*. And he supports the *path taken by the city of Krems to establish contact with the individual residents or users of the properties through surveys (...)* [44].

Werner Jäger stated at the beginning of his lecture [45] that the renovation was not just about maintaining individual buildings, *but about maintaining a unique atmosphere* in their immediate vicinity. *It has to be possible to fill these parts of the town and their buildings with real life, to give them such functions again that would make it possible to maintain them on their own*. [46] The question whether and in what form the town of Krems has benefited from its pioneering role, its commitment and time and knowledge advantage to this day is particularly interesting. For a meaningful evaluation, the relevant comparisons should be made and conclusions should be gathered.

CONCLUSION

Various conflicting goals were identified in the work. In practice, just one of these conflicts can delay a remediation project or even cause it to fail. The Duden defines the term "conflict of goals" as a conflict that arises when two goals are set whose simultaneous, full fulfillment is mutually exclusive [47].

If the chance for an actual renovation and renewed use of the existing building is to be maximized, the potentially existing target conflicts should be resolved well in advance:

- Refurbishment versus new construction

The decision to renovate an existing building and not to build a new one often leads to a conflict of objectives in the development and planning process.

The use of a comprehensive set of arguments with scientifically founded facts and possibilities for comparison should be considered as a potential solution.

- Use versus preservation

The decision to renovate and maintain an existing property can mean protecting the existing building but also exposing it to destruction through such use. A conflict of goals between the

use and protection of an object can develop. One approach to solving this problem can be seen in the target group-oriented dissemination of information on the basis of technical expertise for in-depth knowledge expansion

- User demands versus property-adequate use

Finding suitable, property-appropriate use requires special consideration in the planning process and can also cause a conflict of goals due to the different interests of those involved and the decision-makers.

The solution-focused approach consists in the timely analysis of the characteristics of the building and the definition of its potential.

- Building maintenance versus climate protection

Building renovation and especially monument protection aim to preserve, whereas climate protection requires changes towards increased energy efficiency and reduced energy consumption and CO₂ emissions.

A solution can be based on the necessary coordination within the process of adoption of new regulations and the legislature on the one hand and in the high-quality information transfer among all people involved in the renovation project on the other hand.

It can be stated that the solution-focused approaches aimed at avoiding the individual target conflicts described above share a common basis:

- Affinity for the irretrievable values of the existing building and its surroundings
- Raising awareness of the complexity of climate and environmental issues
- Identification with the architectural heritage

The consistent consideration of these three subject areas in the preparation of ambitious legal regulations and technical specifications increases the chances of successful implementation of renovation projects.

Tendency to focus on the integration of the population can be clearly seen in the merging of the previously mentioned solution-focused approaches and topics.

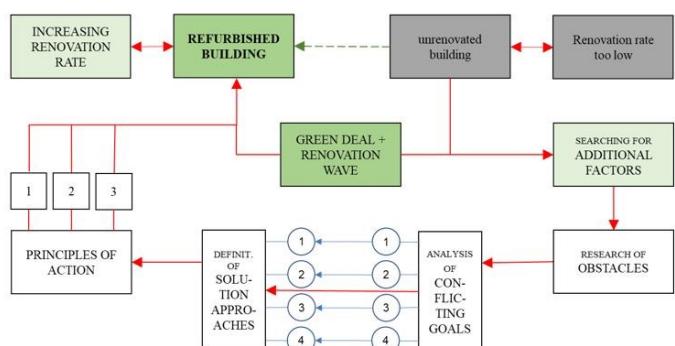


Figure 4: Presentation of the methodology used in the paper.
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The saying attributed to Protagoras *Man is the measure of all things* [48] can also be applied, with some adjustment, to the subject of the renovation of the old building. By accepting and considering this principle as well as integrating the knowledge gained into the development of future strategies, there is a basis for a real chance to promote activities aimed at success-

fully increasing the renovation rate such as the "Renovation Wave for Europe" to "The European Green Deal".

Note: quotations translated into English by the author

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