Recommendations on how to prepare upcoming National Building Renovation Plans with a focus on Zero Energy Buildings

Project name	Expert support to Implementation Working Group 5 of the SET Plan - Energy Efficiency in Buildings
Grant agreement	101075700

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Deliverable Factsheet

Deliverable no	Deliverable 1.10
Responsible Partner	ECTP
WP no. and title	Work Package 1 Community consolidation
Task no. and title	1.3 Deepen collaboration between Member States
Version date	April 2025
Dissemination level	Public
Authors	Cornelia Partsch, ECTP
Review	Partners of IWG5-CSA

Revision	Date	Comments	Author
Draft version	18.04.2025		Cornelia Partsch (ECTP)
Feedback of CSA partners	25.04.2025	Nicolas de la Vega (EUREC)	
Final version	30.04.2025		Cornelia Partsch (ECTP)

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List of acronyms

CID	Clean Industrial Deal
CPR	Construction Product Regulation
EC	European Commission
EEB	Efficient Buildings Europe
EPBD	Energy performance of buildings directive
ECTP	European Construction and sustainable built environment Technology Platform
ETS 2	Emission Trading System 2
GHG	Greenhouse Gas
IWG5	Implementation Working Group on Energy Efficiency in Buildings
JRC	Joint Research Centre
LTRS	Long-term Renovation Strategies
NECP	National Climate and Energy Plans
NBRP	National Building Renovation Plans
NZEB	Nearly-Zero Energy Buildings
PV	Photovoltaics
SET Plan	Strategic Energy Technology Plan
SCP	Social Climate Plans
ZEB	Zero-Emission Buildings

Executive Summary

The 2024 revision of the Energy Performance of Buildings Directive (EPBD) represents a significant strategic shift in the European Union's efforts to decarbonize its building sector by 2050. Two core components introduced in this revision are the **National Building Renovation Plans (NBRPs)** and the enhanced focus on **Zero-emission Buildings (ZEBs)**. These build upon earlier frameworks like the Long-Term Renovation Strategies (LTRS) and Nearly Zero-Energy Buildings (NZEBs), marking a more integrated and ambitious approach to building renovation and energy performance.

This deliverable 1.10 of the IWG5-CSA project, combines findings from comprehensive desk research, and a targeted survey to develop a set of recommendations for the NBRP and ZEB implementation. The survey was sent out to the members of the Implementation Working Group on Energy Efficiency of Buildings (IWG5) of the Strategic Energy and Technology Plan (SET) Plan. Currently, 24 countries and 24 stakeholder organisations are represented in IWG5. Survey insights from IWG5 highlight key challenges like administrative complexity, financing, data gaps, and limited stakeholder engagement. Major barriers to ZEB implementation include costs, regulatory clarity, administrative burdens and a lack of knowledge and public awareness.

To succeed, Member States must adopt holistic, well-coordinated approaches and improve interministerial collaboration, financing, and public awareness, while aligning with broader EU climate goals and upcoming regulations.

Introduction

As part of the European Green Deal, the European Commission launched the Renovation Wave in 2020 to double the EU's annual rate of energy renovations. Despite this, renovation rates remain low. The revised Energy Performance of Buildings Directive (EPBD) [1], and new initiatives such as the Affordable Action Plan on Energy and the Clean Industrial Deal [2] (CDI)- which foresees a revised Heating and Cooling Strategy by 2026- create new momentum for European climate neutrality goals.

A key pillar is the decarbonisation of the European building stock. For this, the existing building stock stock has to be transferred into Zero-emission buildings (ZEBs) which are not producing any on-site carbon emissions from fossil fuels by 2050. This is done in several steps. By 2028 public buildings have to be ZEBs, followed by all new buildings by 2030. Finally, all existing buildings have to become ZEBs by 2050. The revised EBPD makes thus a shift from Nearly-zero energy buildings (NZEBs) towards Zero-emission buildings (ZEBs). The EPBD also changes from Long-term renovation strategies to National Building Renovation Plans (NBRPs) aligning the process and improving the comparability of the data of the Member states. As Member states have to report every 5 years on their progress, the last progress reports are still covered by the Long-term Renovation Strategies in 2020. The draft versions of the National Building and Renovation Plans are expected by the end of December 2025. Final versions are anticipated by the end of 2026.

This Deliverable 10 of Task 1.3 under the IWG5-CSA project focuses on those new elements in the revised EPBD, especially Articles 3 (NBRP) and 11 (ZEB). It is closely tied to ongoing policy developments and the timeline for NBRPs. It analyses the requirements of the EBPD and gives some recommendations on the ZEBs also considering some additional aspects. A key element of the deliverable is the input of a survey sent out to the members of the Implementation Working Group on Energy Efficiency of Buildings (IWG5) of the Strategic Energy and Technology Plan (SET) Plan. The group works on sustainable materials and technologies for energy efficient solutions in buildings and on cross-cutting heating and cooling technologies for buildings. It has updated the targets of its implementation plan in 2024. In 2025, IWG5 published two white papers on Affordable, Sustainable Energy Transition and Building Renovation and on Energy-efficient buildings as job-creation motor. Both papers will be used for a second update of the implementation plan anticipated in summer 2025.

This short report comes at a time when Member States have just started working on their NBRPs. The due date of the NBRP will be on December 31. Thus, this deliverable focused on a few, simple recommendations based on the survey input of the IWG5 members and current EU initiatives linked to this.

1. Scope and Methodology

Given the current timeline, a direct comparison between LTRS and NBRPs is not feasible. Additionally, the EPBD introduces several new elements unique to NBRPs, calling into question their comparability.

As a result, the deliverable focused primarily on relevant EPBD articles. In addition, findings from comprehensive desk research, such as the Joint Research Centre (JRC) assessment of the LTRS[3] and the white paper on Affordable, Sustainable Energy Transition and Building Renovation [4] of the task force 5 of the Implementation Working Group on Energy Efficiency in Buildings (IWG5) were used as a basis to get some insight on possible NBRP and ZEB implementation recommendations.

Additional insights came from the Webinar #14 of the Zero-Emission Buildings Academy which took place on 9 December 2024. This webinar provided insight into the EPBD.wise, project and into the challenges, policy needs, and strategies for implementing NBRPs and ZEBs in Bulgaria, Greece, Hungary, Poland, Romania, and Ukraine. The good practice examples were based on LTRS experiences. At internal IWG5 meetings in November 2024 and February 2025 renovation examples of IWG5 members and the impact of the new Construction Products Regulation (CPR)[5] were discussed. The CPR is linked to a set of European regulations and directives, one of them the EBPD.

Finally, a survey was developed and circulated among members of IWG5, with a focus on Long-term Renovation Strategies (LTRS), National Building Renovation Plans (NBRPs), Nearly-zero-Energy Buildings (NZEB), and Zero-Emission Buildings (ZEB). Based on the results of the survey and findings from the desk research, a set of recommendations was developed.

2. National Building Renovation Plans and Zero-emission Buildings in the (EBPD)

a) National Building Renovation Plans (EBPD)

As part of the 2024 recast of the Energy Performance of Buildings Directive (EPBD), Article 3 introduces National Building Renovation Plans (NBRPs). These plans require each Member State to develop a national strategy for renovating its stock of residential and non-residential buildings—both public and private—into a highly energy-efficient and decarbonised building stock by 2050. These updated plans are intended to serve as more robust and actionable planning tools, aligned with the "energy efficiency first" principle. It is recommended that these reports should place greater emphasis on financing mechanisms to support renovation efforts. The ultimate goal is to achieve a highly energy-efficient and decarbonised building stock and the transformation of existing buildings into zero-emission buildings by 2050.

Key components of the National Building and Renovation Plans include an overview of the national building stock covering building types, climate zones, barriers, construction sector capacities and vulnerable households. The renovation roadmap must address targets and indicators for 2030, 2040, and 2050 including renovation rates, energy consumption, greenhouse gas emission and reduction of energy poverty. Minimum energy performance standards for non-residential buildings and national trajectories for residential buildings should be addressed. Further elements foresee policies & measures, investment strategies, performance standards, renovation milestones which foresee trajectories for residential buildings and energy use by 2030/2035. An important element is the public consultation involving local and regional authorities, civil society, and stakeholders working with vulnerable households. This must be done prior to submitting the respective NBRP to the EC.

In contrast to the LTRS which used indicative milestones, NBRPs requests specific data related to Member States' national building stock, including also quantifiable indicators and national targets. They will be drafted following a common template (Annex II) making the data more comparable between the member states. The template in Annex II of the EPBD is split up in 7 areas (a-f) describing the following mandatory elements addressing also *life-cycle and circularity issues* of buildings see table 1 below:

Article 3, Annex II	Mandatory elements
a) Overview of the national building stock	• Number of buildings and total floor area, number of energy performance certificates • Annual renovation rates • Primary and final annual energy consumption • Annual operational greenhouse gas emissions • Market barriers and failures (description) • Energy poverty (definition), primary energy factors • Definition of nearly-zero energy building for new and existing buildings • Cost-optimal minimum energy performance requirements for new and existing buildings

Article 3, Annex II	Mandatory elements

b) Roadmap for 2030, 2040, 2050

- Targets for annual renovation rates
- Targets for expected primary and final annual energy consumption
- Targets for expected operational greenhouse gas emissions
- Expected wider benefits
- The Member State's contribution to the Union's energy and renewable energy efficiency targets attributable to its building stock's renovation

c) Overview of implemented and planned policies and measures

- Identification of cost-effective approaches to renovation for different building types and climatic zones,
- National minimum energy performance standards (Article 9)
- Promotion of deep renovation
- Empowering and protecting vulnerable customers and the alleviation of energy poverty
- Creation of one-stop shops and similar mechanisms
- Decarbonisation of heating and cooling,
- *Prevention and high-quality treatment of construction and demolition waste*
- Promotion of renewable energy sources in buildings
- Deployment of solar energy installations in buildings
- *Reduction of whole-life-cycle greenhouse gas emissions for the construction, renovation, operation and end of life of buildings, and the uptake of carbon removals*
- Promotion of district and neighborhood approaches and integrated renovation programmes at district level
- Improvement of buildings owned by public bodies
- Promotion of smart technologies and infrastructure for sustainable mobility in buildings
- Addressing market barriers and market failures;
- Addressing skills gaps and promoting education, targeted training, upskilling and reskilling in the construction sector and energy efficiency and renewable energy sectors
- Awareness-raising campaigns and other advisory tools
- Promotion of modular and industrialised solutions for construction and building renovation.

(d) Outline of the investment needs, the budgetary sources and the administrative resource:

- total investment needs for 2030, 2040, 2050 (million EUR)

e) Thresholds of new and renovated zero-emission buildings, referred to in Article 11

- operational greenhouse gas emissions thresholds of new zero-emission buildings;
- operational greenhouse gas emissions thresholds of renovated zero-emission buildings;
- annual primary energy use thresholds of new zero-emission buildings;
- annual primary energy use thresholds of renovated zero-emission buildings

f) Minimum energy performance standards for non-residential buildings:

- maximum energy performance thresholds, pursuant to Article 9(1)

Article 3, Annex II	Mandatory elements
g) National trajectory for the progressive renovation of the residential building stock: • the national trajectory for the progressive renovation of the residential building stock, including the 2030 and 2035 milestones for average primary energy use in kWh/(m2.y), pursuant to Article 9(2)	

Table 1: Relevant mandatory elements of NBRPs. Source Directive 2024/12 Planning

Process and Timeline: Member States must report progress in their National Energy and Climate Progress Reports (NECPs). Therefore, the next plans shall be synchronised with the cycles of the NECPs. The EU Commission will issue biannual progress reports and annually monitor building stock performance via the EU Building Stock Observatory. Member states have to provide their draft plans by 31 December 2025 and the final plans by 31 December 2026. Updates are foreseen every 5 years.

b) Zero-emission Buildings (EBPD)

An integral component of the National Building Renovation Plan (NBRP) is the introduction of Zero-emission Buildings (ZEBs), which represent a progression beyond the concept of Nearly Zero-Energy Buildings (NZEBs).

- Nearly-Zero Energy Buildings (NZEBs)

The requirement for NZEBs was first was initially established by the Energy Performance of Buildings Directive (Directive 2010/31/EU), which was subsequently revised in 2018. Since 2020, all newly constructed buildings within the European Union have been mandated to achieve high energy performance with minimal energy demand, primarily supplied by renewable energy sources produced either on-site or in close proximity. To facilitate this transition, each Member State was required to formulate and implement a national plan aimed at promoting and achieving NZEB standards. In October 2023, the European Commission published a Report on renovation of the national stock of residential and non-residential buildings and on nearly zero-energy buildings [6] The report highlights that all Member States have established specific definitions for NZEBs in new buildings, and most have also defined criteria for NZEB renovations. In most cases, the NZEB requirements for new buildings were stricter than those for NZEB renovation. A number of Member States had the same requirements for new and renovated NZEBs. Although there has been a progress towards NZEBs in sixteen countries, only a limited number of countries were able to provide comprehensive datasets across all relevant time periods and building categories, thereby hindering cross-country comparability. Moreover, the current NZEB framework does not include aspects such as life-cycle global warming potential of buildings, circularity and resource efficiency; In response, the revised Energy Performance of Buildings Directive (EPBD) introduces Zero-emission Buildings (ZEBs) as the new regulatory standard.

- Zero-emission Buildings (ZEBs)

The revised EPBD describes **Zero-emission Buildings (ZEBs)** in Article 2 as follows:

" (2)'zero-emission building' means a building with a very high energy performance, as determined in accordance with Annex I, requiring zero or a very low amount of energy, producing zero on-site carbon emissions from fossil fuels and producing zero or a very low amount of operational greenhouse gas emissions, in accordance with Article 11".

For covering the energy needs of a zero-emission building different options are mentioned in the EBPD introduction (22), for example generated on site or nearby from renewable sources such as solar thermal, geothermal, solar photovoltaics, heat pumps, hydroelectric power and biomass, renewable energy provided by renewable energy communities, efficient district heating and cooling, and energy from other carbon-free sources. Energy derived from combustion of renewable fuels is considered to be energy from renewable sources generated on-site where the combustion of the renewable fuel takes place on-site.

Article 11 of the EPBD delineates the technical requirements for ZEBs, stipulating that such buildings must not emit any on-site CO_2 from fossil fuel use. Additionally, ZEBs should be equipped to respond to external signals and be capable of adapting their energy consumption, generation, or storage based on economic and technical feasibility.

Member States are **tasked with defining the maximum allowable energy demand for ZEBs**, ensuring that it aligns with, or is more stringent than, the cost-optimal levels established in their most recent national reports. Specifically:

- The energy demand thresholds for ZEBs must be reviewed in accordance with any updates to cost-optimal levels. As of 28 May 2024, these thresholds must be at least 10% lower than those currently set for NZEBs.
- For building renovations, Member States may adjust the thresholds as long as they continue to meet cost-optimality and existing regulatory requirements. Furthermore, they are required to establish maximum permissible levels of operational GHG emissions, which may differ for new versus renovated buildings. These thresholds must be incorporated into national building renovation plans.
- Annex II, section e) of the directive outlines the different groups for ZEBs:
    - Operational GHG emissions for new ZEBs;
    - Operational GHG emissions for renovated ZEBs;
    - Annual primary energy use for new ZEBs;
    - Annual primary energy use for renovated ZEBs.

Implementation Timeline: From January 2028 all new buildings owned by public bodies shall be ZEB. By 2030, all newly constructed building - within the EU – with the possibility for specific exemptions- are expected to meet ZEB standards. Existing buildings must undergo transformation to achieve ZEB compliance by 2050.

3. Survey

a) Overview

As part of this deliverable, a short survey was sent out to IWG5 members focusing on the knowledge and involvement of IWG5 members on national renovation plans as well as Nearly-zero energy and zero-emission buildings. IWG5 members were also asked about the challenges in their respective countries. The survey included 8 topic related questions, 4 of them covering renovation and 4 of them ZEB topics as well as 2 additional questions, see table 2 below:

Nr.	Question
1	Which entity are you representing?
2	Do you know the national Long-Term Renovation Strategy of your country?
3	Have you been involved in the drafting of the Long-Term Renovation Strategy of your country?
4	Are you involved in the drafting of National Building Renovation Plans (NBRP) in your country?
5	In your opinion, what are the main challenges in your country in setting up the National Building Renovation Plan?
6	Are you aware of the Nearly-zero Energy Buildings Plan (NZEB) in your country?
7	Have you been involved in the drafting of the NZEB (Nearly-zero Energy buildings plans) in your country?
8	In your opinion, what is needed going from Nearly-zero energy buildings (NZEB) to Zero-emission buildings (ZEB)?
9	What are the main challenges for ZEB in your country?
10	Do you have further remarks on NBRP and/or ZEB?

Table 2: Survey questions

The survey was sent out to IWG5 members on 17 February with a deadline on 10 March 2025. Overall, 18 member organisations (37,5%) of IWG5 responded to the survey. IWG5 has currently 48 member organisations, including 24 countries and 24 stakeholder organisations which include European industrial associations and research organisations. The members come from ministries and related entities such as project management agencies, European industrial associations and research organisations. Research organisations gave the most responses (9), followed by ministries and national agencies (5), industry stakeholders (2) and other organisations (2), see Figure 1 below:

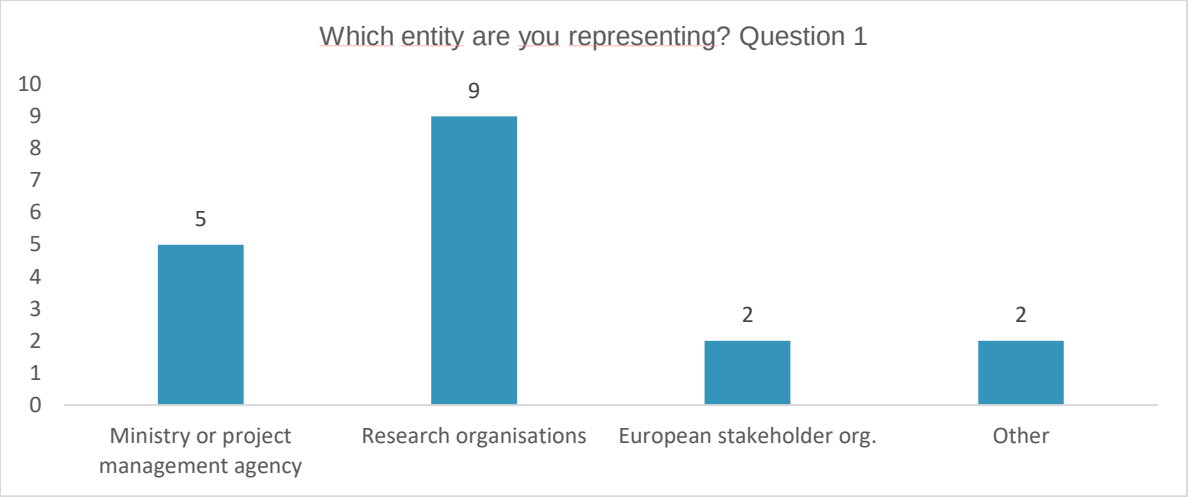

Figure 1: Survey responses split up in entities

b) Results

- Knowledge on Renovation Plans and Strategy

The majority of IWG5 members have some knowledge of the long-term renovation strategy of their country, some have even been involved in the drafting of these strategies. Several members are also involved in the drafting of the National Building Renovation Plans, see Figure 2 below:

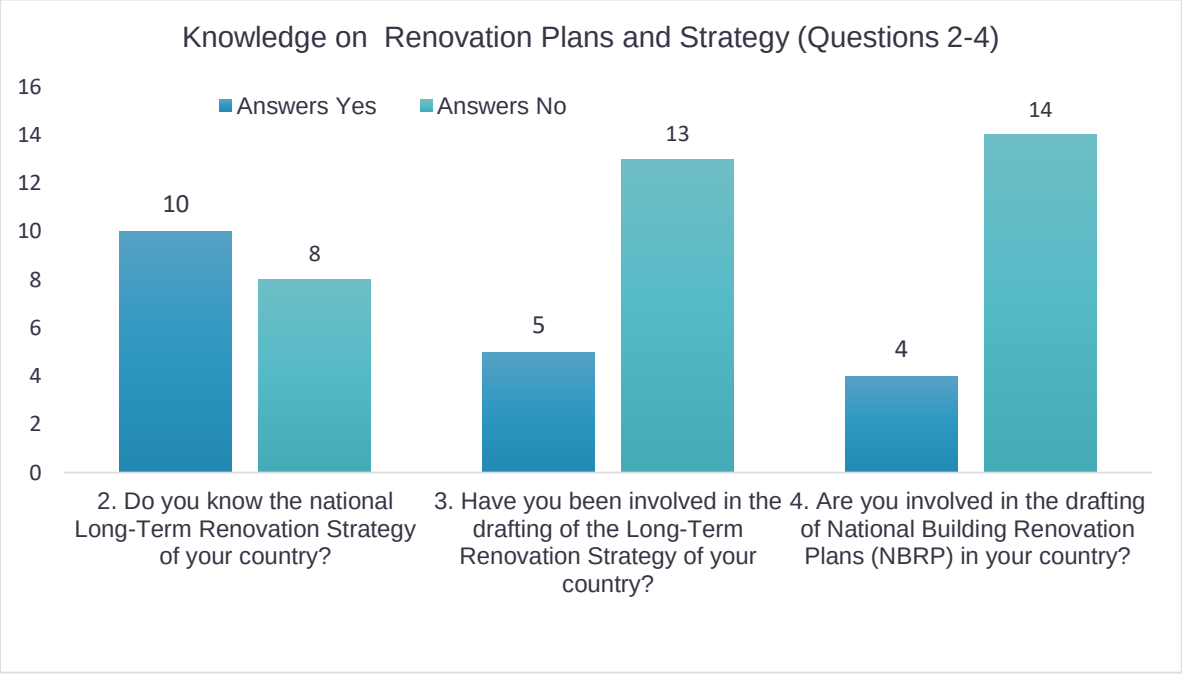

Figure 2: Knowledge on Renovation Plans and Strategy

However, the engagement differs between the IWG5 entities. Whereas there is a great knowledge and engagement of the research organisations of IWG5, there is less involvement and knowledge of the members coming from ministries and project management agencies and even less of European stakeholder organisations. As IWG5 covers a broad topic portfolio, this is not a surprise. Renovation is also spread between different national ministries and entities.

As the National Building Renovation Plans (NBRP) are only due by the end of the year, the knowledge and involvement gap widens for all IWG5 entities, see table 3 below:

Questions	Yes	No
1. Do you know the national Long-Term Renovation Strategy of your country?	10	8
Ministries, project management agencies	1	4
Research organisations	7	2
European stakeholders (industry associations)	1	1
Other	1	1
2. Have you been involved in the drafting of the Long-Term Renovation Strategy of your country?	5	13
Ministries, project management agencies		5
Research organisations	4	5
European stakeholders (industry associations)		2
Other	1	1
3. Are you involved in the drafting of National Building Renovation Plans (NBRP) in your country?	4	14
Ministries, project management agencies	1	4
Research organisations	2	7
European stakeholders (industry associations)		2
Other	1	1

Table 3: Knowledge and involvement on renovation plans and strategies (IWG5 entities)

As a last question (question 5) in this section, IWG5 members were asked about the main challenges for setting up the National Building and Renovation Plans.

For the IWG5 members, some of the more difficult burdens to overcome included the following key areas (see also figure 3):

Organisational and administrative burdens emerged as a major challenge (28%). In several member states, responsibilities for building renovation are distributed across different ministries and institutions. As a result, aligning various national strategies and ensuring effective coordination among the involved ministries becomes a major challenge. Moreover, the administrative complexity of deep renovation projects—often requiring the involvement of multiple stakeholders at both national and regional levels—was seen as a significant barrier.

Financing (22%) was also seen as major challenge. There is a need for financial support across all building types and for securing the necessary funding to implement the National Building Renovation Plan Policy as a whole. Stakeholders also raised concerns about the high

costs of construction and renovation, particularly noting the need for more cost-efficient approaches in regions with warmer and milder climates.

Engaging building owners (17%) was identified as another significant obstacle. This difficulty stemmed not only from insufficient outreach efforts but also from a lack of willingness among some building owners to undertake renovation projects. Encouraging building owners to see themselves as active participants in reducing CO_2 emissions through renovation was considered crucial. Additionally, tensions sometimes arise between building owners and tenants, further complicating this engagement.

Data gaps (11%) presented another obstacle, particularly in relation to the availability of relevant data on the building stock. There is also a lack of structured processes for collecting and reporting detailed primary data on renovation activities, which hampers planning and monitoring efforts.

Finally, a number of additional challenges (22%) were noted. These included a shortage of skilled labour, low levels of public awareness, difficulties related to addressing the diversity of climate zones and technical barriers.

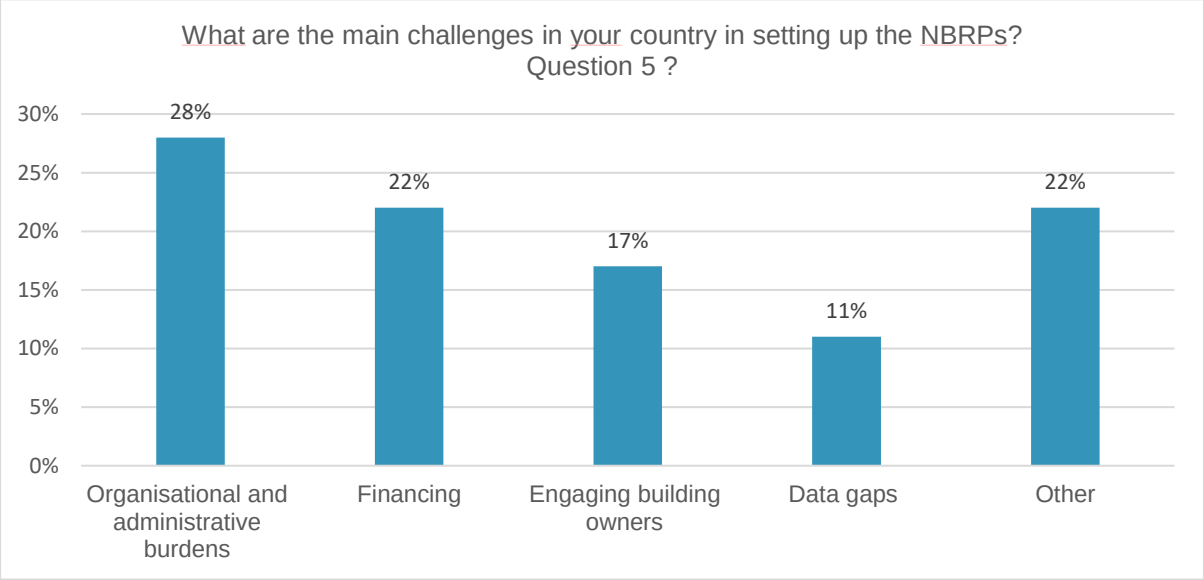

Figure 3: Main challenges for NBRPs

- Knowledge on NZEBs and ZEBs

In the **second part of the survey** (questions 6-9), IWG5 members were asked about their knowledge, their involvement and their feedback concerning NZEBs and ZEBS.

The majority of IWG5 members who responded to the survey are aware of the Nearly-zero Energy Buildings Plan (NZEBs) of their country, however, most of them were not involved in the drafting phase the NZEBs, see Figure 4 below.

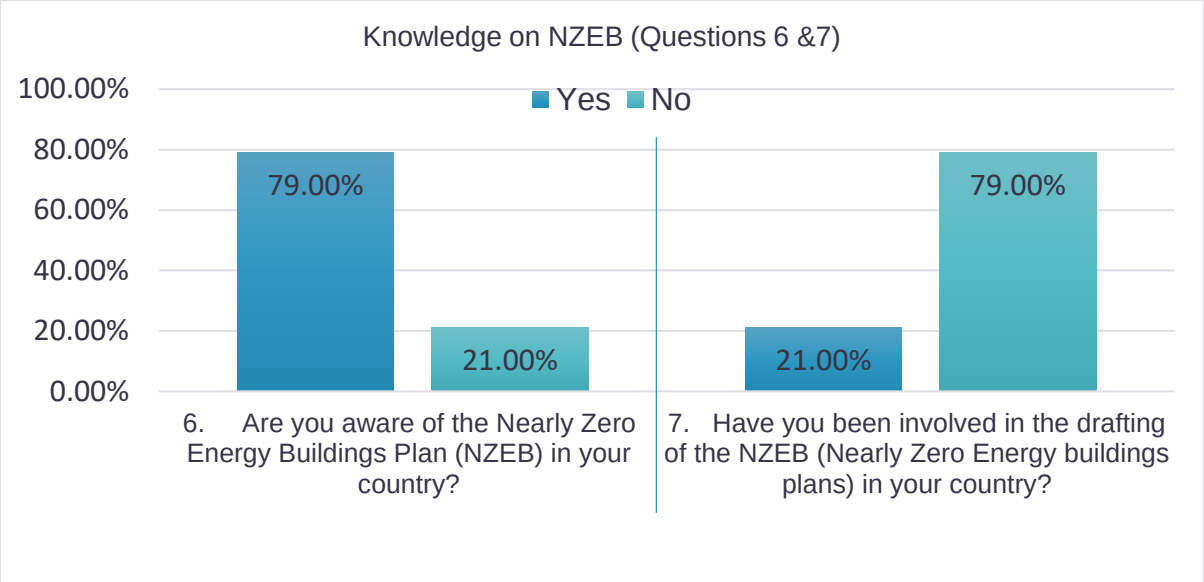

Figure 4: Knowledge on NZEB

There was more awareness concerning the NZEBs among the members coming from research organisations (50%), compared to members coming from ministries (21%). The European stakeholders who participated in the survey were not aware of the national NZEB plans. Only some IWG5 respondents, mainly coming from research organisations (14%) and other entities (7%) have been involved in setting up the NZEB plans.

Following this question, the survey responders provided their feedback on the needs going from NZEB to ZEB.

The following main needs (see also Figure 5) were mentioned:

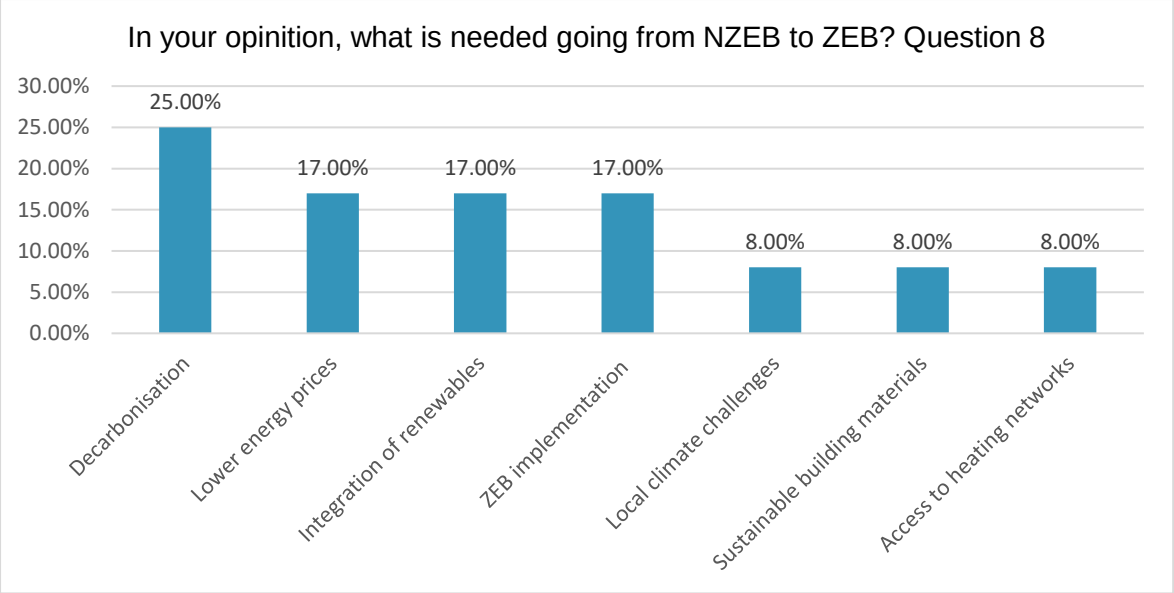

Figure 5: Needs for ZEB

Full Decarbonisation (25%): The complete elimination of fossil fuels is essential, as current demands for consumption limitations are already high and must be further intensified. The decarbonization of electricity production is crucial. In Czechia, for example, brown coal power plants are still operational, and the realization of new nuclear plants intended to replace them has been delayed. Additionally, the decarbonization of local heat distribution networks is necessary. Enhanced energy efficiency is imperative.

Lower energy prices/ Addressing high energy prices (17%): There has been an increase in energy prices which has to be addressed. However, affordable energy for the consumers does not only mean lower costs but also stable prices for a long-term period, and security of supply. It was recommended, that Member States should push geothermal energy as it has one of the highest load factors (over 80%) of all energy technologies.

Integration of Renewables (17%): To advance on-site renewable energy systems, improvements are necessary in several areas, including energy generation, storage, demand reduction, efficiency, grid interaction, and smart energy management. Additionally, supportive policy and financial frameworks are essential. While enhancing energy efficiency is critical, on-site renewable energy alone may not always meet demand. Therefore, it may be necessary to supplement it with renewable energy sourced from nearby areas, creating a localized solution that operates independently of the central grid.

Successful ZEB Implementation (17%): A thorough understanding of the Nearly-zero-Energy Building (NZEB) concept and its practical application is essential, particularly in ensuring compliance and accurately defining the ZEB standard within the regulatory framework. The revised Energy Performance of Buildings Directive (EPBD) introduces the Zero-Energy Building (ZEB) concept in a way that necessitates a significant methodological shift in setting performance requirements, while also aligning with the current NZEB definition. Establishing a clear method for defining ZEBs is therefore a critical first step. Within this context, two key issues require consensus: first, a revision of the primary energy conversion factors for various energy sources—especially electricity- and second, a clear approach to accounting for renewable energy based on its source location (e.g., on-site, nearby, or from the grid). These considerations are not purely technical; due to their potential for varied interpretation, they may also require decisions at the policy level. Addressing these issues—along with other, less prominent but still important factors—will be crucial.

Solutions for local climate challenges: Policies transitioning from NZEB to ZEB should be adjusted according to the local climate.

Sustainable Building Materials (8%): The use of sustainable building materials is essential.

Access to heating networks (8%): A significant problem is buildings that lack access to the heating network, where meeting energy efficiency standards poses a challenge.

As a final question in this section, survey responders mentioned the challenges for a successful ZEB implementation in their country (see figure 6 below):

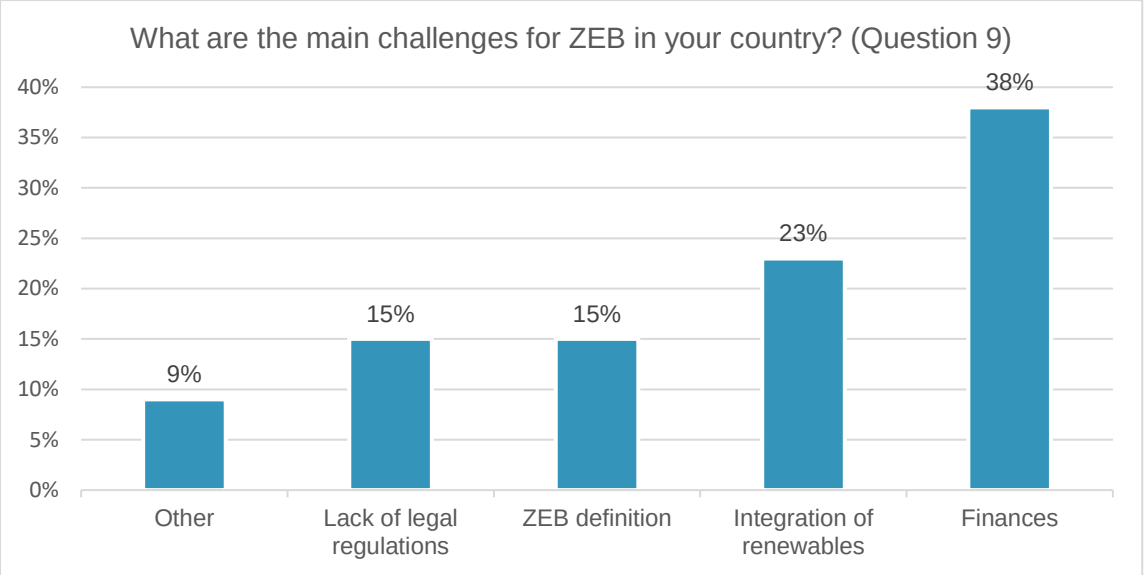

Figure 6: ZEB Challenges

The majority of the survey responders (38%) mentioned finances as one of the biggest gaps for Zero-emission Buildings in their country. This is because the initial costs are higher and investment in ZEB buildings has to be attracted. In addition, to develop cost-efficient approaches for warmer and milder climate zones was seen as a challenge. There were also some remarks (23%) linked to problems with the integration of renewables, mainly due to a lower potential of renewables in some regions and the need for more efficient solutions (especially PV) and for policy requirements. For some survey responders, the ZEB definition itself is seen as hurdle (15%°). There is also still a lack of building regulations (15%). Other challenges mentioned were: availability and certification of sustainable building materials, lack of skilled workers and the full elimination of fossil fuels. For some countries, like Iceland, ZEB is not really an issue.

There were some additional comments on the need of the phasing out of fossil fuels. Furthermore, for many survey participants it is still too early to say which effects the National Building Renovation Plans will have in the long-term.

c) Summary

The survey highlights uneven awareness and engagement among IWG5 entities, with research organizations being significantly involved compared to other stakeholders. Key challenges in implementing building renovation and Zero/Nearly-Zero Energy Buildings (ZEB/NZEB) include financing, regulatory complexity, renewable integration, administrative hurdles and a lack of knowledge between relevant ministries and institutions. Data gaps, limited involvement of building owners, and the need to address diverse climate scenarios on the national level persist as major obstacles. Additionally, aligning ZEB definitions and practices with national regulations remains a significant challenge.

To ensure the effective implementation of National Building Renovation Plans (NBRPs) and ZEBs, a nuanced, multifaceted strategy is essential, one that acknowledges and addresses both regional and national barriers. Bridging knowledge gaps between ministries and responsible entities regarding renovation policies is particularly critical. This need is underscored by the inclusion of new elements in Annex II, which address circularity and life-cycle Global Warming Potential (GWP) in buildings, necessitating the involvement of additional actors in interministerial dialogues.

4. Recommendations

The National Building Renovation Plans (NBRPs) and Zero-emission Buildings (ZEBs) are important elements of the EPBD, helping to transform existing buildings into Zero-emission buildings by 2050. Nevertheless, the update from LTRS to NBRPs and from NBEZ to ZEB will only be successful if the approach is taking into account **some of the previous challenges as well as good examples of the LTRS and NEZBs**. So, the national planning process should consider good practices from members states, as for example displayed in the EC report from 2023[7] or of the EPBD.wise project on National Building Renovation Plans and Zero-Emission Buildings. Policy needs and best practices (D2.1).[8] Efficient Buildings Europe (EEB) has published an EPBD guideline in November 2024. [9]A European Commission guideline on the EBPD is expected by summer 2025.

Furthermore, Member states are encouraged to adopt a **more holistic approach** and c**onsider the timing of linked initiatives** while drafting their National Building Renovation Plans. The optional indicators listed in the template of the NBRP (Annex II) cover a broad spectrum of areas, including energy cost reductions, life-cycle global warming potential, circular economy and waste management, job creation, and an overview of the legal and administrative framework. Other important elements- such as energy poverty and skills- are mentioned in the mandatory requirements.

The EPBD is also closely tied to other EU climate policy instruments, such as the Construction Products Regulation and the new Emission Trading System, called (ETS2). Starting in 2027, the EU will apply a price on the carbon emissions associated with buildings and road transport. In parallel, the Social Climate Fund will provide financial support to ensure a just transition, mitigating the social and economic impacts on the transport and heating/cooling sectors. As part of this initiative, each Member State must submit a draft Social Climate Plan by the end of June 2025. Considering this timeline member states should try to use synergies of the Social Climate and National Building Renovation Plans. [10]This could also help to make the bridge to other, highly relevant initiatives, as for example the European Affordable Housing Plan where additional means for vulnerable groups are foreseen, as for example the planned action plan of the European Investment Bank (EIB).

The timing is also important for all the measures and policies related to the whole life-cycle policies, as for example the planned delegated act for the Whole Life-Cycle Global Warming Potential (GWP) reporting for buildings which is mentioned in Article 7 of the EBPD. The delegated act is foreseen by the end of 2025. By 27 January 2027, Member States have to publish national roadmaps introducing life-cycle GWP targets and limit values for all new buildings in the EU.

Furthermore, the European Commission is planning to revise its Circular Economy Act in 2026 accelerating the transition to a circular economy as announced in the communication on the Clean Industrial Deal (CDI) published at the end of February, 2025. The goal is to achieve 24% circular use of materials by 2030.

The Implementation Working Group on (Resource) and Energy Efficiency in Buildings (IWG5) is also addressing circular and resource efficiency needs in their last update of the implementation plan and it also highlighted in the white paper on Sustainable Material-based Solutions For Energy Efficient Buildings of IWG5-CSA. [11]Given Europe's limited availability of critical raw materials, the IWG5 stresses the need that research efforts should prioritize the development of sustainable, durable materials with long service lives. In the context of energy efficiency for buildings, materials must be both environmentally sustainable and designed to minimize waste. Overall, renovation approaches in the building sector should align with circular approaches.

In addition, member states and all entities working on the NBRPs and its policies should try to **close the information gap on the NBRP**. The EPBD and the NBRPs introduce new elements- such as the GWP- which might be covered by a range of national ministries and organisations. Therefore, an internal information exchange about ongoing linked policies is essential. A lack of awareness and understanding—both among policymakers and the general public—could undermine the success of renovation strategies and their alignment with broader EU climate goals.

Lastly, implementing the ZEB definition at the Member State level remains a significant challenge, necessitating further support in both regulatory development and financing. It is thus vital that adequate funding is made available at both European and national levels. Research institutions and organizations specializing in energy-efficient buildings can play a key role in supporting national and regional bodies by sharing expertise and promoting best practices across Europe.

Conclusion

The 2024 revision of the Energy Performance of Buildings Directive marks a significant step toward achieving a fully decarbonised European building stock by 2050. The introduction of National Building Renovation Plans (NBRPs) and the strengthened focus on Zero-Emission Buildings (ZEBs) represent a strategic shift from previous frameworks like the LTRS and NZEBs. However, successful implementation hinges on overcoming persistent challenges, including administrative complexity, regulatory burdens, financing gaps, data limitations, lack of awareness, and stakeholder involvement.

To meet the ambitious goals set out in the EPBD and in the renovation wave, Member States and all involved entities must ensure better coordination across ministries and involved entities, engage stakeholders at all levels, and adopt integrated policy approaches that align with related EU initiatives. Bridging knowledge and information gaps, promoting innovation, and securing adequate financial and technical resources will be crucial. Ultimately, a collaborative, well-informed, and flexible approach—tailored to national and regional contexts—will be key to transforming Europe's building sector into one that is energy-efficient, climate-resilient, and socially inclusive.

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