

Deliverable D 2.1 - Updated toolkits and training materials

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I. LIST OF ACRONYMS

AR	Augmented reality
EE	Energy efficiency
EER	Energy efficient renovation
EU	European Union
OSS	One-stop shops
nZEB	Near Zero Energy Buildings
RES	Renewable Energy Sources
VR	Virtual reality

II. INTRODUCTION

This Executive summary provides a concise overview of the toolkits and training materials updated/developed within T2.3. The list of the materials include:

1. Engagement Guide
2. Technical Guide
3. Integration of Renewable Energy Sources into Residential Buildings Guide
4. Project Management Guide
5. Near Zero Energy Buildings / Zero Emissions Buildings Guide
6. Innovative Technologies and Design Approaches
7. Energy Management Guide
8. Technical Inspections and Compliance Guide

The above listed materials all together are meant to empower the One-stop shops (OSS) staff by broadening their knowledge base, providing standerdized tools and information to enhance service offerings, improving project quality and compliance, facilitating effective stakeholder collaboration, and providing strategic insights for adapting to market changes. This comprehensive understanding and toolkit enable OSS staff to more effectively promote, guide and support the homeowners efforts to execute energy efficiency renovation projects, ultimately contributing to scaling up the process of energy efficiency improvement in the residential sector.

III. THE GUIDES' HIGHLIGHTS

THE ENGAGEMENT GUIDE

Initially developed under the H2020 SHEERenov project, the Guide has been updated under the LIFE22-CET-SHEERenovPlus project to take account of the newly emerged circumstances and good practices establithed in the course of piloting the H2020 SHEERenov model for provision of seamless services for housing energy efficiency renovations.

The guide aims to enhance homeowners' awareness and trust in the benefits and quality of energy-efficient renovations (EER).

It outlines the steps from initiating interest in renovation to successfully applying for funding and implementing EER.

The Engagement Guide lays out a comprehensive pathway for modernizing and improving the energy characteristics of residential buildings through a collaborative effort

between homeowners, OSSs, and municipal administrations. It emphasizes the critical role of OSSs in navigating the complexities of the EER process, ensuring a standardized and efficient approach to achieving energy efficiency goals.

The guide draws on various sources, including national funding schemes and EU best practices, to present a well-rounded view of the organizational aspects of energy-efficient renovation projects.

The Guide offers OSSs' staff:

- a blueprint for planning and implementing energy-efficient renovations effectively from an organisational point of view;
- templates of documents;
- an overview of programs and funding schemes representing a market for the OSSs.

THE TECHNICAL GUIDE

The Guide aims to:

- contribute to the standardization and optimization of the building EER process;
- increase awareness and provides guidelines for quality control implementation in the process of providing integrated services for energy-efficient renovation of residential buildings.

The Guide offers comprehensive insights into the practical, technical, and regulatory aspects of energy-efficient renovation of multifamily residential buildings. It serves as a valuable resource for professionals involved in the renovation process, from planning to implementation, emphasizing the role of innovative technologies, sustainable practices, and effective energy management in achieving energy efficiency and environmental sustainability goals.

It incorporates in its content the topics dealt with in the individual Guides as they cover crucial aspects of the EER ecosystem.

Moreover, the Guide:

- provides OSS staff with a structured approach to energy-efficient renovation projects, from initial assessment through project management to execution, enabling them to offer a more comprehensive and integrated service to homeowners;
- lays out a framework for effective collaboration among various stakeholders involved in renovation projects, including municipal administrations, service providers, and

homeowners, facilitating smoother project execution;

- highlights current regulations in building energy efficiency, focusing on the 2022 ordinances for energy performance requirements and energy efficiency audit and certification.

THE INTEGRATION OF RENEWABLE ENERGY SOURCES (RES) INTO RESIDENTIAL BUILDINGS GUIDE

The Guide provides an extensive overview of the current regulatory framework, including recent amendments and the introduction of new regulations aimed at facilitating the integration of RES technologies. It covers the administrative processes for connecting RES facilities to the electrical grid, focusing on smaller-scale installations for personal consumption and larger systems capable of contributing significantly to the grid.

In a special section there are details about the operations of EVN Bulgaria's Center for Sustainable Services, which offers consultations and support for individuals looking to benefit from national schemes supporting renewable energy investment.

The Guide can not only serve as a comprehensive guide for stakeholders interested in the production and use of renewable energy but also to raise the awareness about the importance of ongoing legislative evolution and the need for supportive frameworks that encourage the uptake of renewable technologies.

THE PROJECT MANAGEMENT GUIDE

The Guide is not a specialized manual for executing investment projects for EER but rather complements the professional skills of OSSs' employees with broader context on the European green transition. It aims to inform about ecological necessities, strategies, regulations surrounding EER projects, and foundational knowledge in initiating, managing, and accounting for infrastructure projects similar to the initiatives for building stock renewal.

The topics covered include:

- introduction to the necessity, concepts, and models guiding the transition from a linear to a circular economy, emphasizing the significant role of the construction sector in resource consumption and its impact on climate change;
- detailed overview of the regulatory, strategic, and programmatic framework at both EU and national levels, focusing on EER, including strategies like the Renovation Wave, directives on building energy performance, and the ambitious goals for 2030;
- in-depth look at project management phases, from problem analysis, stakeholder analysis, logical framework method, to planning of resources, selection of

contractors, and project implementation and monitoring.

Depending on identified needs, the information within the Guide can be utilized for self-study or as part of organized seminars. Furthermore, it caters to local experts who engage themselves professionally or in partnership with OSSs, aiming for maximum effect from the investment projects by fostering collaboration with local business and authorities. Furthermore, the Guide is an invaluable resource for advancing the skills and understanding of those committed to Bulgaria's transition towards a green economy, contributing to the achievement of energy independence, sustainability, and reduced greenhouse gas emissions in line with Bulgaria's energy and climate goals.

THE NEAR ZERO ENERGY BUILDINGS / ZERO EMISSIONS BUILDINGS GUIDE

The Guide focuses on the pivotal transition towards Near Zero Energy Buildings (nZEB) as mandated by the Bulgarian Energy Efficiency Act (EEA)[1].

The Guide highlights the key requirements to achieve high levels of energy efficiency and transitioning to zero emissions buildings:

- knowledge of legal frameworks: understanding and adhering to legislative requirements;
- proper designing: incorporating energy efficiency from the design phase;
- skilled construction teams: training construction teams to ensure quality and compliance.
- high-quality materials: using certified components and materials for energy efficiency.
- continuous quality control: ensuring the construction meets the specified energy efficiency standards.

The Guide can serve as an essential resource for professionals involved in the construction, renovation, and certification of energy-efficient buildings, underlining the critical steps, methodologies, and best practices for achieving nZEB buildings in Bulgaria.

THE INNOVATIVE TECHNOLOGIES FOR BUILDING RENOVATION:

The Guide presents various innovative technologies vital for sustainable development and environmental preservation in building renovation, such as:

- intelligent buildings: integration of advanced digital systems and sensors to optimize

[1] It defines an nZEB as a building that not only meets the highest class A energy consumption standards but also sources at least 55% of its energy from on-site or nearby renewable sources for heating, cooling, ventilation, domestic hot water, and lighting.

energy consumption, enhance inhabitant comfort, and streamline operations;

- prefabricated components and modular constructions: these technologies offer faster construction, quality control, waste reduction, and improved sustainability;
- renewable energy technologies: incorporation of solar, wind, and other renewable energy sources into buildings to enhance energy self-sufficiency;
- augmented reality (AR) and virtual reality (VR), Drones, and 3D Technologies: utilization in design visualization, energy analysis, construction planning, and maintenance to enhance efficiency and sustainability.

The direct benefits of the Guide include but are not limited to:

- knowledge enhancement – OSSs'staff and local professionals can enhance their understanding of cutting-edge technologies and innovative design approaches essential for energy-efficient building renovations, including intelligent building systems, prefabricated components, renewable energy integration, and the use of AR/VR and drones for design and construction;
- service diversification - by familiarizing themselves with the latest trends and technologies, OSSs staff can diversify the services offered to homeowners, including consultancy on smart technologies and renewable energy solutions, potentially expanding their client base and improving service quality.

THE ENERGY MANAGEMENT GUIDE:

The Guide emphasizes practical strategies for managing energy consumption in residential buildings efficiently, covering aspects like heating, cooling, hot water usage, lighting, appliance use, and monitoring and management systems, including smart homes.

The key strategies for energy efficiency presented in the Guide include:

- effective building management - understanding the building's energy profile through energy audits and utilizing behavior modification strategies to reduce consumption;
- optimization of energy costs - recommendations for maintaining optimal temperatures for different purposes and seasons, using energy-efficient appliances, and adopting smart technologies for energy management;
- monitoring and smart home management - utilizing technology to monitor energy consumption, manage appliances remotely, and employ intelligent systems for lighting and climate control to optimize energy use.

Furthermore, the Guide pays special attention to the behavioral measures, low-budget automation strategies and the potential for significant energy savings through optimized operation and investment in building renovations.

It underlines the importance of collective action among homeowners, service providers, and local authorities to achieve energy efficiency goals effectively.

The direct benefits of the Guide include but are not limited to:

- improved consultancy services - the insights into practical energy management strategies enable OSSs' staff to provide more comprehensive advice to homeowners on optimizing energy consumption, leveraging renewable energy, and implementing energy-saving measures;
- capacity building - knowledge of effective energy management practices allows OSSs' staff to build their capacity in advising on behavioral changes and low-cost automation options for energy efficiency, enhancing the impact of renovation projects.

THE TECHNICAL INSPECTIONS AND COMPLIANCE GUIDE

The Guide idea is to present the important role of a building's technical inspection and the subsequent Technical passport for the provision of a foundational assessment critical for planning and executing renovation works. These documents ensure that refurbishment activities are informed by a comprehensive evaluation of the building's structural integrity, systems condition, and compliance with essential construction requirements.

The Guide's key insights can be summarised as follows:

- technical inspections - a systematic approach to assess a building's compliance with essential requirements such as structural integrity, fire safety, health, environmental impact, accessibility, noise protection, energy conservation, and sustainable resource use;
- technical passport - a comprehensive document encapsulating a building's technical parameters, renovation history, certification records, and a timeline for necessary construction or maintenance activities;
- importance of adequate information - for effective building renovation, detailed information on its architectural, structural, and energy condition is imperative. This ensures a holistic understanding of the building's components and their interdependencies;
- simultaneous assessments - due to the interconnected nature of building elements, technical inspections across various disciplines should occur concurrently, regardless of the number of professionals involved;
- legal and technical framework - the document outlines the legal requirements for

building assessments and the creation of Technical passports, including the roles of architects, engineers, and other specialists in evaluating the building's state.

The Guide offers recommended contents for both the inspection report and the Technical passport, guiding the detailed assessment of existing buildings and the summarization of findings essential for informed renovation decisions.

The direct benefits of the Guide include but are not limited to:

- enhanced quality assurance - understanding the importance of technical inspections and the creation of Technical passports equips OSSs staff with the ability to ensure renovations meet legal and technical standards, thereby enhancing the quality and compliance of renovation projects';
- risk management - familiarity with the procedures for assessing buildings' compliance with construction requirements allows OSSs staff to better manage risks associated with renovation, ensuring projects adhere to structural, environmental, and energy efficiency standards.

IV. NEXT STEPS

As explained above the primarily role of the so developed toolkits and training materials will be to strengthen OSSs' capacity to deliver seamless services for housing EER. They will be included in the virtual platform knowledge repository with free access to professionals and public.

Within T3.2 the toolkits and training materials will be used as a basis for preparing presentations to support the training programmes and the trainings to be held under T3.3.

Furthermore, based on case studies arising during the implementation of WP5 and new developments, the toolkits and materials will be updated accordingly in M34.

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