CEESEN-BENDER

Building intErventions in vulNerable Districts against Energy poveRty

Deliverable 5.3

Report on building – level renovation roadmaps in 5 pilot regions

Renovation roadmaps and investment strategies for buildings in the pilot region Tartu pilot area

(Estonia)

- Summary -

Dissemination Level: Public

WP5 Creating roadmaps and support services for building energy renovations for vulnerable districts

Tartu, 2026

Co-funded by the European Union

CENTRAL & EASTERN EUROPEAN SUSTAINABLE ENERGY NETWORK
CEESEN-BENDER

Building – level renovation roadmaps and investment strategies for pilot multiapartment buildings in Tartu pilot area (Estonia)

As part of the CEESEN-BENDER project, building-specific renovation roadmaps were prepared for six multi-apartment buildings in the Tartu pilot area (Karlova and Annelinn districts). The roadmaps are intended to support apartment associations, homeowners, building managers and other relevant stakeholders in understanding the current condition of the buildings, identifying renovation needs and planning the next steps towards improved energy efficiency, indoor climate and overall building quality.

The roadmaps were developed using available technical documentation, energy performance data, indoor climate measurements, home visits, stakeholder consultations, expert assessments and, where available, completed renovation designs, energy calculations and preliminary contractor quotations. They are not intended to replace the underlying technical documentation, which remains available to apartment associations for the technical preparation and implementation of renovation. Instead, the roadmaps extract and explain the information most relevant for homeowners and present it in a concise and understandable form to support decision-making.

The six pilot buildings were at very different stages of renovation readiness. It would therefore not have been appropriate to apply the same level of detail to every building. The content and level of detail of each roadmap were adapted to the stage reached by the building and to the decisions facing the respective apartment association.

Roadmaps for buildings at the investment preparation stage

Four buildings (Jaama 77, Uus 63a, Anne 45 and Pikk 84) progressed to an advanced stage of renovation preparation during the project period. Their apartment associations moved towards comprehensive renovation and the national renovation grant application process, supported by different CEESEN-BENDER activities during this period. Detailed renovation designs and energy calculations were prepared, and all four buildings reached the renovation grant application stage. Two of the buildings received grant support and moved into procurement and final technical preparation for renovation works, while the other two did not receive support in that funding round and remained dependent on future funding opportunities.

For these buildings, the roadmaps mainly support investment decisions. They bring together information on:

- the current technical condition and energy performance of the building;
- the main technical problems and renovation needs;
- planned comprehensive renovation measures;
- expected changes in energy use and indoor climate;
- estimated investment costs and financing needs;

- expected effects on operating costs;
- the current implementation status; and
- the remaining decisions and actions required before construction.

The assessment of these buildings showed that comprehensive renovation can substantially reduce heating demand while at the same time increasing electricity consumption. This is mainly due to the introduction of mechanical ventilation with heat recovery, automation and other modern technical systems, as well as the electrification of some existing uses.

Renovation should therefore not be assessed only in terms of heating savings. Changes in total final energy demand, electricity consumption, indoor climate, technical condition and operating costs need to be considered together.

The financial assessment also showed that energy-cost savings alone do not necessarily compensate for the investment and loan payments. In some cases, the annual energy bill may remain relatively similar even after a substantial improvement in energy performance. The main benefits of renovation therefore also include improved indoor climate, better technical condition, reduced risk of failures and emergency repairs, longer building lifetime and improved long-term usability and value.

The experience of these four buildings also showed that technical readiness does not automatically lead to implementation. Even where technical designs and energy calculations have been completed, implementation remains dependent on the availability of renovation grants, financing conditions, construction prices and the final investment decision of the apartment association. In Estonia, eligibility for the national apartment-building renovation grant is tied to comprehensive renovation and is therefore a major factor in apartment associations' decisions on whether and when to proceed. Predictable and continuous support schemes are important for turning technically prepared projects into actual renovation works.

Roadmaps for buildings at the preparatory stage

Two buildings remained at an earlier stage of renovation preparation during the project period: a five-storey prefabricated concrete apartment building in Annelinn (Pikk 94) and a small two-storey wooden apartment building in Karlova (Väike-Tähe 7). When the 2025 renovation grant round opened, these buildings had not yet reached the stage where a grant application could realistically be prepared. Their roadmaps therefore focused on identifying the most appropriate renovation pathway and the next steps needed to move the renovation process forward. In practice, they:

- describe the current technical and energy situation;
- identify the most important problems and potential improvement areas;
- integrate available findings from measurements, home visits and consultations;
- identify missing information and further studies required;
- outline possible future renovation pathways; and
- define practical next steps towards a future renovation decision.

For the Annelinn building, information from different project activities helped to build a more complete picture of the renovation needs. Although several building systems

have already been improved, the building still has significant heat losses through the envelope and does not have modern heat-recovery ventilation. Indoor climate measurements also identified periods of insufficient ventilation and elevated CO_2 concentrations. Energy performance indicators alone therefore do not provide a complete picture of renovation needs, and the indoor climate measurements revealed additional issues that should be considered in future renovation planning.

The situation of the Karlova building is different. The small wooden apartment building has already improved its energy performance following the renovation of the heating system and connection to district heating, but no comprehensive renovation project has been prepared. Because of its small size, previous investments and location in a heritage/environmentally valuable area, the appropriate next step is not necessarily to proceed immediately with a standard comprehensive renovation package. Instead, more detailed assessment of the building envelope, ventilation, technical condition and apartment association readiness is needed before selecting the most appropriate long-term renovation pathway.

Key lessons learned

Based on the experience of preparing the six roadmaps, the main lessons learned were:

- **Building-level roadmaps should reflect renovation readiness.** The purpose and level of detail of a roadmap should depend on how far the building has progressed in the renovation process. For buildings that have reached the technical design and financing preparation stage, the roadmap can support the investment decision, while for buildings at an earlier stage it should primarily identify information gaps and establish the next steps.
- **Renovation benefits extend beyond direct energy-cost savings.** Improved indoor climate, building safety and technical reliability, reduced maintenance risks and longer building lifetime can be equally important factors in the investment decision.
- **Energy use should be assessed together with indoor climate.** Comprehensive renovation generally reduces heat demand, while electricity consumption may increase because ventilation, automation and other technical systems are introduced to provide an indoor climate that may not have been adequately ensured before renovation. Measurements of CO_2, temperature and humidity also showed that energy consumption alone does not reveal whether adequate indoor conditions are being maintained.
- **Financing remains one of the decisive factors for implementation.** Even technically well-prepared renovation projects may not proceed to construction if grant support is unavailable or financing conditions are unsuitable. Technical preparation alone therefore does not guarantee implementation.
- **Renewable energy solutions need to be assessed building by building.** Rooftop PV can help compensate for increased electricity consumption after renovation, but its feasibility and relevance depend on available roof area, competing

technical equipment, structural conditions, investment costs and expected self-consumption.

- **Renovation pathways need to be adapted to the individual building.** Building size, construction type, technical condition, previous investments and heritage requirements can all affect which renovation measures are appropriate and in what sequence they should be implemented.
- **Roadmaps should interpret technical information rather than duplicate it.** The technical documentation required for renovation, including designs, energy calculations and other assessments, is prepared separately as part of the renovation process and, where relevant, the grant application process. The roadmap does not replace these documents; its added value is to extract the most relevant findings and explain in clear terms what they mean for the building, the planned renovation and the decisions facing homeowners.

Overall conclusion

The experience with the six Tartu buildings showed that building-level roadmaps can serve two different purposes. For buildings that progressed to an advanced stage of renovation preparation, the roadmap brings together and interprets the relevant technical, energy and financial information in a form that supports investment decisions by apartment associations and homeowners. For buildings at an earlier stage, it helps to structure the pathway towards renovation by identifying the main issues, further assessments and practical next steps.

The Estonian experience suggests that a useful building-level roadmap can follow a common underlying structure, while its focus and level of detail should reflect the building's stage in the renovation process and the decisions that need to be made. Its added value is not to replace the technical documentation required for renovation, but to make the relevant information understandable and useful as practical decision support for homeowners.

Co-funded by the European Union

The CEESEN-BENDER project has received funding from the European Union's Programme for the Environment and Climate Action (LIFE 2021-2027) under grant agreement no LIFE 101120994. The information and views set out in this material are those of the author(s) and do not necessarily reflect the official opinion of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.