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RENOINVEST
sustainable renovation of buildings

Best practice handbook of sustainable building renovations: Highlighted case studies

Web publication

RENOWAVE.AT IBW EMI ARCHENERG ZAG

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List of acronyms / abbreviations

Acronym	Original	Explanation
BM VIT	Bundesministerium für Verkehr, Innovation und Technologie	Federal Ministry for Transport, Innovation and Technology
CD	/	Cooling demand
CE	/	Central European
CED	/	Cooling energy demand
CHP	/	Combined Heat and Power
CSOK	Családi Otthonteremtési Kedvezmény	Family Home Creation Allowance
DHW	/	Domestic Hot Water
ECA	/	Energy Consulting Austria
EE	/	Energy efficiency
EIB	/	European Investment Bank
ELENA	/	European Local Energy Assistance (Facility)
EPC	/	Energy Performance Contracting
ESCO	/	Energy Service Company
ETICS	/	External Thermal Insulating Contact System
GHG	/	Greenhouse Gas
GIWOG	Gemeinnützige Industrie-Wohnungs-AG	Non-profit industrial-housing-association
GOLEA	Goriška lokalna energetska agencija	Goriška Local Energy Agency
HED	/	Heating energy demand
HUF	/	Hungarian Forint
LED	/	Light Emitting Diode
MOK	Mestna občina Kranj	Municipality of Kranj
MOL	Mestna občina Ljubljana	Municipality of Ljubljana
MOM	Mestna občina Maribor	Municipality of Maribor
PV	/	Photovoltaic cells/panels
PV/T	/	Photovoltaic thermal collectors
REAAL	/	Renewable Energy Across the Alpine Land
RES	/	Renewable energy source
RRF	/	Recovery and Resilience Facility
SIR	Salzburger Institut für Raumordnung und Wohnen	Salzburg Institute for Spatial Planning and Housing
SEIF	/	Sustainable Energy Investment Forum
SME	/	Small to Medium Enterprise
SWOT	/	Strenght, Weakness, Opportunity and Threath Analysis
TOP	Terület- és Településfejlesztési Operatív Program	Territorial and Settlement Development Operational Program
ZBR	Zöld Beruházási Rendszer	Hungary National Housing Renovation Program
WNFL	Wohnnutzfläche	Usable living space
WUK	Wiener Werkstätten- und Kulturhaus	Culture centre Vienna

1 RENOINVEST PROJECT

The RENOINVEST project is co-funded by the European Union under the LIFE programme. The project intends to reflect cross-border challenges and opportunities for sustainable building renovation in the private and public sectors. The main aim of the project is to develop action plans on smart investments in sustainable renovation of buildings for 2025-2030 for Austria, Hungary and Slovenia by establishing three national roundtables building on the activities of the Sustainable Energy Investment Forums.

RENOINVEST provides a platform for open dialogue involving key financial, private and public experts through the green finance thematic working group activities to identify barriers to the upscaling of long-term financing instruments and propose improvements to support the development of large-scale investment programmes in existing private and public buildings. Three national policy briefs and a cross-border recommendation package will also be delivered.

Assessing the implementation of the Long-term building renovation strategies and documents and reviewing existing financial solutions and market conditions for stimulating financing of energy efficiency improvement of the existing building stock is an important starting point of the project.

Sharing knowledge among project partners, experts, national stakeholders and similar EU projects three international cross-border exchange events with site-visits will be organized in order to showcase collected 50+ good practices and elaborate six case studies to foster the roll out of smart financing possibilities.

The added value of RENOINVEST is that the consortium is providing specific technical knowledge by engaging key actors representing legislative advisory organizations, research institutes, large engineering manufacturers, SMEs and financial experts in three CE countries fostering sustainable investments.

Originating from a collective vision to address cross-border challenges and unlock opportunities for sustainable building renovation in both private and public sectors, RENOINVEST seeks to craft action plans for smart investments in sustainable renovation from 2025 to 2030. This project serves as a testament to collaborative innovation, bridging key financial, private, and public expertise through green finance thematic working groups. These platforms are instrumental in identifying barriers and proposing enhancements for large-scale investment programs, thereby revitalizing existing infrastructure with an emphasis on energy efficiency. The RENOINVEST project not only fosters and environment of knowledge sharing among its partners and stakeholders but also positions itself as a beacon for sustainable investment in the Central European region.

2 PROJECT CONSORTIUM

1. ÉMI Építésügyi Minőségellenőrző Innovációs Nonprofit Kft (ÉMI) – HUNGARY, coordinator

2. Solar Tech-Investment Tervezési Fejlesztési Tanacsado Kft. (ARCHENERG CLUSTER) – HUNGARY

3. Zavod za gradbeništvo Slovenije (ZAG) – SLOVENIA

4. Gospodarska zbornica Slovenije (CCIS) – SLOVENIA

5. RENOWAVE.AT eG (RENOWAVE) – AUSTRIA

6. Institut für Immobilien, Bauen und Wohnen GmbH (IIBW) – AUSTRIA

3 EXECUTIVE SUMMARY

This document is an abridged study of the executed practices in the financing of sustainable building renovations in Austria, Hungary and Slovenia. The original report provides a total of 50 renovation examples of buildings or building complexes of different sizes, 16 from Austria, 17 from Hungary and 17 from Slovenia. The examples vary greatly in size and structure, from individual buildings to entire settlements, from urban and rural areas, but mostly from larger (capital) or smaller cities. They cover the public and private construction sector and a variety of financing options, with the EPC being the dominant mechanism.

A large part of the study includes the presentation of each individual case with data on the building and its photography, the implementation of the renovation, financial data and expected results. The examples are complemented by analyses of strengths, weaknesses, opportunities and risks.

The study has shown that examples of financing comprehensive, i.e. sustainable, renovations are rare. Investments in the renovation of public buildings are more widespread and are implemented in larger buildings or in a combination of a larger number of buildings.

The study contributes to the understanding of the past and current use of models, procedures and processes of financing the renovation of buildings or building complexes, which could be important to identify opportunities to solve challenges and in the further development of financial models. The question raised in the analyses will be used in the discussions at the national thematic working group events and on the national platforms. The collection will also be an opportunity for the three countries Austria, Hungary and Slovenia to learn from each other.

4 INTRODUCTION

4.1 The structure of the study

The study was prepared by the team of RENOINVEST project partners with the aim of collecting existing best practices of financing sustainable building renovations in all three partner countries, Austria, Hungary and Slovenia. The aim of the team was to analyse the cases and extract key findings, which will be one of the starting points for consideration in the TWGs, the national round tables discussions and the international exchange events. This document is an abridged version of the report delivered to the Commission, and is highlighting only three to four examples from each country.

In the following, a short description of the common methodology and the processing of the individual cases is provided. Chapter 5 is the main part of the handbook and contains selected examples of financial models of building renovation for all three countries. This section has been shortened for public use to the main highlighted study cases selected by the partners.

4.2 Common methodology of the introduction of best cases

The common methodology for analysing the best practices related to the financing of measures to increase the sustainability aspects of building renovation in Austria, Hungary and Slovenia is presented in Figure 1. The methodology itself is based on previous experiences and practises of the team involved in the research within the RENOINVEST project.

Figure 1: Flow chart of the common methodology for preparing best practices catalogue.

The process of finding best practises and detailed information on their technical implementation and financing, different methods were used depending on the availability of data. More than 80 cases of energy renovation were initially collected by searching energy web portals, news, government and municipal websites. Some best practices were highlighted by stakeholders and participants in thematic working groups or directly by the organisations and beneficiaries responsible for the renovations. Once the list was finalised, the next step was to sift through the best practices and exclude those that were not suitable for the report. Each case was described separately with as much information as possible, presented with a photo and a SWOT analysis.

The examples described were or are still considered best practise in their respective national contexts. However, there is always room for improvement and the search for best practises with interesting and successful financial models will continue.

5 EXAMPLES OF FINANCIAL MODELS OF SUSTAINABLE BUILDING RENOVATION

5.1 Description and analysis of highlighted study cases

5.1.1 Austria

No. 1: **Residential complex "Friedrich-Inhauser-Straße", Salzburg – Zero Carbon Refurbishment "Wir InHAUSer"**	
FINANCIAL DATA	
Type of financing, year	Housing Subsidy Salzburg, 2021
Financier	Federal State of Salzburg, Climate and Energy Fonds Austria
Specifics	Payback renovation costs through densification/extension of buildings
Beneficiary	Heimat Österreich (non-profit housing association)
Link	https://www.heimat-oesterreich.at/de/Unternehmen/Referenzen/Friedrich-Inhauser-Strasse_rf_1386
DESCRIPTION and PHOTO	

The residential complex of the non-profit housing association "Heimat Österreich" was built in 1985. The energy efficiency of the complex was correspondingly to the year of construction. Lack of accessibility, poor lighting and an urgent need for refurbishment of balconies, roofs and moisture insulation necessitated renovation.

The aim of the extensive refurbishment was to reduce the CO2 emissions of the residential complex: an energy concept with an exhaust air heat pump and heat recovery from wastewater, a reduction in individual car use through a targeted mobility concept, as well as the use of eco building materials contribute to the Zero Carbon Refurbishment Concept.

The project also supports urban densification, that contribute to the medium to long-term reduction of land consumption and thus sustainable urban development. The extension was carried out in timber construction and to the existing 75 flats a total of 24 subsidised flats were added. So that the refurbishment not only contributes to the Paris climate targets, but also within the specified cost of the Salzburg housing subsidy, the various technical aspects had to be well harmonised. Unique in this combination (subsidised housing, densification) is the modern heat recovery system. Waste heat from the room air and wastewater are used to cover the heat demand. Some of the electricity is also generated directly on site. Up to 20 % of the total electricity are supplied via the photovoltaic system on the roof. For this Salzburg AG is offering a new tenant electricity model which gives the residents a detailed overview of their electricity consumption. The combination of all measures leads to a reduction greenhouse gas emission. The greatest CO2 savings are achieved in operating energy and grey energy. The overall technical concept was drawn up by ECA- Energy Consulting Austria and developed together with the Fachhochschule Salzburg and SIR- Salzburger Institut für Raumordnung und Wohnen and optimised step by step based on simulations.

The refurbishment project was accompanied by a research project with SIR. With the studies 'ZeCaRe' (Zero Carbon Refurbishment) and 'ZeCaMo' (Zero Carbon Mobility), the SIR developed an overall concept for

refurbishment with a low ecological footprint. Comprehensive accompanying research was financed by the Climate and Energy Fund as part of the 'Smart Cities Initiative'. The architectural realisation was provided by cs-architektur (Christoph Scheithauer) and Stijn Nagels.

Picture 1 Wir InHAUSer Neighbourhood, ©Arch. DI Christof Reich

The total gross costs amounted to 2 250 Euros per square metre of gross floor area, the heating requirement is 28.6 kWh/m2a. Instead of gas, pellets are used for heating, 75 per cent of the heat supply is covered by heat pumps with heat recovery from wastewater, and 20 per cent of the total electricity requirement comes from photovoltaics. The issue of mobility was considered right from the start - a particularly important aspect in Salzburg, which is notoriously infatuated with individual transport. Today, a mobility point with sharing services, a bicycle garage and e-charging stations offers residents a range of options, and the car parking space ratio has been reduced from 1.2 to 0.8.

As a non-profit building organisation, Heimat Austria only charges the construction costs to the residents, beyond that there are no further surcharges.

The increase from 75 to 99 flats has created an additional 24 subsidised flats. The city of Salzburg has the right to allocate all flats, thus ensuring that they are allocated according to social criteria. In addition to operating costs, the rent also includes use of the 'Mobility Point'. The rents were also made possible by the City of Salzburg granting a building right to the property developer.

In Salzburg, the average rent on the open market is 18.50 euros per square metre. Thanks to the housing subsidy and densification, a rent of EUR 10.50 per m2 (guideline rent EUR 10.05) was maintained in the project.

SWOT ANALYSIS	
Strengths	**Weaknesses**
▪ Savings for tenants in energy costs through switch to renewable energy and recovery of heating energy. ▪ Densification.	▪ Effort and inconvenience for relocation of residents during the construction site.
Opportunities / Possibilities	**Threats / Barriers**
▪ Comprehensive accompanying research – well documented for replication by other social housing associations.	▪ Dependency on subsidy conditions.

No. 2: **Out of gas' showcase project Zwölfergasse 21- Vienna**

FINANCIAL DATA	
Type of financing, year	Subsidies, Erste Green Housing Loan, 2023
Financier	City of Vienna, Erste Bank der österreichischen Sparkassen AG
Specifics	Pilot project for Gründerzeithaus renovation with geothermal heating
Beneficiary	Building owner private
Link	https://www.wien.gv.at/umwelt/vorzeigeprojekt-zwoelfergasse

DESCRIPTION and PHOTO

Picture 2 Courtyard View After Renovation, ©Graf Holztechnik

The pilot project shows how a Gründerzeit House can be converted to a centralised geothermal heating supply and what role a pavement can play in this.

A 4-storey Gründerzeit building with a courtyard wing at Zwölfergasse 21 in the 15th district was to be thermally renovated, modernised and converted from gas to a climate-friendly heat supply. In view of the poor building fabric, the lack of connection options to the district heating system and the cramped conditions on site, this project proved to be particularly challenging.

During renovation, 4 of the 12 existing flats were merged into 2 refurbished flats and 4 new flats were created, 3 of which were in the newly converted attic. All façades were extensively thermally refurbished with 18 centimetres of thermal insulation and new windows. The articulated façade on the first floor was given new windows and subtle internal insulation, while the other floors were fitted with classic external insulation. The lift in the courtyard provides barrier-free access to all floors, and the pergola theme was generously reinterpreted as a link between the street and courtyard wings, giving each flat a direct open space and transforming the peripheral location into a high-quality, modern residential building.

The building in Zwölfergasse was previously heated with natural gas. After renovation, it is heated and cooled using a heat pump with photovoltaic support. The system is based on energy recovery from geothermal probes. The probe field consists of seven probes. Four probes were installed in the inner courtyard of the building. To ensure a 100 per cent geothermal supply, three additional probes were installed at the roadside in front of the building. This possibility of utilising public property for the energy supply of a private residential building is new in Vienna. A solar thermal system on the roof is also part of the energy concept to regenerate - i.e. reheat- the soil in the area of the probes.

Initial situation of the energy supply: High heating requirement of 127 kWh/m2a and hot water and heating via gas heating with individual boilers and radiators.

Elements of the new energy system

- Expansion stage 1: four geothermal probes at 100-150 metres in the inner courtyard
- Expansion stage 2: an additional 3 geothermal probes at 220 metres in the pavement in front of the house (public property)
- 55 kW brine-to-water heat pump for heating and cooling
- Hot water is heated in the flats from the flow from the heating systems
- Heat output in new and fully renovated flats via underfloor heating or low-temperature radiators, in partially renovated flats via high-temperature radiators
- 100 kWp solar thermal system for 'over-regeneration' of the geothermal probes in the inner courtyard (Heat Harvest system)
- 6.48 kWp PV system on the roof of the street wing to supply the heat pump
- CO2-free full supply from completion in April 2023

Financing, costs, savings:

An investment totalling around 4.1 million euros was made, which should pay for itself in around 20 years due to savings in energy costs and higher achievable returns.

The project has got subsidies from the City of Vienna ("Sockelsanierung": mix of non-repayable subsidy (depending on energy savings) and subsidised loan (for around 40 % of renovation costs) and an additional special grant: "Blocksonderförderung" for urban structural improvement as non-repayable subsidy up to 100 % of costs for structural improvement).

The rest of the investment was financed through own resources and "ERSTE Green Housing Loan" (financed by the EIB program) over a period of 25 years with fixed interest rates.

The heating requirement could be reduced by around 65 per cent with comprehensive thermal measures.

The project was advised and accompanied by "Hauskunft" (One-Stop-Shop for renovation, City of Vienna) and is one of hundred showcases in the Viennese initiative "Raus aus Gas".

SWOT ANALYSIS	
Strengths	**Weaknesses**
▪ Through involvement of EIB – fixed interest rates and good loan conditions. ▪ Vienna promotes urban structural improvements.	▪ Relatively high investment for deep drilling for geothermal energy. ▪ Lack of space in urban regions.
Opportunities / Possibilities	**Threats / Barriers**
▪ Vienna allows building owners to dig for geothermal heating also in public space to foster deep geothermal energy use.	▪ High investment costs and long-term returns discourage many building owners.

No. 3: Volksschule Semirach - Model Renovation (Styria)

FINANCIAL DATA

Type of financing, year	Subsidies and transfers, 2020
Financier	Climate and Energy Fund (KLIEN)
Specifics	
Beneficiary	Marktgemeinde Semirach
Link	Volksschule Semriach • Mustersanierung

DESCRIPTION and PHOTO

Picture 3 New Façade Primary School, © Arch+More Architekten

The market town of Semriach (ST) has carried out a thermal renovation of the school building constructed in 1892. The three-story building is used exclusively for educational purposes. In addition to the renovation, the school building was expanded on the upper and attic floors.
The comprehensive renovation included extensive thermal insulation, the installation of a ventilation system with heat recovery, external shading, optimization of the lighting system, and the installation of a photovoltaic system. The building was predominantly insulated with materials certified by the Austrian Eco-label and natureplus.
The building meets the klimaaktiv Gold Standard.

The thermal renovation was done by applying an 8 cm mineral insulation board to the exterior walls, insulating the roof and the top floor ceiling with 20-46 cm cellulose fiber insulation, insulating the lowest floor ceiling with 14 cm XPS boards, insulating the walls in contact with the ground with 16 cm XPS boards, and insulating the ground floor with 20 cm XPS boards. The windows were exchanged with modern wooden-framed windows.

In addition, building service was renewed and some components were newly installed:

Heating is provided via an existing district heating connection (biomass). External shading elements were installed to reduce cooling demand. A ventilation system with heat recovery was installed. Hot water is now supplied through an existing district heating connection (biomass).

The lighting was upgraded to efficient LED lighting as part of the renovation. A photovoltaic system with a module area of around 125 m² and a capacity of 20.00 kWp was installed, generating approximately 14,690 kWh of electricity annually. The remaining electricity demand of the renovated building is covered by green energy.

Financing, costs, savings:

Total Costs: € 2.802.063,76 EUR

Interim financing: Raiffeisen Bank Passail with a loan of 2.800.000,00 EUR (term 25 years)

Federal Estate of Styra: Subsidy in form of repayment grant: 2.100.000,00 EUR in total

KIP (Community Investment program) – Subsidy: ~ 70.000,00 EUR

Subsidy for Model Renovation (Climate and Energy Fund)

- Basis for subsidy: 953.945,00 EUR (environmental-related additional costs)
- Subsidy State of Austria: 200.486,79 EUR
- Subsidy EU: 195.967,21 EUR

Heating Energy Demand / Before: 134.0 kWh/(m²a) = HWBref,RK
Heating Energy Demand / After: 36.2 kWh/(m²a) = HWBref,RK
Cooling Demand / Before: 0.0 kWh/(m²a) = KB*RK
Cooling Demand / After: 0.6 kWh/(m²a) = KB*RK
Specific Heating Load:
Before: 103.6 kW, equivalent to 80.55 W/(m²BGF)
After: 65.4 kW, equivalent to 44.46 W/(m²BGF)

SWOT ANALYSIS	
Strengths	**Weaknesses**
▪ Ecological renovation. ▪ A relatively long loan term – 25 years instead of 15 years as usual for renovation projects.	▪ Small school buildings in Austria often date back to the 19th century, are listed and therefore each renovation is a highly individual and expensive process (no standardization).
Opportunities / Possibilities	**Threats / Barriers**
▪ Model renovations must achieve high quality standards and energy savings as good example for other projects.	▪ Without the high transfer and subsidy from other public bodies most municipalities could not afford comprehensive energetic renovation.

5.1.2 Hungary

No. 4: Multi-apartment building at Hamvas Béla street 10-12, Szentendre

FINANCIAL DATA	
Type of financing, year	Grant, ESCO, private financing, 2014
Financier	EU + Hungarian State + Municipality of Szentendre + Apartment owners
Specifics	Multi Apartment building (80 dwellings) + shops on the ground floor PIMES CONCERTO project (flat rate) + ZBR National Grant + Own contribution + ESCO type financing
Beneficiary	Municipality of Szentendre (and their tenants), Apartment owners
Link	https://szentendre.hu/atadtak-az-elso-concerto-hazat-szentendren/ http://www.emi.hu/webadatbazisok/Rendezvenyek.nsf/EventsPreviewHTMLByDate/6DB5DE11A897EEF4C1257DD500401A79/$FILE/2014-11-14-EMI-PIMES-Conference-Vitoria-Gasteiz-MK.pdf

DESCRIPTION and PHOTO

Picture 4 Condominium with photovoltaic thermal panels @PIME'S Concerto project

The four-story apartment building with ground-floor shops was constructed in the late 1970s, and it was one of the first buildings near Móricz Zsigmond High School and the new swimming pool at the Püspökmajor Housing Estate. The renovation was part of the PIMES CONCERTO project and also benefited from support through the parallel National Housing Renovation Program (ZBR).

As part of the renovation, the flat roof was upgraded and transformed into a 'solar field' featuring hybrid Photovoltaic Thermal (PV/T) systems. The building's façade was enhanced with External Thermal Insulation Composite Systems (ETICS), and an 8 kWp photovoltaic system was installed on the south-facing side to generate renewable energy.

The windows, entrance doors, and glass walls in the stairwell were all replaced with modern, energy-efficient alternatives. The previously unused transparent areas in the shop fronts were converted into solid, well-insulated walls to improve energy performance. On the east-facing façade, 40 new balconies were added, providing shading and improving fire safety. Additionally, new adjustable ventilation elements were installed to allow for better airflow and comfort.

Under the CONCERTO program, the PIMES project utilized flat-rate financing for both energy efficiency measures (per square meter) and renewable energy installations (per kWp). In both cases, the EU provided 50% of the funding. The Hungarian grant, however, was tied specifically to achieving primary energy savings.

The difference between the total installation costs and the combined EU and national grants was partially covered by the apartment owners through the 'Lakástakarék' savings scheme. Meanwhile, the solar energy system was financed by the General Contractor through an ESCO-type (Energy Service Company) financing model, also known as energy contracting, which allowed for cost recovery through the energy savings generated over time.

Picture 5 Renovated building with PV @PIME'S Concerto project

SWOT ANALYSIS	
Strengths	**Weaknesses**
▪ Very cooperative representative from the beneficiaries. ▪ Mixed and balanced finance. ▪ Outstanding funding rate. ▪ Clear and valuable flat rate financing. ▪ Value added renovation with multi purposes new balconies. ▪ Good cooperation with the stakeholders: Community of owners, Municipality, General Contractor, Designer, Project management (ÉMI).	▪ Lack of reserve in the implementation. ▪ Late decision on the National Grant caused delay in the implementation as well. ▪ Low budget and interest on fine tuning of the solar-thermal and the domestic hot water system. ▪ Change of the leadership and in consequence lower the interest by some key stakeholders.
Opportunities / Possibilities	**Threats / Barriers**
▪ As best practice examples it has been replicated several other renovation project in the estate without EU fund. ▪ Other extra activities beyond the energy focus measurements (Painting the staircase). ▪ Good reference of the key stakeholders.	▪ Lack of interest, losing the interest meantime. ▪ Insisting the old and useless/reasonless solution just by “we use for it”. ▪ Administration burden could kill the initiatives.

No. 5: Renovation of single-family house in Tatabánya

FINANCIAL DATA

Type of financing, year	Preferential loan, 2018
Financier	Hungarian Development Bank
Specifics	Loan aimed at increasing energy efficiency and renewable energy use in residential buildings (Call identifier: GINOP-8.4.1/A-17- Loan programme)
Beneficiary	Homeowners
Link	https://archive.palyazat.gov.hu/ginop-841-a-17-lakpletek-energiahatkonysgnak-s-megjul-energia-felhasznlsnak-nvelst-clz-hitel#

DESCRIPTION and PHOTO

The preferential loan programme allowed complex renovation of private buildings, condominiums and housing cooperatives choosing from different eligible activities, such as: 1) Energy efficiency measures: outer wall insulation, replacement of doors and windows, installation of shading structures, modernization of heating and/or domestic hot water systems, Modernization of heat recovery equipment, Modernization of lighting system; 2) Renewables: installation of solar collector, briquette, pellet, wood chip and wood gasification boiler systems for domestic hot water, solar panel, heat-pumps.

The project included complete insulation of the building, such as:

- wall insulation with 5-10-15 cm graphite expanded polystyrene insulation and foundation insulation
- roof insulation with 2x10 cm mineral wool
- replacement of windows.

Picture 6: House with insulation and new windows

The total cost amounted to HUF 2.15 million, of which 90% was covered by a preferential loan at a 0% interest rate, while the remaining 10% was financed through self-funding. The loan repayment term is a maximum of 20 years, providing favourable conditions and resulting in relatively low monthly instalments.

The call requires energy performance certificate before and after the renovation. Energy efficiency improvements have resulted in a reduction of 4,570.284 GJ/year in primary energy consumption. Greenhouse gas emissions have decreased by 299.742 tons/year, and the annual primary energy consumption of the residential building has been reduced by 1,269,523 kWh/year.

SWOT ANALYSIS

Strengths	Weaknesses
▪ Other related costs, such as project preparation activities, project managements and cost of experts (notary, energy, etc.) are eligible costs. ▪ Low own contribution requirement. ▪ Interest-free loan. ▪ Extensive eligible technical content. ▪ Energy efficiency and renewable energy development investments can also be implemented within the program allowing comprehensive building energy renovations. ▪ Fast administrative processing. ▪ Clear communication.	▪ The support is refundable. ▪ As a loan product, additional supplementary costs may arise. ▪ Available only for homeowners (not for tenants).

- Personalized administration at Hungarian Development Bank Points.
- Free choice of contractors.
- Realistic implementation timeline.

Opportunities / Possibilities	Threats / Barriers
▪ Support for investment elements that do not directly increase energy efficiency or renewable energy use but are essential for the investment. ▪ Could always be available, not only for limited time. ▪ More stringent requirements for reaching deep renovation could be set. ▪ Although indicators must be provided higher energy saving targets could be set for projects.	▪ The program does not include provisions for long-term monitoring data, preventing assessment of actual energy savings or greenhouse gas emission reductions.

No. 6: Püspökmajor Kindergarten, Szentendre

FINANCIAL DATA	
Type of financing, year	Grant, own resources (Municipal investment), 2012-2013
Financier	EU, Structural Fund (EU + National Fund), Municipality of Szentendre
Specifics	EU flat rate (PIMES CONCERTO project), Structural Fund and own contribution
Beneficiary	Municipality of Szentendre
Link	https://smart-cities-marketplace.ec.europa.eu/sites/default/files/pimes_detailed_design_specifications_of_szentendre_energy_systems.pdf http://www.emi.hu/webadatbazisok/Rendezvenyek.nsf/EventsPreviewHTMLByDate/1D02818581BAA932C1257DD50039AC04/$FILE/2014-05-06_06-12-PIMES-EMSZ-RSZN-Szfhvar.pdf

DESCRIPTION and PHOTO

The renovation of the kindergarten in Szentendre, originally built in the 1970s, was carried out in three distinct phases. The first phase focused on upgrading the windows and the parapet above them to improve energy efficiency and insulation. During this phase, a strong emphasis was placed on the use of recycled and natural materials, promoting sustainability in the renovation process.

In the second phase, as part of the PIMES CONCERTO project, the foundation, parapet wall and roof were retrofitted for improved thermal performance. This phase also included the addition of a new sunspace at the entrance of the building, which helped regulate indoor temperatures by capturing sunlight in winter and providing shade in summer. A green roof was installed on part of the building to enhance insulation and contribute to environmental sustainability. Photovoltaic (PV) panels were mounted over the sunspace, designed to serve a dual purpose—providing shading in the summer while being adjustable to a different angle in winter to maximize solar energy generation.

Picture 7 Püspökmajor Kindergarten building after renovation

The third phase involved the installation of additional PV panels over the terrace, providing further shading and energy generation.

The financing for the first phase was partially supported by a Structural Fund project, a joint effort between the European Union and the Hungarian Government. The second and third phases were financed by both the EU and the Municipality of Szentendre.

The combined energy-saving measures implemented across the three phases resulted in a reduction of over 55% in the kindergarten's energy consumption, highlighting the success of the project in terms of both sustainability and cost-efficiency.

SWOT ANALYSIS	
Strengths	**Weaknesses**
▪ High EE and RES performance. ▪ Value added renovation: Green roof, sun space. ▪ With careful design optimal solutions for the cold bridges at the joints. ▪ Smart metering and the annual balance of consumption and production lead to high efficiency for the PV system. ▪ Low carbon footprint via recycled materials.	▪ Shading on the PV. ▪ Long time waiting for to join the grid. ▪ No practice moving the PV between “summer” and “winter” position.
Opportunities / Possibilities	**Threats / Barriers**
▪ Create/join to the local energy community for PV production and electricity consumption. ▪ Involving the installer in the capital financing with energy contracting scheme. ▪ Heat recovery ventilation for better indoor air quality.	▪ Establishing energy communities is not promoted yet. ▪ Lack of adequate ventilation results low Indoor air quality.

No. 7: Energy modernisation and smart energy management development of the "Autumn Light" Home for the Elderly in Alsómocsolád

FINANCIAL DATA

Type of financing, year	EU Grant (KEOP) 2015. Own resources (Municipal investment) 2023.
Financier	European Regional Development Fund, Central Government, Municipality of Alsómocsolád
Specifics	1. The development of the "Autumn Light" Home for the Elderly in Alsómocsolád (KEOP-4.10.0/F/14-2014-0155): the project was financed by the European Regional Development Fund and national central budget appropriations in the form of non-reimbursable grants. Amount of EU support: 80% (HUF 62.167.060) Municipal investment: 20% 2. Smart energy management improvements in the Autumn Light Home for the Elderly (self-financed investment) Municipal investment: 100% (HUF 4.800.000)
Beneficiary	Municipality of Alsómocsolád
Link	https://www.youtube.com/watch?v=O5eCnLdinUs&t=2s Energymanagement in the Elderly Home of Alsómocsoád

DESCRIPTION and PHOTO

Picture 8 Home for the elderly in Alsómocsolád

In August 2014, the Municipality of Alsómocsolád submitted an application for the call for proposals entitled "Development of the building energy efficiency of the "Autumn Light" Home for the Elderly in Alsómocsolád", announced by the Deputy State Secretary for Environmental and Energy Efficiency Operational Programmes of the Ministry of National Development in the convergence regions".

Prior to the renovation, the residential care home, built in 2006, had an energy rating of BB, which was upgraded to A+ with the renovation.

The building currently accommodates 46 people in rooms with 2 and 3 beds. Two rooms (apartments) have 1-1 bathroom (shower + toilet). There is also a 300-capacity kitchen and a restaurant serving tourism.

The aim of the project was the energy modernisation of the "Autumn Light" Home for the Elderly. The investment included external thermal insulation, plasterboard suspended ceiling, attic insulation, plinth insulation, installation of 5 solar collectors with bivalent storage and a 16.5 kW solar panel system. The project resulted in an annual energy cost reduction of HUF 3,000,000.

The energy crisis of 2022 has further strengthened the need to reduce the energy consumption of the elderly home by using smart solutions. Our measurements in March 2023- at the end of the heating season- showed that the windows (in the rooms and bathrooms) are open on average 41% of the time during the heating season, which can lead to correspondingly higher gas consumption in the winter months and, in addition to higher electricity consumption in the summer months, can also cause dehydration-related health problems in the event of overheating.

Based on these measurements, rooms and bathrooms are equipped with opening sensors that detect when windows are open for more than 10 minutes. In this case, the Loxone system automatically turns down the heating.

Functions of the system:

- night and day heating comfort adjustment (automatic temperature control)
- automatic heating and cooling control
- preventing overheating: by setting maximum and minimum values in every room
- alarm in case of higher or lower than healthy temperatures
- automatic ventilation, warning to ventilate when air is exhausted

The system's installation and operation were self-financed, with the investment projected to achieve full payback within 3 to 4 years through energy savings. Beyond cost reductions, the implementation has also streamlined operations through automation, significantly lowering staff workload and contributing to a healthier living environment.

Other development goals include the replacement of the existing 9-year-old solar panel system, the expansion of the smart energy management system, the deployment of a smart grid system - with the involvement of other public buildings in the municipality -, the purchase of an electric minibus for energy storage, the installation of an electric charging station, and the creation of an energy community involving the inhabitants and local businesses.

To finance these improvements, the municipality plan to use the ESCO model, the EKR (Energy Efficiency Obligation System) scheme, the involvement of businesses' own investments and the creation of an energy community fund for the inhabitants.

SWOT ANALYSIS

Strengths	Weaknesses
▪ The stable economic situation of the municipality as the maintainer. ▪ Availability of funding. ▪ Existing project management experience. ▪ Relatively new building with favourable but not perfect energy performance. ▪ Constructive cooperation between the municipality and the institution.	▪ The smooth running of the nursing home and kitchen had to be ensured during the renovation. ▪ Meeting grant/supporter requirements. ▪ Limited financial resources available. ▪ Lack of local expertise and skills.
Opportunities / Possibilities	**Threats / Barriers**
▪ The energy efficiency potential of smart energy management and automation. ▪ Scalability of projects. ▪ Attracting additional financial resources (ESCO, Energy Efficiency Obligation System). ▪ Use and transfer of knowledge acquired. ▪ Support for renewable energy sources. ▪ Opportunities in Smart Grid developments. ▪ Possibility of creating an energy community, including other municipal buildings and residential buildings.	▪ Changes to support options. ▪ Deterioration of the economic situation. ▪ Significant and continuous increase in prices of goods and services. ▪ Restructuring of the political and economic framework. ▪ Unpredictability of the regulatory environment. ▪ Lack of public resources and lack of motivation.

5.1.3 Slovenia

No. 8: Energy efficiency measures in Municipality of Kranj, SLOVENIA	
FINANCIAL DATA	
Type of financing, year	Energy Performance Contracting (EPC), 2001 (phase 1) Energy Performance Contracting (EPC), 2018 (phase 2)
Financiers	MOK, Petrol d.d. MOK, Petrol d.d., Domplan d.d. and Gorenjske elektrarne d.o.o.
Specifics	PPP between municipality and private company (phase 1); PPP between municipality and private companies (phase 2)
Beneficiary	Municipality of Kranj (MOK)
Link	https://www.petrol.si/znanje-in-podpora/2019/clanki/mestna-obcina-kranj---trajnostno-zgodbo-skupaj-gradimo-ze-19-let.html
DESCRIPTION and PHOTO	

In 2001, the Municipality of Kranj (MOK) and company Petrol signed a 15-year contract based on the energy contracting model. This was the first project of contractual financing of measures for the efficient use of energy in Slovenia. The contract included 14 buildings with a total area of 73,000 square meters owned by the MOK. The business model included assurance of savings, assurance of energy supply and energy management. The buildings that were part of the contract were in poor energy condition with high energy costs.

With the contract, Petrol undertook to provide an average 18.7% saving in energy for heating by introducing energy measures in nine selected buildings. After the implementation of the first measures, the project was upgraded with some additional implemented measures. The project was mostly financed by Petrol, and the investment was repaid from the savings achieved. Additional upgrade measures also included funding from the MOK, grants from the tenders of the Republic of Slovenia and the Swiss Renewable Energy Across the Alpine Land (REAAL) mechanism, which supported projects in the field of renewable energy sources in the Alpine region to improve energy efficiency in public infrastructure. Investment risks, responsibility and possible consequences due to failure to achieve the predicted effects were assumed by Petrol.

Picture 9 Olympic pool in Kranj, source: https://www.zsport-kranj.si/vsi-sportni-objekti/pokrit-olimpijski-bazen

The project started in 2002 and ended in August 2017 with the following results: in 15 years, 14 contracted buildings saved 3 years of heat consumption as regard to reference year. With the implementation of measures in nine buildings, the use of heat in these buildings during the implementation of the contract was almost halved.

In the covered Olympic swimming pool and open swimming pool in Kranj, despite the increased use of the facilities, the use of primary energy for heat decreased by 62% compared to the reference use. All devices operated uninterrupted at all times. The project also included staff training on proper ventilation and energy management, technical details of system operation, thermostat settings, proper ventilation, etc.

This positive experience encouraged the MOK to continue the renovation of buildings according to the same 15-year contract model in the consortium of the companies Petrol, Domplan and Gorenjske elektrarne. The

project (started in 2018) includes a comprehensive energy renovation of 10 public buildings and a partial energy renovation of 12 buildings (all together 68,450 m^2). The investment amounts to 6.18 million euros, of which private partners invest 3.1 million euros, 2.25 cames from European cohesion funds, and 0.83 million euros was the investment of MOK. The total guaranteed annual saving of energy is 2,473,000 kWh.

SWOT ANALYSIS	
Strengths	**Weaknesses**
▪ Uninterrupted operation of all devices. ▪ Significant improvement of the energy efficiency of selected buildings. ▪ Big energy savings. ▪ Increase of the value of real estate and impact on the quality of life. ▪ Demonstration case on which trust in contracting is built. ▪ The established trust and good experience encouraged the continuation of the process in a similar project.	▪ Measures were targeting energy efficiency renovations only and not sustainable renovation. ▪ Commitment to a contracted supplier for 15 years. ▪ Inadequate methodology of evaluating the profitability of energy efficiency renovation: usual cost-benefit analysis is not useful in evaluating side benefits, such as improved health and well-being, better living and working conditions, general more favourable environmental effects, etc.
Opportunities / Possibilities	**Threats / Barriers**
▪ Possibility to obtain additional funds. ▪ Support measures such as stuff training and additional learning about technical details of system operation, ventilation, etc.	▪ Relatively long return of investment (due to low price of energy).

No. 9: Energy renovation of boiler house and the replacement of the heating network, Kranj, SLOVENIA

FINANCIAL DATA	
Type of financing, year	Housing savings fund, deferred payment of investment, 2017, 2018
Financier	Apartment owners of Šorlijevo naselje, Domplan d.d.
Specifics	The possibility and burden of delayed payment was taken over by the private company Domplan d.d.
Beneficiary	Apartment owners of Šorlijevo naselje
Link	https://www.domplan.si/energetika/toplotna-oskrba/prenova-ogrevalnega-sistema-sorlijevo-naselje

DESCRIPTION and PHOTO

In 2017 and 2018 a community of housing settlement Šorlijevo naselje in Kranj decided to renovate their boiler house. The investment was covered from their own savings (in their housing fund). The conditions for the start of the investment were made possible by the management of Domplan, which, together with the heating committee, prepared the starting points for the preparation of the technical documentation and the terms of the deferred financing.

The total investment was around €800 000. Around €250 000 has been saved by users over the past two years in the form of payments into a maintenance fund, and Domplan has allowed the remainder of the investment to be repaid over nine years, in the same form and amount as before. Thus, the amount of heating bills would not increase, but a reduction in variable heating costs of around 12 % was expected as a result of the modernisation of the system.

The renovation of the boiler house included construction, mechanical and electrical works. The construction work on the boiler house included the renovation of the roof, replacement of windows and doors, rehabilitation of concrete surfaces, and painting of external and internal surfaces. The mechanical work included the installation of two hot water boilers with an attached gas burner of 1 400 kW each, the construction of two new flue gas stacks, the installation of a heat exchanger, the replacement of distribution pumps, valves, piping, etc. The renovation switched the entire heating system to a closed static pressure maintenance system, with attached dictation pumps and a degassing plant. In the boiler room, the entire electrical installation was replaced, a controller was installed to control the operation of the plant and auxiliary devices were installed for remote control of the boiler room.

Picture 10 Boiler room in Šorlijevo naselje, source: https://www.domplan.si/energetika/toplotna-oskrba/prenova-ogrevalnega-sistema-sorlijevo-naselje

With the replacement of the heating pipelines in the estate, a total of approx. 3,300 m of pipelines were replaced. The existing steel were replaced by pre-insulated pipelines with leakage indication fitted. The route of the new pipelines mostly follows the existing AB kinettes. At the same time as the heat pipes were replaced, electrical cabling was installed to allow the connection, remote monitoring and control of the heat stations. After the renovation, the boiler house and all the heat substations to which the heat pipeline was

being renovated were remotely controlled and operated from the headquarters of Energetika.

After the renovation of the boiler house and the heat pipeline, no additional financial burden was imposed on the apartment owners, who would repay the remaining difference through their established earmarked savings. However, the savings due to lower heat losses in the heat pipe, better boiler efficiency and more optimal control were passed on to the apartment owners in January 2018, with a reduced variable heating cost of approx. 12%.

SWOT ANALYSIS	
Strengths	**Weaknesses**
▪ Initiative from apartment owners and building manager. ▪ A new model for paying off a large private investment, while also having lower electricity cost immediately.	▪ The residents covered 100% of the investment with their savings fund, with deferred payment for the next 9 years. ▪ The process covered only energy renovation, not sustainable renovation.
Opportunities / Possibilities	**Threats / Barriers**
▪ Combining this model with EU or national subsidies. ▪ Using the case as a promotion for other similar renovations.	▪ 100% consent and cooperation from all owners is still required for a model like this. ▪ The existing boiler room may be too small for the installation of new appliances.

No. 10: The first cooperative community solar power plant, Hrastnik, SLOVENIA

FINANCIAL DATA

Type of financing, year	Own resources, grant and loan, 2024, 2024
Financier	Energy community Zeleni Hrastnik (public and private users/owners of the power plant), Ministry for Infrastructure, Eco Fund
Specifics	PPP between ministry and owners: Zadruga Zeleni Hrastnik 20 %, Ministry for Infrastructure 20%, loan by Eco Fund 60 %
Beneficiary	Users of the solar power plant
Link	https://www.caszazemljo.si/zelena-energija/soncna-sola-hrastnik.html

DESCRIPTION and PHOTO

The Hrastnik Solar School is Slovenia's first community-owned, self-sustaining solar power plant set up by a cooperative group (*zadruga*) on the roof of a public building. It differs from other community power plants in an important way- all customers own the power plant at the same time, so major energy intermediaries are removed from the calculation.

The solar power plant is made up of 662 PV panels and is therefore much bigger than the ones you usually see on domestic roofs. With a capacity of around 300 kW, the Hrastnik Solar School is one of the largest solar power plants for community self-sufficiency in the country. It supplies 16 homes in nearby blocks of flats, three public buildings- a municipal building, a school and a swimming pool, a small commercial space and the premises of two companies with electricity generated by the sun, according to the Zeleni Hrastnik Cooperative.

Picture 11 School in Hrastnik, source: https://www.caszazemljo.si/zelena-energija/soncna-sola-hrastnik.html

The electricity generated by the Hrastnik School solar power plant is net metered and deducted from the energy consumed by the customers of the solar power plant. Over the first 13 years, the total cost of their electricity consumption will be reduced by around 30%, and after the loan is paid, by around 65%, they will only have to cover the maintenance and management costs. Independence from market fluctuations was also a key factor in their decision.

The investment was worth approximately EUR 235 000. The financing method involved an initial contribution of €150 per kW of capacity from the customers involved, which covered 20% of the investment. A further 20% was co-financed by the Ministry of Infrastructure, under a call for tenders for grants for solar power plants, and the remaining 60% was covered by a loan to Zadruga Zeleni Hrastnik (cooperative group) by Eco Fund.

The customer is connected according to their own electricity needs, so that by leasing a share of the solar power plant it covers their annual electricity consumption. As an example, a household that consumes 170 kWh of electricity per month: Since the annual electricity production of a solar power plant is about 1000 kWh per 1 kW of capacity, this means that this household would need to lease 2 kW of solar power plant capacity to cover its

annual needs. Their initial investment was therefore €300 (€150 x 2 kW). The lifetime of such a plant is expected to be 25-30 years.

The project, which combines solidarity-based community resource management and environmental sustainability, was led by the Zeleni Hrastnik Energy Cooperative, established in 2022, with the support of the Municipality of Hrastnik and the environmental organisation Focus. Technical know-how was contributed by Kisik, which also carried out the installation of photovoltaic panels on the roof of the Hrastnik primary school. The financial structure of the project is as follows: one fifth was contributed by the cooperators with initial inputs, one fifth was covered by a grant from the Ministry for the Promotion of Solarisation and the remainder by a loan from the Eco Fund.

SWOT ANALYSIS	
Strengths	**Weaknesses**
▪ A lot of interest for joining from people. ▪ Cooperative model means all users are also co-owners of the power station. ▪ Independence from market price fluctuations.	▪ Currently, only houses that are connected to the school's transmitter station can be included in the solar plant. ▪ The solar plant is facing a possibility of overwhelming due to big interest to join the system.
Opportunities / Possibilities	**Threats / Barriers**
▪ Subsidy funds by Eco Fund or Borzen to supplement the loan to Zadruga Zeleni Hrastnik. ▪ Exapanding the capacity of the solar plant beyond school's transmitter station. ▪ To promote the concept of community-owned, self-sustaining solar power plant.	▪ Lack of qualified leaders and managers for projects like these. ▪ Issues with communication with the local community.

No. 11: Energy renovation of the Home for seniors Jesenice, SLOVENIA

FINANCIAL DATA

Type of financing, year	Energy Performance Contracting (EPC), 2022
Financier	Municipality of Kranj, Petrol d.d.
Specifics	PPP between municipality and private company; public source: Operational Programme for Cohesion Policy Funding (OP-EKP 2014–2020)
Beneficiary	Home for Seniors Jesenice
Link	https://www.gov.si/novice/2022-02-04-evropska-sredstva-za-energetsko-prenovo-doma-upokojencev-dr-franceta-bergelja-jesenice/

DESCRIPTION and PHOTO

The project includes renovation of buildings B, C and D of the Dr. Franck Bergelj Jesenice Retirement Home, which cover an area of 6612.50 square metres. The financing model used here was EPC provided by Petrol. Within the scope of the concessioned activity, Petrol ensured the implementation of energy measures to improve energy efficiency in facilities and contractually guaranteed energy savings. With EPC, he also took over the investment risk and the availability risk. The energy renovation comprised the construction of a façade, replacement of windows and doors, thermal insulation of the roof, installation of balcony railings, replacement of roofing, installation of thermal insulation of the external walls inside (Building B), modification of the control equipment in the district heating substation, earthing of the lightning conductor, renovation of the lighting and several other energy upgrades.

Picture 12 Retirement home in Kranj, source: https://www.facebook.com/DomUpokojencevdrFrancetaBergeljaJesenice/

The energy renovation of the Dr Franck Bergel Jesenice Retirement Home increased the efficiency of energy use and consequently reduce operating costs. The project was worth €1.4 million and the Cohesion Fund has contributed €550,000. The renovation was completed in 2023.

SWOT ANALYSIS

Strengths	Weaknesses
▪ A wide range of renovation measures and additional functional improvements.	▪ 15-year long concession contract with the same energy provider (Petrol).

▪ Recent example of the use of this financial model.	
Opportunities / Possibilities	**Threats / Barriers**
▪ Promotion of investment concept. ▪ Obtaining information (positive and negative), learning from experiences, introducing new companies to this financial model.	▪ Improper use and behaviour of occupants can negatively affect the expected results. ▪ Installation of thermal insulation on inner side of the external walls could cause more intense thermal bridges. ▪ Lack of companies with proper competences for such a large project.

6 CONCLUDING REMARKS

The present document is an abbreviated compilation of best practices found in the use of various financial mechanisms for sustainable building renovations from three partner countries, Austria, Hungary, and Slovenia. The original contributes to the understanding of the past and current uses of models, procedures and processes of financing the renovation of buildings or building complexes, both in the private and the public sectors. The study was prepared as part of EU granted project **LIFE22-CET-RENOINVEST - Roundtables enhancing smart investments in sustainable renovation of buildings**.

The research showed that renovation cases where the analysis and overall satisfaction demonstrate integrity are rare. It also revealed that investment in renovations is easier and more widespread in public buildings, since private renovations most often require investors own savings or/and investment that is subsidised by a loan. Also, public investments in renovation are usually carried out on larger buildings or in a combination of a larger number of buildings. The fact that they are public, and their size may be the reason that they are slightly more exposed to the public and more information can be obtained about them. In the private sector, shared ownership can also be an issue as it is more difficult to agree on a joint investment.

The results of the study show that in **Austria** there is diversity in subsidies and in ESCO collaborations, partially due to many different and fragmented funding schemes and options available. This presents particular advantages and disadvantages. Different schemes and funding options were shown to be combined in best practices above, with cases of good social support in non-profit and public buildings. However, through SWOT analyses it was highlighted that most large-scale (public) renovations faced a lack of funding or dependency on future projects or schemes. Like in other two countries, high costs of renovation also discouraged the users and investors from starting or continuing the energy efficiency measures.

Private renovations were in the minority of renovation cases we compiled, with renovations of public buildings with different forms of municipal, national or European funding dominated. On the other hand, similar to Slovenia, Austrian best practices also lack promotion across country. In the case of the public buildings in **Hungary** most of the energy efficiency refurbishments described were financed by non-refundable grants, i.e. subsidies (70-100 %), or by a combination of grants and the own contribution of the municipality in question (50-50 %). The study revealed that for municipalities grants are the only opportunity to implement investments in refurbishments or renewables, however they have to be able to prepare the tender application. The renovations of Hungarian single-family homes are financed by the combination of grants and own contributions, by preferential loans and own contributions or by own resources only. There are more possibilities for financing renovations in the case of multi-family buildings. However, it has to be emphasized, that none of grant programmes and facilities is long-standing, and there is a lot of administrative burden connected to them.

In **Slovenia** the two main paths to fund an energy renovation from combined sources were distinguished: energy performance contracting (EPCs) and funding schemes of European Union. The analysis of the cases in general showed that in Slovenia there is insufficient emphasis on the promotion of successful financial solutions. It was found that knowledge and findings are not transferred enough to the educational process (or not at all) and that confidence in financial models does not increase over the years of use. Additionally, on the basis of the presented examples, it can be pointed out that in Slovenia there are certain specific legal, formal and procedural obstacles that should be eliminated in order to make the implementation of financial solutions easier and, above all, faster, especially in the private building sector.

To conclude, the examples of good practices collected will be helpful in discussions at national thematic working group events and on national platforms. The collection will also be an opportunity for the three countries, Austria, Hungary and Slovenia, to learn from each other.

The detection of examples of good practices will continue during the project through other activities such as conversations with stakeholders, connecting with other projects, with foreign stakeholders, etc. The cases found will be analysed and placed on the list of existing cases. On this basis, a new selection will be made in the last part of the project and a new planned report (Deliverable D2.3) will be prepared - a refreshed catalogue of 50 examples of good practices.

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sustainable renovation of buildings

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