

○ Working Paper

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## The TIMEPAC Renovation Passport - Challenges and resulting recommendations based on stakeholder workshops held in the capital cities of four Austrian regions

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## Summary

As part of the project-related tasks of TIMEPAC, the project partner SERA organised workshops for different stakeholders in the capitals of four Austrian regions between October 2023 and January 2024.

In the workshops, the participants were informed about the results of the TIMEPAC research and discussed key issues. This Working Paper summarises the results of the discussions on the Renovation Passport.

## 1 Introduction to TIMEPAC

'TIMEPAC - Towards Innovative Methods for Energy Performance Assessment and Certification of Buildings' is a Horizon 2020 research project with a duration from 1 July 2021 to 30 June 2024 and helps to improve the existing energy certification procedures by moving from a simple, static certification to a more holistic and dynamic process. At the demonstration sites in Italy, Croatia, Austria, Slovenia, Spain and Cyprus, TIMEPAC has developed new methods and tools to create a better basis for collecting and analysing data. TIMEPAC demonstrates the feasibility of combining EPC databases with other data sources to make certification more effective and reliable. In addition, TIMEPAC promotes digitalization so that EPCs can better reflect actual building conditions and enhance accessibility for users. Improved EPCs are expected to enable additional deep renovation. In the six partner countries, in total 27 residential and non-residential buildings from different construction periods and building sizes have been analysed, and results were used to develop reports as input for further work but also guidelines for practitioners.

All documents are available for [download](#). This Working Paper refers to the [Guideline for creating renovation passports from data repositories](#).

## 2 Renovation passport and stakeholder discussions

As part of TIMEPAC's project-related tasks, the project partner SERA organised workshops for the various interest groups in Salzburg, Vienna, Graz, and Klagenfurt between October 2023 and January 2024. The topics covered included the challenges for a targeted, practical implementation of a Renovation Passport, the associated Renovation Concept or Roadmap, an extension of the energy performance certificate (EPC) with links to data repositories and the use of BIM (Building Information Modelling), considering also operational data and additional indicators.

In the workshops, the participants learned about the results of the research work conducted in TIMEPAC and discussed the following essential questions, among others:

- How does the next generation of EPC look like?
- What purpose does a Renovation Passport fulfil?
- What role does a Renovation Concept/Roadmap have and who issues it?
- How does the design of the Renovation Passport look like in order to increase the renovation rate?
- What data is necessary for the development of a Renovation Concept and how can it be obtained in a time-saving manner?
- Can the data in the ZEUS energy performance certificate database (e.g. province of Salzburg) be used and expanded?
- What works well, what is missing, what is necessary? What are the next, necessary steps to be taken?

The topics discussed ranged from monitoring, the quality of energy performance certificates, costs and benefits for consumers to the need to emphasise the difference between new buildings and existing buildings and to adapt and/or redesign the EPC and, subsequently, the Renovation Passport accordingly.

In this Working Paper, the discussion results related with the Renovation Passport are summarised. A total of 48 people from different sectors participated in the workshops and the analysis presented is qualitative and does not claim to be exhaustive.

The core of the discussions about the status quo, its enhancement - improvement strategies, taking it to the next level - and how various measures are reflected in a Renovation Passport including Renovation Roadmap appear in the following Table 1.

Table 1 Insights from the stakeholder discussions in Austria, clustered according to the sections “Status quo”, “Strategy”, and “Renovation Passport”

Status quo	Strategy	Renovation Passport (RP)
Equal subsidy requirements for new and existing buildings.	Introduce building regulations for new buildings and building regulations for existing buildings which is followed by a separation of subsidies between new and existing buildings.	Renovation Passport for new and for existing buildings.
Rarely complete (deep) renovations, especially in single and multi-family homes.	Structural distinction between the two technically constructive approaches: dynamic state and airtight building envelope.	RP includes a Renovation Roadmap which is based on a renovation concept. Two options: 1. All at once Renovation with the greatest possible utilisation of subsidies; 2. Renovation within 20 years through a bank loan on the basis of the EU-Taxonomy. Implementation of the life cycle analysis.
Existing building condition is being restored and not improved.	Renovation should be equated with energy efficiency improvements: changing the meaning of the term renovation in the property sector is necessary. Implement the circular economy in the construction sector by means of OIB (OIB = Austrian Institute of Construction Engineering) Guideline 7.	RP is easy to use and understandable for end-users. Shows the reduction in energy consumption after each measure. Appealing graphics for communication, e.g. Energy flow diagram; qualitative cost estimation → high, medium, low, (e.g., GEQ tool for energy consulting). Ensure relevance for property managers as a basis for reserves for maintenance&repair and improvement.
No specification on costs and savings.	Set up a system for collecting prices.	
No database with all necessary information of a building	A building database with all the necessary information from which the required assessments and certificates can be generated automatically and dynamically would be ideal (i.e., always up to date). How can the databases from klimaaktiv (especially in materials) be utilised? Check automated transfer to ZEUS (Zentrales Energieausweis Umgebungs System = Centralised energy performance certificate environment system). Check what role SIMULTAN software (TU Vienna) can play in this context.	Digital building logbook contains RP Extension of EPC database towards building logbook Repositories such as BIMServerCenter (CYPE) Expansion towards GIS with regard to the use of renewable energy sources to achieve decarbonisation
No real one-stop-shop	Coordination between energy advice and renovation planning → expertise from various disciplines needed (building services, renewable energy, building automation, building physics, materials science, architecture, health, life cycle assessment, etc.).	Example Carinthia: The Renovation Coach is a new role that assists the homeowner with the implementation of the renovation measures that have been identified in the renovation road map.
Households are unable to raise capital and/or pre-financing needed to make use of subsidies	A loan for project realisation could be granted simultaneously and unbureaucratically with the funding approval - equity replacement loan.	RP scheme includes clear definitions of subsidies and loans.

### 3 Discussion results from Vienna, Salzburg, Graz

The workshops held in Vienna, Salzburg and Graz followed a similar format and are therefore summarised according to topics.

**Existing and new buildings:** There is an urgent need to distinguish between existing and new buildings: Historic constructions with centuries of lifespan compared to new buildings with a shorter one. Data of an existing building is mapped differently. We need new building regulations that do justice to existing buildings. According to one participant, there are two technical-constructive philosophies: the “dynamic” state (e.g. “Gründerzeithaus” – houses of “Fin de Siècle”) or completely “sealed”, i.e. an airtight building envelope. The Renovation Passport should be able to map and reflect this. The introduction of life cycle analysis (life cycle assessment) was also mentioned.

**Result/recommendation: Introduce building regulations for new buildings and building regulations for existing buildings.**

The **Renovation Passport** must clearly state the goal of decarbonisation by 2050. Quote on the current situation in real estate management: "If renovation is currently taking place, then the existing condition is being restored and not improved." Provide simple handling for the end user, e.g. by means of a bar with a traffic light system and a connected update on the implementation of measures. You cannot see what the benefits are, so visualise what is planned and what costs that can be saved if renovation measures which improve the building are implemented. Adapt data to the principles of the repair society/circular economy; OIB Guideline 7 (based on the EU Construction Products Regulation) is currently being developed for this purpose.

Links:

[https://www.bmk.gv.at/themen/klima\\_umwelt/abfall/Kreislaufwirtschaft/strategie.html](https://www.bmk.gv.at/themen/klima_umwelt/abfall/Kreislaufwirtschaft/strategie.html)

<https://www.oib.or.at/de/oib-richtlinien/richtlinien/2023/oib-richtlinie-7-grundlegendokument>

**Result/recommendation: Renovation should be equated with energy efficiency improvements (Changing meaning of the term renovation in the property sector). Implement the circular economy in the construction sector by means of OIB (OIB = Austrian Institute of Construction Engineering) Guideline 7. Make the Renovation Passport easy to understand for end users and make it EU-Taxonomy compliant.**

**Target group for the Renovation Passport:** There are key distinguishing features between the Renovation Passport; with target values/requirements and the Renovation Roadmap (Renovation Concept): with measures and schedule as part of the Renovation Passport. Renovation passport is for information purposes, simple presentation for end users: Current operating costs / energy consumption - planned measures and reduction in operating costs / reduction in energy consumption after each measure. The figures are also to be given as percentages because they are easier to remember. The Renovation Passport makes it easier to obtain subsidies and obtain favourable conditions from banks (EU-Taxonomy). Ensure relevance for property managers as a basis for reserves for maintenance & repair and improvement.

**Result/recommendation: Renovation Roadmap/ Renovation Concept contains measures with deadlines for implementation; loses validity if not implemented on time, must then be drawn up again. Control via ZEUS EPC database. Check the legal structure to see how binding obligations can be established for property managers.**

**Renovation Roadmap / Renovation Concept** in the desired level of detail: realisation planning and detailed planning, at least creation of guiding details for window connections; the effort involved is high. In a municipality, several detached houses could be combined to save costs. Award a prize for high-quality Renovation Roadmaps, such as the klimaaktiv building standard. High-quality Renovation Roadmaps (with at least the status of an expert opinion) could be used in the property valuation to price in maintenance backlog and need for improvement. A detailed Renovation Roadmap goes far beyond energy advice. Interface between energy advice and architecture is unclear - introduce rules by means of subsidies.

Links:

<https://arge-eba.net/>

<https://www.klimaaktiv.at/bauen-sanieren/gebäude-deklarieren/sanierungsfahrplan.html>

**Result/recommendation: Take into account the different roles of energy advice in single-family homes and multi-storey residential buildings; energy consultants as a preliminary stage to renovation planning (engineering offices, civil engineers, architecture); define interface to architecture; define different levels of detail for the Renovation Roadmap (e.g. energy advice protocol for single-family homes = level of detail 1; property safety inspection in accordance with ÖNORM B 1300 combined with energy audit plus action plan and schedule = level of detail 2); technical due diligence inspection plus implementation planning of measures and schedule = level 3 detail).**

**Obligation to renovate:** Some participants are in favour of penalties being imposed after an appropriate transition period if the targets of the Renovation Roadmap and Renovation Passport are not met. This could be checked with the ZEUS Energy Performance Certificate database. Quote: "Like a building permit or a car licence sticker."

**EPC:** In a European comparison: standardisation would make sense but is rather unrealistic. Requirements are too different, keywords "affordable housing", "fire protection". Asset and operational rating in Germany; asset rating in most EU member states; in addition, the planned Renovation Passport (according to EPBD recast) is based on energy consumption data. Who is authorised to issue a Renovation Passport in Austria?

Regarding EPC, the industrial code regulates which professions are authorised to issue EPCs; not defined in the architects' fee regulations. Quote: "Energy Performance Certificate is somehow included in the work, the quality is not good". Quote: "Show more seriousness with regard to quality of the EPC." There should be extended training and further education for this.

EPC database: Who is responsible for uploading additional building data? No standardised regulation in Austria, but rather Province-specific; ZEUS (Central Energy Performance Certificate Environment System) is not yet established everywhere, currently in the Provinces of Salzburg, Styria, Carinthia, Burgenland, Tyrol, Lower Austria. The credo is not to make the Energy Performance Certificate even more complicated, but rather to simplify everything.

Difficulties in Austria: EPC issuers must apply for authorisation for ZEUS in each Province. ZEUS is operated by the federal Provinces.

Links:

<https://www.energieausweise.net/>

**Result/recommendation: Simplify the Energy Performance Certificate (pages 1 and 2), not make it more complicated. The calculations in the EPC must better reflect technical and climatic developments, especially in renewable energy technologies and overheating in summer.**

**Calculation method Energy Performance Certificate:** Accounting generation and demand on an hourly basis would be necessary for a new type of tariff system (e.g., different costs for energy depending on time availability). Still considered too complicated by some, while others are already working with it.

Links:

<https://www.annex67.org/publications/software/pvopti/>

**Result/recommendation: Simplify energy balancing on an hourly basis in the application.**

**Calculation method Renovation Passport:** The fact that costs and savings must be specified causes difficulties. How can quality-assured cost data be obtained for the implementation of measures? Collection of prices would be necessary.

**Result/recommendation: Set up a system for collecting prices, possibly in cooperation with klimaaktiv. Design subsidy statements in such a way that a basis of prices/costs can be established. Based on the BKI building cost information system.**

**Monitoring of energy consumption data:** In principle, the option exists in ZEUS, but is not currently provided for in all Provinces. In practice, this is often not possible because space heating and domestic hot water are not recorded separately. In response to this, one participant reported on a sample renovation in which monitoring was carried out. In principle, 90% of building owners and tenants are not interested in this, but the eye opener was, as they could see on paper what was being saved. The advantage for the property managers: they had evidence as a basis for further financing renovation options. It was emphasised that it is important to insist on monitoring so that it is not cancelled for financial reasons. An energy production and consumption display in the house would be important but is usually too expensive for the clients. There can be competition between neighbours to see who uses the least. "If you know how much you use, you save." A psychological effect sets in; it is important to know your energy consumption in order to achieve energy savings and minimise the rebound effect.

**Result/recommendation: Energy production and consumption monitoring should be mandatory for subsidies, including for residential buildings.**

**EPC versus comprehensive building assessment:** The participants agreed on the need for a holistic approach, although not necessarily reflected in the EPC. Great importance is attached to the life cycle assessment. Life cycle assessments are established with Level(s). Level(s) is a formal framework of the European Commission; Construction Products Regulation and EPBD recast lead to OIB Guideline 7 from 2027 - material documentation, material storage, requirements for deconstruction and reusability, waste. It is unclear whether this will become part of the EPC, considered rather unrealistic or not useful.

Links:

[https://environment.ec.europa.eu/topics/circular-economy/levels\\_en](https://environment.ec.europa.eu/topics/circular-economy/levels_en)

<https://www.oneclicklca.com/levels-framework-for-sustainable-buildings/>

**Result/recommendation: As a legally binding instrument, the EPC should be reliable, understandable for end users and not overloaded with information. There are other tools that offer additional information. Requirements such as healthy indoor air must be complied with in the calculation. A database-based dynamic EPC could include a query option for certain parameters.**

**Building Logbook und Databases/database-based dynamic EPC:** Several options for collecting data on buildings are conceivable: BIM Server Center (CDE, Spanish enterprise CYPE); ZEUS (Salzburg, Austria), private company has its own database for its own buildings, public institution on behalf of the federal states (because building regulations) such as OIB. Differentiation: Collection of data for the creation of assessments/certificates (e.g., EPC, klimaaktiv declaration, SRI assessment), or collection of the results, namely EPC, klimaaktiv declaration, SRI assessment, etc. A system comparable to the land register would make sense: make certain information publicly accessible (as in other countries, e.g., Denmark). Possible problem: short lifespan of IT systems in contrast to long-lasting buildings; how can we ensure that the database systems last as long as the buildings? Connected to public administration, ZEUS in Salzburg has been working since 2007. Currently: EPC are uploaded from the calculation software to the Energy Performance Certificate database via XML interfaces. Dynamic EPC: In future, the building data would be entered and kept up to date and the calculation and output of the EPC would be database-based.



The companies that currently provide the calculation software would then provide and maintain the user interfaces and work on the database processes.

Links:

<https://bimserver.center/de>

<https://nachhaltigwirtschaften.at/de/sdz/projekte/simultan-simultane-planungsumgebung-fuer-gebaeudecluster-in-resilienten-ressourcen-und-hoechst-energieeffizienten-stadtteilen.php>

**Result/recommendation: Check options for the building logbook; a building database with all the necessary information from which the required assessments and certificates can be generated automatically and dynamically would be ideal (i.e., always up to date). How can the databases from klimaaktiv (especially in materials) be utilised? Check automated transfer to ZEUS. Check what role SIMULTAN (TU Vienna) can play in this context.**

**BIM and BIM to EPC:** Different views in the discussion: "BIM is too complex", "BIM is already good for networked, faster work." Pilot operation of the BIM-based building application model (BAM) in Vienna: Advantages, as the client only provides data once (bank, housing subsidy, municipality, building physics, etc.). Data protection can only be managed in BIM if there is a public interest. Advantage: fewer discrepancies between EPC and planning documents. Current problem: superstructures in the plan do not match the superstructures in the Energy Performance Certificate; building authorities enquire. With BIM, the problem will no longer exist.

BIM supports the circular economy: reuse of components becomes easy. The following information must be available in the model: how are materials connected, can they be separated? How to annotate, how to make the information accessible?

Master's thesis at Danube University Krems (now: University for Continuing Education Krems) on life cycle assessments based on BIM - REVIT - with ONE CLICK LCA. Integration of baubook material database (see link BIM Terminal).

Who will update the BIM model? In the case of renovation planning, the renovation measures would already be in BIM; they would then only need to be selected and confirmed. Example of future process: Click on which windows are to be replaced in the BIM, contractors carry out the work, site manager stamps the work on completion. Tradesmen have an app; the BIM model is updated in the background.

Could BIM models be automatically generated from existing EPC for further processing, with photos and google maps and AI? Creating BIM models for existing buildings based on planning documents is a problem because they are usually not built as planned; plans are not updated, as-built surveys are required. However, BIM-based EPC and Renovation Certificates are considered unrealistic for the time being as they are too complex for many small and medium-sized enterprises, also due to the problem of information loss with IFC and Open BIM.

Links:

<https://digitales.wien.gv.at/wp-content/uploads/sites/47/2022/04/BRISE-Information-zum-Pilotbetrieb.pdf>

[https://cdn.austrian-standards.at/asset/dokumente/Themengebiete/Bau%20%26%20Immobilien/jahrestagung-bau/2020/5\\_Jahrestagung\\_Bau\\_2020\\_Jarolim.pdf](https://cdn.austrian-standards.at/asset/dokumente/Themengebiete/Bau%20%26%20Immobilien/jahrestagung-bau/2020/5_Jahrestagung_Bau_2020_Jarolim.pdf)

<https://bimterminal.com/> (6D-BIM-Terminal Missing Link Missing link for the planning of CO2-neutral buildings. Support for continuous life cycle analyses during planning.)

**Result/recommendation: Develop simple BIM-based tools for widespread use; clarify legal issues.**

**EU-Taxonomy:** ÖGUT - Austrian Society for Environment and Technology - is developing an online tool based on a guideline from March 2023 (see link) that maps building qualities in line with the EU-Taxonomy. Also relevant for buildings: CSRD (Corporate Sustainability Reporting Directive 2022), where auditors are required.

Links:

[https://www.klimaaktiv.at/dam/jcr:02abbd12-f9e2-4b28-bc54-](https://www.klimaaktiv.at/dam/jcr:02abbd12-f9e2-4b28-bc54-6fbfbe3417c4/Konformit%C3%A4t_klimaaktiv_EU-Taxonomie_Geb%C3%A4ude-WEB.pdf)

[6fbfbe3417c4/Konformit%C3%A4t\\_klimaaktiv\\_EU-Taxonomie\\_Geb%C3%A4ude-WEB.pdf](https://www.klimaaktiv.at/dam/jcr:02abbd12-f9e2-4b28-bc54-6fbfbe3417c4/Konformit%C3%A4t_klimaaktiv_EU-Taxonomie_Geb%C3%A4ude-WEB.pdf)

<https://www.bmk.gv.at/green-finance/finanzen/eu-strategie/eu-taxonomie-vo.html>

[https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting\\_en](https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en)

**Result/recommendation: The new Energy Performance Certificate and Renovation Passport should be designed in such a way that the information required by the EU-Taxonomy and CSRD can be read directly without additional effort.**

**Subsidy schemes:** Renovation all at once makes the most sense, but is not feasible for many, so funding is needed for stepwise renovation. Important: Adhere to the schedule and deadlines of the Renovation Roadmap/Renovation Concept, achieve targets in the Renovation Passport, demand monitoring as a mandatory measure and, if possible, link funding to consumption data. Public interest: What data is needed for what and can be collected with the subsidy?

**Result/recommendation: Approval of funding based on Renovation Passport and Renovation Roadmap/Renovation Concept (detail level 1); funding may be awarded based on monitoring of consumption data for non-residential buildings; possibly for single-family homes, but not for multi-storey residential buildings.**

**Reporting on the status and progress of the building stock:** (discussed only at the workshop in Salzburg): TIMEPAC's reference building approach is interesting; comparison with empirical values or other methods still required. Could be an opportunity to work on the requirements for the renovation of public buildings regarding the new version of the Energy Efficiency Directive 2023.

**Result/recommendation: Clarifications as mentioned.**

#### **Socio-economic issues:**

Support **SME** and involve them in the public discourse, especially regarding the increasingly extensive tasks associated with BIM.

**Industrial lobby:** Ensure that we do not allow ourselves to be captured by a lobby. Look at the proportionality and type of data, obtain actual consumption data under data protection conditions, separate existing and new buildings (e.g., box-type windows), apply a holistic approach.

**Mandatory requirements** for the renovation of existing buildings make it very difficult, and renovation is not carried out at all because it is too complicated, time-consuming, and cost-intensive.

Urgently needed: **Federal requirements for the financing of renovations**, as the construction industry has faltered considerably; make other credit requirements, it would be important to implement this soon.

**More advertising** on this, e.g., on the building sites - with this building I save so much after the renovation.

## **4 Discussion results from Klagenfurt**

In Klagenfurt, the workshop was organised on a different scale due to the collaboration with klimaaktiv and ARCH+MORE architecture. Although the agenda remained the same as in the previous workshops, the spectrum of participants and their reception of the research topic presented widened. Therefore, it was decided to list the topics discussed individually below.

### **Energy Performance Certificate:**

- The Energy Performance Certificate (EPC) is currently an official document and not suitable for communicating with residents. A new layout would be necessary. One argument against a new layout is that the current layout has been explained for years and is slowly being understood. The bigger problem in communication is, that depending on the version of OIB Guideline 6, the Energy Performance Certificates for the same building can be different.
- Use elements that are easy for residents to understand: Energy flow diagram; qualitative cost estimation (high, medium, low, e.g., GEQ tool for energy advice).
- The Energy Performance Certificate should be a planning tool for improving the energy efficiency of the building and not only be created for housing subsidies. It should at least provide the key data for the invitation to tender for the implementation of measures.
- The inclusion of further indicators in the EPC means that the experts who issue the EPC will need additional qualifications, particularly about materials and the calculation of the greenhouse gas potential over the entire life cycle. The experts already must cover a wide range of specialist areas.
- An informal analysis of EPCs has shown that it is possible to determine whether the EPC was compiled by someone specialising in building physics or building services based on the data quality for the respective sub-area.
- Entries from outside the specialist area are often unknowingly incorrect. So, there is already a problem, that becomes bigger when other specialisations are added (e.g. materials, indoor air quality).
- The area of materials is also gaining in importance with the requirements relating to the circular economy regarding the EU-Taxonomy Regulation.
- The EPC for existing buildings based on default data results in energy demand values that are far too high. Often only individual rooms are heated. After renovation, heating energy consumption is usually not lower, but comfort is higher. In such cases, financing models based on repayment through savings are obsolete. The Energy Performance Certificate is therefore often not suitable as a basis for renovation recommendations.
- Monitoring has a high priority.
- Energy advice is mainly provided on site for detached and semi-detached houses based on an inventory. A technical and dimensional survey is carried out as part of the energy consultation. Two working hours are estimated for this. The energy consultation covers the majority of the building stock, as detached and semi-detached houses make up around 70% of the building stock. (In terms of the number of flats, approx. 50% of the flats are in multi-storey residential buildings).

### **Data:**

- There is often no EPC for detached and semi-detached houses (existing buildings), as they were built before the introduction of the EPC obligation for new buildings and are rarely sold or rented out in this sector.
- Energy advice is the key to determining the data. The high-quality, because specific, EPC can be a by-product of energy advice. The EPC as the basis for the energy consultation is less common than EPC as the result of the energy consultation.
- BIM is not an issue for detached and semi-detached houses.
- Data collections on detached and semi-detached houses may be useful in accordance with the Salzburg ZEUS example, also regarding recording consumption data.
- The question remains as to how owners can be motivated to collect the data and make it available to third parties.
- Data collections on multi-storey residential buildings are fully available (depending on the respective company).

### **Renovation Passport:**

- The concept of the Renovation Passport is a good addition to the EPC (because it includes a specific utilisation profile, consumption values, financing information, etc.).
- In Carinthia, there is a very good approach in this direction with energy advice and the renovation coach.
- About the zero-emission building standard target for existing buildings by 2050, it is noted that the topics of energy and spatial planning have been merged at the Office of the Carinthian Provincial Government. Work is underway on a spatial information system for spatial energy planning. This will improve the data situation on the availability of renewable energy sources and for assessing the possibilities of district heating supply when drawing up renovation concepts.
- Financing is a key issue. Even if subsidies are available, there is still a proportion of self-financing that households are unable to raise. Funding is promised at the start of the project but is only recognised and paid out on presentation of the final invoice. Many households cannot afford the pre-financing and do not want to take the risk of ultimately not receiving the subsidy or not receiving it in the expected amount (e.g., provisions on "obligations" and "reclaiming the subsidy" in the general terms and conditions). In most cases, therefore, only the heating system is replaced because this is the simplest measure and the one with the lowest investment costs. If the principle of "energy efficiency first" is to be realised with measures on the building envelope, then appropriate financing options must be offered. For example, a loan for project realisation could be granted simultaneously and unbureaucratically with the funding approval (equity replacement loan).
- The funding situation is confusing: federal and state funding, possible combinations, new regulations.
- The continuity of financing measures is important to evenly utilise the companies involved in building renovation and to enable sustainable operation. Otherwise, staff will have to be made redundant, which in turn will be difficult to find later.

### **Statistical analyses of the EPC database and reference building approach:**

- The ZEUS database contains EPCs created by engineering firms with and without energy consultant training. It contains specific EPCs and those based on default data. The quality therefore varies greatly.
- A certain level of quality is required for statistical analyses. There are currently no concrete plans to analyse the Carinthian ZEUS database.

### **Excursus on the topic of energy advice and funding in Carinthia**

Energy consultations are offered via the Energy Consultancy Network, to which only qualified energy consultants belong, i.e., those who have attended the Austria-wide standardised A-course and F-course of the Arge EBA and passed the examination. The consultations are subject to quality control and the consultants are obliged to undergo further training. Energy advice is the responsibility of the federal states, and the regulations vary slightly from state to state.

A relevant trade licence must also be held to issue EPC. This is regulated by the trade regulations (federal competence).

According to the Guideline for the renovation of owner-occupied homes, other buildings and multi-storey residential buildings (except residential buildings (co-)owned by non-profit building associations and municipalities) in accordance with the Carinthian Housing Promotion Act K-WBFG 2017, LGBl.Nr. 68/2017, valid from 01.01.2024 to 30.06.2024, the following is subsidised:

- Consultancy services
- Measures to increase the thermal insulation of individual building components
- Energy-efficient ecological building services installations
- Comprehensive energy-efficient renovation

The subsidised consulting services are as follows:

#### I. On-site energy advice

Funding is provided for the mandatory on-site energy consultation to be carried out in accordance with the Guidelines of the Carinthian Energy Consultancy Network (netEB) and the associated services, such as

- Assessment of the building (exterior tour, boiler room, cellar, attic, heat emission systems, etc. ...)
- Assessment of energy consumption and recommendation of measures to sustainably reduce energy consumption for heating and hot water (thermal renovation, heating conversion, solar and PV systems etc. ...)
- The focus is on comprehensive energy renovation
- Cost estimate of the recommended renovation measures and subsidy advice
- Reference to official notifications
- U-value calculations
- Reference to energy accounting
- No overheating in summer
- Summary of the consultation with an easy-to-understand protocol for the customer

#### II. Renovation coach - renovation support

Funding is available for services provided by an authorised contractor (see: [www.neteb-kärnten.at](http://www.neteb-kärnten.at)) when carrying out an energy-efficient renovation (individual selection is possible):

- Analysis of problems (moisture, draught, structural damage, etc. ...)
- Support with funding applications
- Support in obtaining tenders
- Advice on energy-related issues during the construction phase
- Support with the inspection and invoicing of construction work
- Support in compiling documents for the funding agency

Additional service: Preparation of the EPC (existing building plan and planning EPC), renovation concept.

The scope of services does not include:

- Local building supervision
- Expert reports
- Quality assurance (thermography, blower door)
- Procurement of building contractors
- Advice on household electricity and mobility
- Planning services, such as tendering, detailed and implementation planning

#### **Excursus on the topic of funding/support**

Federal subsidies are shown in Table 2. In principle, it is possible to combine the federal funding programme "Environmental Funding in Austria" (handled by KPC) with state funding. Corresponding provisions are available from the provincial funding agencies.

#### **Provincial subsidies Carinthia**

##### **Getting out of oil and gas:**

- The state subsidy is granted in addition to the federal subsidy. Priority must be given to the federal subsidy "Raus aus Öl und Gas" 2023/2024 (KPC) (proof: subsidy commitment or payment letter from the federal subsidy). Provincial funding is granted on a subsidiary basis as follow-up funding if the eligibility requirements are met. <https://www.ktn.gv.at/Service/Formulare-und-Leistungen/BW-L98>

### Renovation of buildings:

- Housing subsidy, Guideline 6 Renovation of residential buildings: A combination of the subsidy under this guideline with any federal subsidies is possible. <https://www.ktn.gv.at/Service/Formulare-und-Leistungen/BW-L104>

### Evidence:

- Submission of an EPC (existing and planning Energy Performance Certificate) for comprehensive energy renovation and a renovation certificate digitally via the ZEUS database for insulation of the exterior wall. Instead of an existing and planning energy performance certificate, a renovation certificate can be submitted for comprehensive renovation, provided that the intended renovation measures for the comprehensive renovation are depicted therein and the provisions pursuant to Section 3.4 of the Directive (energy requirements) are complied with.

Table 2 Overview of relevant subsidies 2024 in Austria

Type of funding	Document of proof	Processing
<b>Renovation bonus for private individuals: Renovation of individual building components</b> <a href="https://www.umweltfoerderung.at/privatpersonen/sanierungsscheck-ein-zweifamilienhaus-und-reihenhaus-2023/2024">https://www.umweltfoerderung.at/privatpersonen/sanierungsscheck-ein-zweifamilienhaus-und-reihenhaus-2023/2024</a>	<b>Energy advice protocol</b> of the respective federal state or a valid EPC (max. 10 years old, pages 1-3) or an overall renovation concept	Federal funding, KPC
<b>Renovation bonus for private individuals: Partial renovation and comprehensive renovation</b> <a href="https://www.umweltfoerderung.at/privatpersonen/sanierungsscheck-ein-zweifamilienhaus-und-reihenhaus-2023/2024">https://www.umweltfoerderung.at/privatpersonen/sanierungsscheck-ein-zweifamilienhaus-und-reihenhaus-2023/2024</a>	Technical details of the EPC, i.e., energy performance certificate before and after renovation	Federal funding, KPC
<b>Boiler replacement for detached and semi-detached houses</b> <a href="https://www.umweltfoerderung.at/privatpersonen/kesseltausch-ein-zweifamilienhaus">https://www.umweltfoerderung.at/privatpersonen/kesseltausch-ein-zweifamilienhaus</a>	<b>Energy advice protocol</b> from the respective federal state or a valid <b>energy performance certificate</b> (max. 10 years old, pages 1-3) or an overall <b>renovation concept</b>	Federal funding, KPC
<b>Low-income households: "Clean heating for all":</b> Conversion of heating systems One-off, non-repayable investment cost subsidy in addition to the basic subsidy from the federal government and the respective federal state up to the respective technology-specific upper cost limit <a href="https://www.umweltfoerderung.at/privatpersonen/sauber-heizen-fuer-alle-2024/unterkategorie-ein-und-zweifamilienhaus">https://www.umweltfoerderung.at/privatpersonen/sauber-heizen-fuer-alle-2024/unterkategorie-ein-und-zweifamilienhaus</a>	After the formal conditions have been checked by the respective federal state, a comprehensive energy consultation must be carried out, which consists of a binding initial consultation and support in obtaining offers and submitting applications. Only then is the application submitted.	Federal funding, KPC Carinthia: Office of the Carinthian Provincial Government Department 11 - Future Development, Labour Market and Housing

## 5 Conclusions and recommendations

The following is a summary of the aspects that should be taken into account when introducing the Renovation Passport.

General aspects:

- Change the meaning of the term renovation in the property sector: renovation should be equated with improving energy efficiency, not restoring the status quo.
- Implement the circular economy in the construction sector via RP.
- Make the RP easy to understand for end users: quantitative information also to be given as percentages because they are easier to remember.
- Make the RP EU-Taxonomy compliant – the scheme should be designed in a way that information required by the EU-Taxonomy and CSRD can be read directly without additional effort.
- Renovation roadmap/ Renovation concept contains measures with deadlines for implementation; loses validity if not implemented on time, must then be drawn up again. Control via EPC database.
- Check the legal structure to see how binding obligations can be established for property managers.

Renovation Roadmap / Renovation Concept in the desired level of detail:

- Realisation planning and detailed planning, at least creation of guiding details for window connections; the effort involved is high. In a municipality, several detached houses could be combined to save costs.
- High-quality Renovation Roadmaps (with at least the status of an expert opinion) could be used in property valuation to price in maintenance backlog and need for improvement.
- A detailed Renovation Roadmap goes far beyond energy advice. Interface between energy advice and architecture is unclear - introduce rules by means of subsidies.
- Define different levels of detail for the Renovation Roadmap (e.g. energy advice protocol for single-family homes = level of detail 1; property safety inspection in accordance with ÖNORM B 1300 combined with energy audit plus action plan and schedule = level of detail 2); technical due diligence inspection plus implementation planning of measures and schedule = level 3 detail).

Data and financing:

- The fact that costs and savings must be specified causes difficulties. How can quality-assured cost data be obtained for the implementation of measures? Collection of prices would be necessary, e.g. set up a system for collecting prices, possibly in cooperation with klimaaktiv. Design subsidy statements in such a way that a basis of prices/costs can be established. Based on the BKI building cost information system.
- Monitoring of energy consumption data: In principle, the option exists in the EPC database ZEUS, but is not currently provided for in all Provinces. In practice, this is often not possible because space heating and domestic hot water are not recorded separately, and building owners are not interested in the monitoring option. Energy production and consumption monitoring should be mandatory for subsidies, including for residential buildings.
- Subsidy schemes: Adhere to the schedule and deadlines of the Renovation Roadmap, achieve targets in the Renovation Passport, demand monitoring as a mandatory measure and link funding to consumption data.

The Renovation Passport and the EPC are closely linked. Therefore, the conclusions and recommendations related to the EPC are set out below.

- Essential aspects of the new Renovation Passport are already available in the form of energy advice and the renovation coach.  
Recommendation: Make a few adaptations to achieve the goal of zero-emission buildings with staggered packages of measures and prove achievement of the goal with an EPC.

- The area of detached and semi-detached houses must be considered separately. The EPC is usually not available for existing buildings and is therefore rarely an input for energy advice. However, a high quality EPC can be the result of energy advice.  
Recommendation: Create a category in the ZEUS database as a basis for statistical analyses: i.e., EPC that are issued as a result of an energy consultation in connection with a RP should be marked accordingly.
- With regard to the quality assurance of EPCs, the authorisation to provide energy advice and to issue EPCs should be synchronised.  
Recommendation: For example, introduce a provision stating that EPC for funding applications may only be issued by persons who are also qualified as energy consultants.
- The additional indicators in the new EPC and RP require additional expertise.  
Recommendation: Offer appropriate seminars as part of further training for energy consultants.

In addition, expertise from a variety of disciplines is required for the new EPC and RP (building services, renewable energy, building automation, building physics, materials science, architecture, health, life cycle assessment, etc.). This may no longer be able to be handled by one person with the required quality. A dynamic version of EPC and RP could provide a solution, for example through the following workflows:

- Several small companies with different specialisations work together and store data and calculation results in the same building database. The various assessments (energy performance certificate, klimaaktiv, etc.) and other results (renovation concept) are then generated from this database.
- Larger companies cover the required disciplines internally; they use internal databases/platforms and export the required indicators.
- The assessments could be generated for specific target groups: Appealing graphics for communication with residents; key figures for communication with the authorities.



## Abbreviations

BIM	Building Information Modelling
EPC	Energy Performance Certificate
KPC	Kommunalkredit Public Consulting
OIB	Österreichisches Institut für Bautechnik
RP	Renovation Passport
TU	Technische Universität
ZEUS	Zentrales Energieausweis Umgebungs System (EPC database environment)