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DELIVERING THE EPBD

A GUIDE TOWARDS BETTER, AFFORDABLE AND MORE RESILIENT BUILDINGS FOR ALL IN EUROPE

BPIE

Lead Author
Hélène Sibileau

Main contributor
Volodymyr Vladyka

Other contributors
Antonin Chapelot and Arianna Vitali Roscini (Coalition for Energy Savings)
Carolina Koronen, Jelena Simjanovic, Zsolt Toth

Reviewers and Editors
Emily Bankert
Denisa Diaconu
Essam Elnagar
Mariangiola Fabbri
Ivan Jankovic
Barney Jeffries
Judit Kockat
Oliver Rapf
Victoria Taranu

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Ine Baillieul

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BPIE (Buildings Performance Institute Europe) is a leading independent think tank on climate mitigation and adaptation of buildings. Our vision is a climate-neutral built environment, aligned with the ambition of the Paris Agreement, and in support of a fair and sustainable society. We provide data-driven and actionable policy analysis, advice, and implementation support to decision-makers in Europe and globally. www.bpie.eu

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EXECUTIVE SUMMARY

There is nothing more deceiving than unfulfilled promises: in EU policy, the success and impact of legislation depends on effective transposition and implementation.

With just one year remaining before the Energy Performance of Buildings Directive (EPBD) transposition deadline (29 May 2026), Member States must now act decisively. Transposing the EPBD is not just a legal obligation – it is an opportunity to ensure that building renovation and decarbonisation policies deliver real benefits to citizens and businesses alike (lower energy bills, healthier homes, economic growth and climate resilience). In a context driven by a convergence of crises and persistent challenges (geopolitical turmoil, threats to the EU's energy security, energy and cost-of-living crisis, persistent climate change risks), moving EPBD provisions from paper to reality is more crucial than ever.

If implemented effectively – with attention to social fairness at its core – the EPBD has the potential to drive a major transformation in Europe's built environment. Drawing on 15 years of expertise and partnerships across the EU, this publication is an important part of BPIE's contribution to this process. With Member States now in the driving seat, BPIE has developed this guide primarily for policymakers tasked with EPBD transposition at national level, as well as regional and local authorities implementing building policies. Stakeholders such as industry, financial institutions and civil society actors are encouraged to make use of this resource to better understand the regulatory landscape and deliver as best as possible.

The guide intends to serve as a practical roadmap, providing clarity on legal provisions and outlining options not only in terms of policy measures but also for planning instruments, financing programmes and advisory support. It lays down actionable steps in a sequence to help Member States design and implement effective policies in a timely manner, simplifying the process to increase its speed. BPIE's guide includes 80 "recommendation" boxes and 60 good practice examples, giving national policymakers a wide array of solutions to choose from for each national context. Every section or deep dive also contains a list of additional resources to further explore the different topics and grow the reader's expertise.

THE GUIDE CONSISTS OF FOUR CHAPTERS, FOCUSING ON THE MOST IMPACTFUL PROVISIONS AS IDENTIFIED BY BPIE:

1. **Planning tools to achieve the 2050 vision for the built environment** (national building renovation plans)
2. **Policies to improve the renovation of existing buildings** (minimum energy performance standards for non-residential buildings and national trajectories for the progressive renovation of the residential stock)
3. **An updated standard for construction** (zero-emission building) and the progressive integration of life-cycle thinking
4. **A strong information, advisory and financial supportive framework** (energy performance certificates, renovation passports, one-stop shops and financial support)

As social fairness is embedded throughout the EPBD, this aspect is included in all four chapters, from the description of provisions to the recommendations. The guide also includes in-depth explorations of key topics that intersect multiple provisions or lay the ground for significant, long-term changes in building policies:

DEEP DIVE #1
The leading role of public buildings

DEEP DIVE #2
Recalibrating the cost-optimal methodology towards societal gains

DEEP DIVE #3
Empowering buildings to provide non-fossil flexibility to electricity grids

DEEP DIVE #4
Adapting buildings to climate risks, future-proofing investments towards climate resilience

DEEP DIVE #5
Indoor environmental quality and healthy buildings

Fulfilling the EPBD's promises will require sound planning and expertise, but above all, collective action. This guide is both a practical tool and a call to action – to use, share and promote its content. By working together, we can deliver decarbonised, healthy, affordable and resilient buildings across Europe. Let's turn policy into action and results!

> **"The secret of getting ahead is getting started."**
>
> Mark Twain, *The Adventures of Tom Sawyer*

ABBREVIATIONS

EED	Energy Efficiency Directive
EMD	Electricity Market Design
EPC	Energy performance certificate
EV	Electric vehicle
GHG	Greenhouse gas
GWP	Global warming potential
IEQ	Indoor environmental quality
LTRS	Long-term renovation strategy
MEPS	Minimum energy performance standards
NBRP	National building renovation plan
NECP	National energy and climate plan
NZEB	Nearly zero-energy building
RED	Renewable Energy Directive
SRI	Smart readiness indicator
WLC	Whole-life carbon
ZEB	Zero-emission building

QUICK LINKS FOR THIS CHAPTER

IMPLEMENTING THE EPBD IS NECESSARY
IMPLEMENTING THE EPBD IS DESIRABLE
IMPLEMENTING THE EPBD IS MADE SIMPLER

INTRODUCTION

IMPLEMENTING THE EPBD IS NECESSARY

A NEW PHASE: TRANSPOSING THE EPBD TO DELIVER THE RENOVATION WAVE AND THE GREEN DEAL

The Energy Performance of Buildings Directive (EPBD), officially published on 8 May 2024, is the EU's key legislative framework for buildings.[1]

Originally adopted in 2002, the latest recast of the Directive is part of the broader EU Green Deal, the European Commission's flagship initiative for the 2019-2024 mandate, aimed at *"transforming the EU's economy for a sustainable future"*.[2] More specifically for the EU's built environment, the Commission outlined its vision in the Renovation Wave strategy (October 2020),[3] which sets ambitious goals for 2030, based on a 2015 baseline:

-60%
GREENHOUSE GAS EMISSIONS

-14%
FINAL ENERGY CONSUMPTION

-18%
HEATING AND COOLING CONSUMPTION

x2
DOUBLING THE AVERAGE RENOVATION RATE

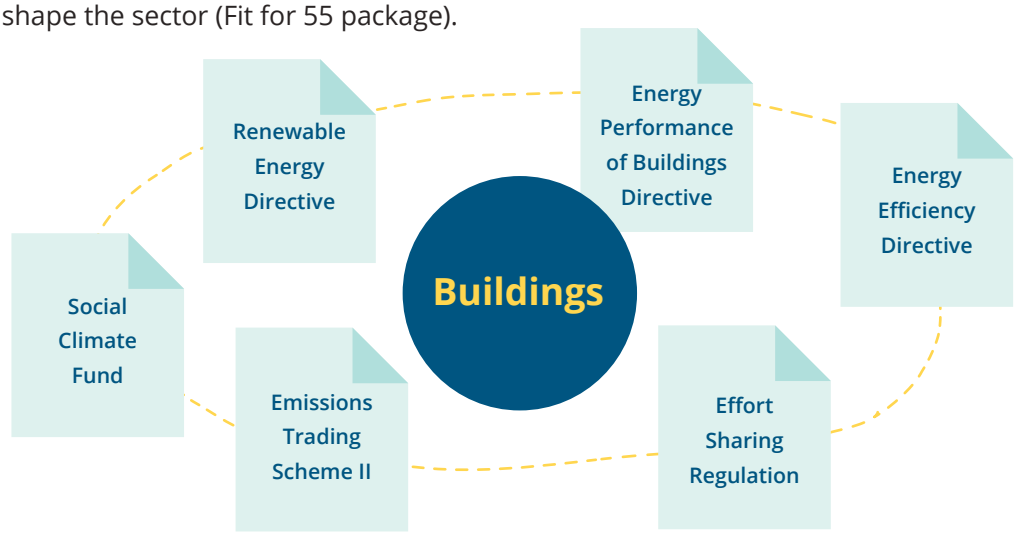
35
MILLION BUILDING UNITS RENOVATED

[1] Directive 2024/1275
[2] European Commission (2019), Communication The European Green Deal.
[3] European Commission (2020), Communication A Renovation Wave for Europe: greening our buildings, creating jobs, improving lives.

These objectives are structured around seven thematic principles, which have influenced the content of the EPBD revision: (1) energy efficiency first, (2) affordability, (3) decarbonisation and integration of renewables, (4) life-cycle thinking and circularity, (5) twin challenges of digital and green transitions, (6) respect for aesthetics and architectural quality, and (7) high health and environmental standards.

In this context, and as part of the Fit for 55 package, aimed at putting the EU Green Deal into legislation, the Commission published its proposal to revise the EPBD in December 2021.[4] Following the EU legislative procedure, the EPBD was amended by both the European Parliament, representing EU citizens, and the Council of the EU, representing Member States. The final version was adopted in April 2024 and subsequently published in the Official Journal of the EU, with a transposition deadline set for 29 May 2026. Translating the EPBD into national legislation and ensuring its effective implementation on the ground is a legal obligation, vital to achieving the objectives of the Renovation Wave and driving the transition towards a more sustainable built environment.

While the EPBD specifically targets the building sector, it does not exist in isolation; rather, it is positioned at the heart of an interconnected ecosystem of EU policies that influence and shape the sector (Fit for 55 package).



Since the publication of the EPBD proposal, the context in the EU has shifted dramatically, driven by a convergence of crises and persistent challenges:

- ***Geopolitical turmoil and threats to the EU's energy security:*** The Russian invasion of Ukraine has had far-reaching consequences for the EU and underscored the pressing need to reduce dependence on imported fossil fuels, especially for heating.
- ***Energy and cost-of-living crisis:*** The energy crisis, which started in late 2021, has evolved into a broader cost-of-living crisis, with rising energy prices directly impacting housing affordability for millions of Europeans. The economic pressure has highlighted the critical importance of resilient buildings in reducing household energy costs and protecting vulnerable populations.
- ***Climate change remains a persistent challenge:*** Despite these immediate crises, the long-term threat of climate change remains ever-present, with the EU staying committed to its climate goals, including achieving climate neutrality by 2050.

[4] European Commission (2021), Proposal for a Directive on the energy performance of buildings (recast).

Today, more than ever, it is crucial to move EPBD provisions from paper to reality.

Even if the EPBD implementation takes place in a different context, challenges are even more acute. As highlighted in BPIE's EU Buildings Climate Tracker 3rd edition, **the building sector is significantly off track its climate goals**, with key indicators – such as CO_2 emissions, energy consumption, renewable energy share and renovation investments – over 40% behind the required trajectories for 2030 and 2050. Between 2016 and 2022, the decarbonisation gap has more than doubled, underscoring the urgent need for action to realign the sector with its commitments, especially regarding final energy consumption in households and the renewable energy share in heating and cooling.[5]

	Indicator	STATUS	How much of the required progress was achieved during 2015-2022?
1	**CO_2 emissions from energy use in buildings for households and services**	OFF TRACK	
	households	FAR OFF TRACK	
	service-sector	OFF TRACK	
2	**Final energy consumption in households and services**	FAR OFF TRACK	
	households	FAR OFF TRACK	
	service-sector	ON TRACK	
3	**Renewable energy share**	FAR OFF TRACK	
	heating & cooling	FAR OFF TRACK	
	gross electricity consumption	ALMOST ON TRACK	
4	**Cumulative investment in renovation**	OFF TRACK	

[5] BPIE (2024), EU Buildings Climate Tracker 3rd edition: transforming buildings, empowering Europe: a pathway to prosperity, equity and resilience.

IMPLEMENTING THE EPBD IS DESIRABLE

A NEW OPPORTUNITY: IMPLEMENTING THE EPBD TO REAP THE BENEFITS FOR CITIZENS AND BUSINESSES

Prompt and comprehensive transposition of the EPBD into national law, along with effective implementation of its measures on the ground, will unlock numerous benefits for European citizens, businesses and governments alike. European citizens themselves are strongly in favour of this, as proved by the recommendation #11, which is to "*expand the implementation of energy efficiency in buildings*" (with a 90% approval rate) of the Citizens' Panel on Energy Efficiency.[6] While a detailed analysis of the adopted EPBD is necessary to fully assess the impact of each of its requirements, the following sections highlight the broader potential benefits of building renovation and decarbonisation. This offers a glimpse into the positive outcomes that successful EPBD implementation could deliver.

Enhancing people's well-being, ensuring social fairness and reducing energy poverty

Buildings play a crucial role in supporting both the physical and mental well-being of people. Europeans spend over 90% of their time indoors – whether at home, work, school or other buildings. However, poorly constructed, unrenovated and outdated buildings pose significant risks to health and safety. Conversely, targeted renovation actions can significantly lower energy bills for vulnerable households, who often live in the worst-performing buildings, and improve living conditions for all. By prioritising building renovations, Member States will enhance well-being, reduce healthcare costs, boost economic productivity and address energy poverty.

In dwellings, renovations can yield a 75% return on investment through health-related benefits alone.[7] In France, for example, upgrading 7.4 million energy-inefficient dwellings (classified as F and G) could save the healthcare system €758 million annually.[8] In schools, improved building design, such as increased daylight exposure and better ventilation, can boost pupil productivity by up to 18%.[9] In hospitals, improvements to the buildings can lead to shorter stays, a 19% reduction in mortality rates and medical cost reductions of up to 21%. Public healthcare expenditure could be reduced by as much as €80 billion annually through improved daylight exposure and better indoor air quality.[10]

Energy poverty remains a persistent challenge in the EU. In 2022, 9.3% of the EU population could not afford to keep their homes adequately warm. In certain Member States, such as Bulgaria, Cyprus, Greece, Lithuania, Portugal, Spain and Romania, over 15% of the population faced this issue.[11] Across the EU, in response to the energy crisis, over €540 billion in public funds has been spent on support measures to help households cope with rising energy prices – placing a significant strain on public budgets.[12] However, most of these efforts have been focused on direct income support rather than structural investments in buildings, which actually represents a far more effective and sustainable solution. Upgrading buildings would not only help reduce household energy costs but also shield families from energy price volatility in the long term, providing lasting economic and social benefits while addressing the root causes of energy inefficiency.

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[6] European Citizens' Panel on Energy Efficiency (2024), final recommendations. The panel, gathering 150 representatives, was convened in the first half of 2024 to inform the Commission of the citizens' perspective and get their recommendations.
[7] BPIE (2024), Healthy Buildings Barometer 2024: How to deliver healthy, sustainable, and resilient buildings for people.
[8] BPIE for Renovate Europe (2020), Building Renovation: A kick-starter for the EU recovery.
[9] BPIE (2018), Buildings 4 people.
[10] BPIE (2024), Healthy Buildings Barometer 2024: How to deliver healthy, sustainable, and resilient buildings for people.
[11] Eurostat, Inability to keep home adequately warm (ilc_mdes01).
[12] BPIE (2024), EU Buildings Climate Tracker 3rd edition: transforming buildings, empowering Europe: a pathway to prosperity, equity and resilience.

Achieving energy security and sovereignty

Buildings account for 43% of the EU's final energy consumption, with residential buildings making up two-thirds of this figure.[13] Within residential buildings, heating, cooling and domestic hot water represent around 80% of energy use, and two-thirds of this energy is sourced from fossil fuels.[14] Natural gas remains the dominant energy source for heating buildings.[15] The Russian invasion of Ukraine in 2022 highlighted the risks of overreliance on foreign energy sources, which can compromise the EU's sovereignty. Although significant steps have been taken to reduce imports of Russian fossil fuels, Russian gas still constitutes approximately 19% of the EU's total gas imports in 2024.[16] Simultaneously, the EU faces the risk of developing a new dependency on other countries, such as China, for renewable energy technologies and critical raw materials.

The boost in energy renovations following the implementation of the EPBD can significantly reduce the EU's overall energy demand. This will enhance the security of the EU energy system, decrease reliance on imported energy and foreign technologies, and shield citizens from price volatility while maintaining their comfort and well-being.[17] For example, insulating residential buildings to a high degree can reduce the final energy used for heating and cooling by 44% (777 TWh) at EU level. This would mean a 46% (309 TWh) reduction in natural gas consumption for heating and cooling, alongside substantial decreases in heating oil and coal use. On a national level, Italy could achieve a 49% reduction in final energy consumption for residential heating and cooling, Austria could cut its reliance on natural gas for this segment by 51%, and Poland could reduce its dependence on coal for heating and cooling by 49%.[18]

Strengthening the economy and competitiveness of the EU construction industry

The construction industry is a vital pillar of the EU economy, contributing over 10% of the EU's GDP and employing millions of workers.[19] Small and medium-sized enterprises (SMEs) dominate the sector, representing over 90% of its businesses.[20] Clear, timely and strong implementation of the EPBD will provide crucial support to the construction sector, instilling market confidence, unleashing business opportunities, creating and securing future-proof jobs, and driving national economic growth. The European Commission estimated that the Renovation Wave ambition would create around 160,000 green jobs in the EU by 2030.[21] Over the longer term, achieving the 2050 targets for buildings could generate over 280,000 new jobs in Germany alone. Indeed, energy renovation investments have proven to be job intensive. For every €1 million invested in energy renovations, an average of 18 jobs can be created across the EU. In some Member States, the potential is even greater, with 29 jobs created per €1 million in Croatia and 42 jobs in Poland.[22] More widely for the EU economy, improved building design in offices and other workplaces can boost worker productivity by up to 10%, with each 1% increase in productivity potentially contributing up to €40 billion annually to the EU economy.[23]

[13] Odyssee-Mure (2021), Energy efficiency trends in buildings in the EU.
[14] European Commission (2020), Communication A Renovation Wave for Europe.
[15] Eurostat, Final energy consumption in households by type of fuel (ten00125).
[16] European Council, 2025, Where does the EU's gas come from.
[17] BPIE (2021), Taking back control: Reducing Europe's vulnerability against energy price volatility by fast tracking deep building renovation
[18] BPIE (2023), How to stay warm and save energy: Insulation opportunities in European homes. In this study, better insulation is considered through reduced U-values of walls and roofs.
[19] European Construction Industry Federation (2024), FIEC Statistical Report.
[20] European Commission (2020), Communication A Renovation Wave for Europe.
[21] Ibid.
[22] BPIE for Renovate Europe (2020), Building Renovation: A kick-starter for the EU recovery.
[23] BPIE (2018), Buildings 4 people.

Reducing emissions from buildings and improving their climate resilience

The EU has committed to achieving climate neutrality by 2050. Buildings, which account for 36% of the EU's total greenhouse gas (GHG) emissions, represent a critical area for emission reductions within any effective climate strategy. However, progress in reducing CO_2 emissions from buildings remains significantly off track. Between 2015 and 2022, emissions from this sector decreased by only 14.7%, falling well short of the required 27.9% reduction.[24] This shortfall has resulted in an additional 367 million tonnes of CO_2 being emitted into the atmosphere since 2015 – equivalent to nearly a full year's emissions from the entire EU building stock. This alarming situation highlights the urgent need for more decisive and accelerated action, in which the EPBD has the potential to play a pivotal role in driving the necessary changes.

Finally, the effective implementation of the EPBD, especially when aligned with the Electricity Market Design reform, can enable buildings to provide critical flexibility to electricity grids. Enhanced building performance can help manage generation and demand fluctuations, optimise the use of existing grid resources, and guide strategic infrastructure upgrades. This in turn reduces the risk of brownouts and blackouts, contributing to improved energy security and greater grid resilience. For more information about these benefits, see Deep Dive #3.

IMPLEMENTING THE EPBD IS MADE SIMPLER

BPIE'S GUIDE TO EPBD IMPLEMENTATION: HOW TO READ IT

Target audiences

This guide is primarily designed to support and empower policymakers and stakeholders involved in transposing the EPBD into national legislation. Additionally, it serves as a reliable, informative and practical resource for anyone working with EPBD-related policies at the EU level.

Objectives

1. *Clarity:* The guide aims to clarify EPBD provisions, particularly those introduced or modified through the recast. By offering detailed explanations, it seeks to demystify these provisions, facilitating better understanding.
2. *Simplicity and speed:* By addressing common barriers and providing practical "how-to" guidance, including best practices and expert insights, the guide supports faster and more straightforward EPBD transposition, leading to stronger and more consistent implementation on the ground.
3. *Impact:* Streamlined information and effective knowledge-sharing about EPBD implementation will maximise its positive impact at the national level.

[24] Ibid.

Approach

- *A holistic implementation framework:* This guide emphasises the importance of addressing EPBD provisions in an integrated manner, avoiding a siloed, provision-by-provision approach focused only on obligations and forgetting or postponing work on the supportive framework. A holistic strategy leverages synergies between provisions, leading to comprehensive and mutually reinforcing solutions. National building renovation plans (NBRPs) are a key tool to achieve this integrated approach.
- *Focusing on impactful provisions and highlighting national flexibility:* While the EPBD includes numerous provisions, and a holistic approach is sought, the guide prioritises measures with the highest expected impact for society, economy and the climate. It also emphasises the significant flexibility provided by the EPBD, allowing Member States to tailor its transposition to their unique national contexts. The guide therefore highlights opportunities for customisation within a coordinated and holistic framework – showcasing different options when they are allowed, pointing towards the best ones and facilitating their implementation.

Structure

The guide consists of four sections, focusing on the most impactful provisions as identified by BPIE.

The structure aligns with a programmatic approach to the EPBD, beginning with strategic planning, and considers transposition deadlines (i.e. the first draft NBRP is due in December 2025 while other provisions have a transposition deadline in late May 2026).

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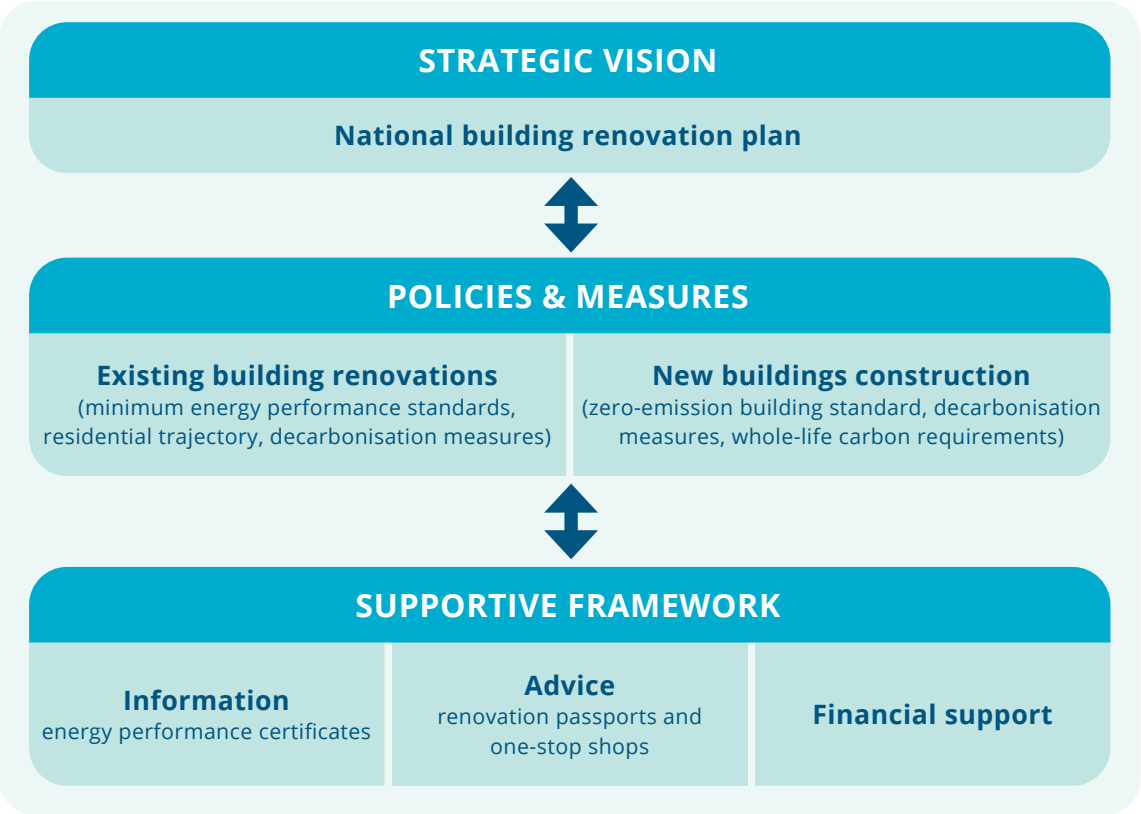
The EPBD Delivery Blueprint



Thematic deep dives

The guide also includes in-depth explorations of key topics that intersect multiple provisions or lay the groundwork for significant, long-term changes in building policies:

DEEP DIVE #1
The leading role of public buildings

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Recalibrating the cost-optimal methodology towards societal gains

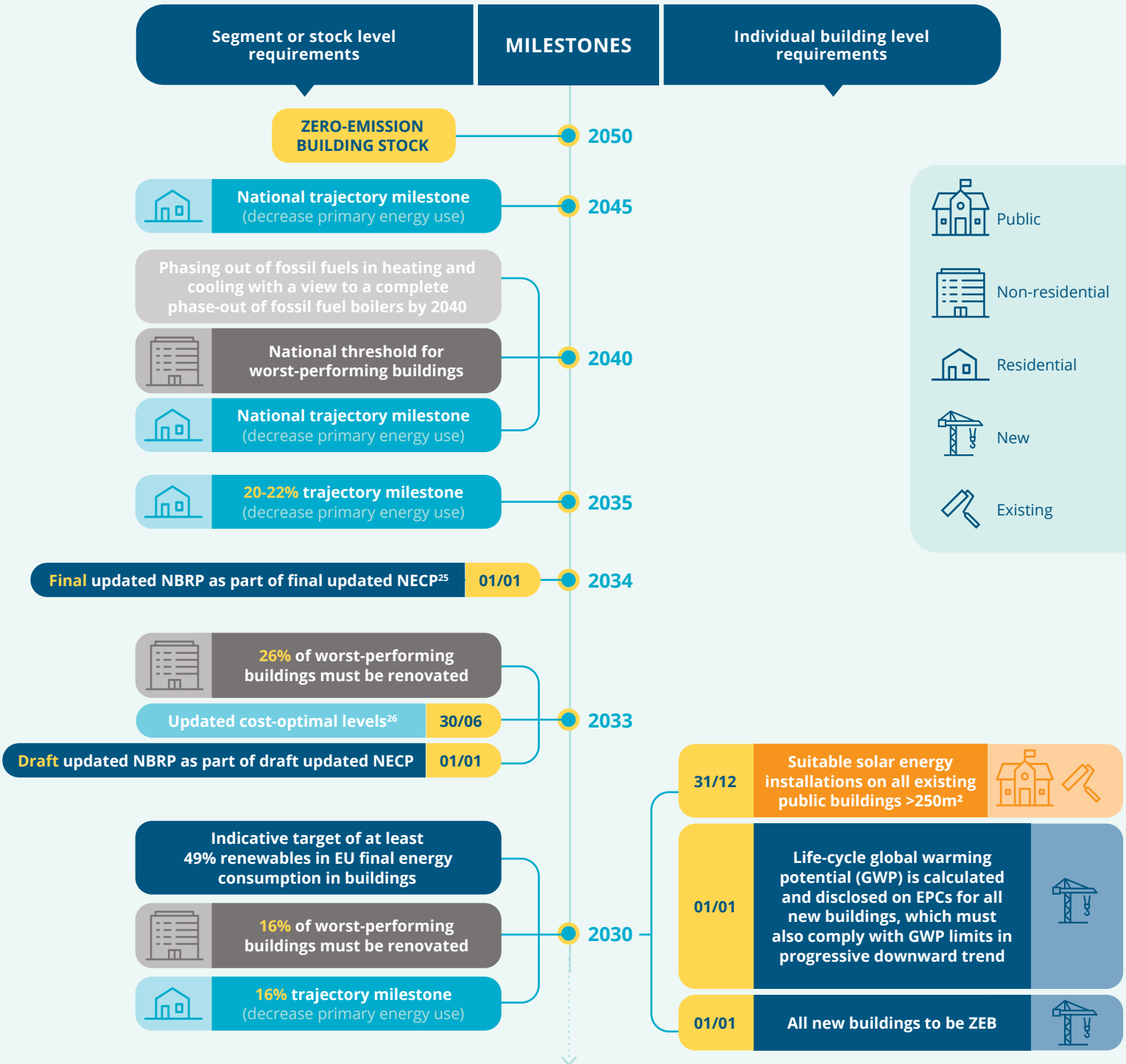
DEEP DIVE #3
Empowering buildings to provide non-fossil flexibility to electricity grids

DEEP DIVE #4
Adapting buildings to climate risks, future-proofing investments towards climate resilience

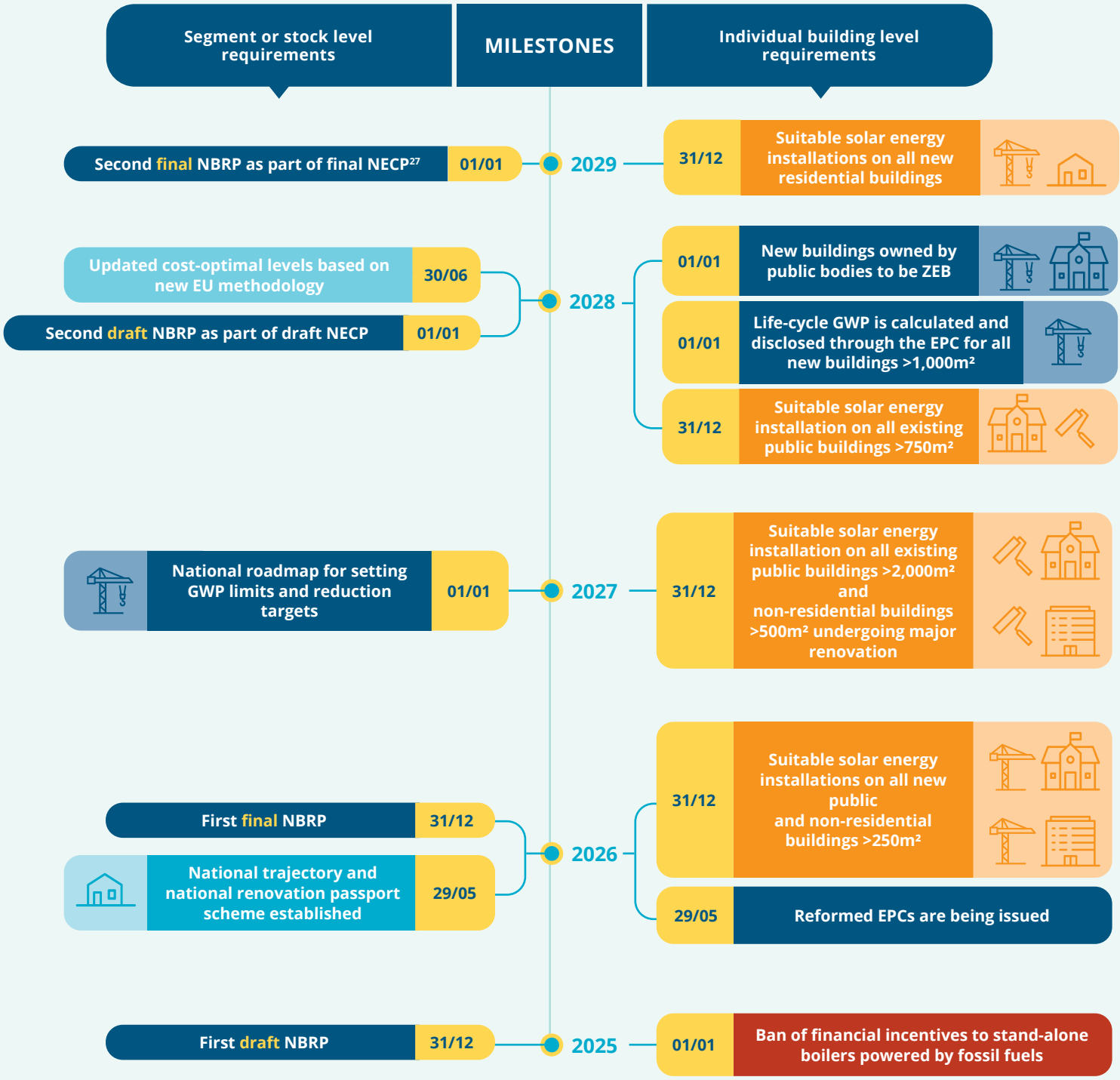
DEEP DIVE #5
Indoor environmental quality and healthy buildings

A ROADMAP FOR IMPLEMENTING THE EPBD: OVERVIEW OF DEADLINES

When planning the transposition process, Member States should not only consider the anticipated impact of the measures but also evaluate their complexity and the legal transposition deadlines. The figure thereafter provides an overview of the most important EPBD deadlines, besides the transposition deadline of 29 May 2026. The deadlines apply to Member States; the requirements applicable to the Commission are not reproduced here.



[25] The next NPRP/NECP is due in 2039 (with an update in 2044).
[26] The following updates take place every five years maximum, i.e. 2038, 2043, 2048.
[27] The next NBRP/NECP must be submitted in 2039 and 2049.


Segment or stock level requirements
MILESTONES
Individual building level requirements
Second final NBRP as part of final NECP[27]
01/01
2029
31/12
Suitable solar energy installations on all new residential buildings
Updated cost-optimal levels based on new EU methodology
30/06
Second draft NBRP as part of draft NECP
01/01
2028
01/01
New buildings owned by public bodies to be ZEB
01/01
Life-cycle GWP is calculated and disclosed through the EPC for all new buildings >1,000m²
31/12
Suitable solar energy installation on all existing public buildings >750m²
National roadmap for setting GWP limits and reduction targets
01/01
2027
31/12
Suitable solar energy installation on all existing public buildings >2,000m² and non-residential buildings >500m² undergoing major renovation
First final NBRP
31/12
National trajectory and national renovation passport scheme established
29/05
2026
31/12
Suitable solar energy installations on all new public and non-residential buildings >250m²
29/05
Reformed EPCs are being issued
First draft NBRP
31/12
2025
01/01
Ban of financial incentives to stand-alone boilers powered by fossil fuels
Public
Non-residential
Residential
New
Existing

1 PLANNING TOOLS TO ACHIEVE THE 2050 VISION FOR THE BUILT ENVIRONMENT

QUICK LINKS FOR THIS CHAPTER

BE ON THE LOOKOUT FOR:

Definitions | BPIE recommendations | Good practice examples | Focus

1.1 A LONG-TERM VISION AND ROADMAP FOR BOTH THE BUILT ENVIRONMENT AND SOCIETY

WHAT IS NEW, WHAT HAS CHANGED AND WHY IS IT IMPORTANT?

EPBD Article 1 establishes the Directive's objective: *"this Directive promotes the improvement of the energy performance of buildings and the reduction of greenhouse gas emissions from buildings within the Union, with a view to achieving a zero-emission building stock by 2050, taking into account the outdoor climatic conditions, the local conditions, the requirements for indoor environmental quality, and cost-effectiveness."* **The EPBD sets a clear vision and roadmap for Europe's built environment over the next 25 years.**

To achieve this "Destination 2050", it is essential for Member States to translate the Directive's goals and intermediate milestones framed at EU level into national building renovation plans. These plans will provide citizens, industry and investors with greater visibility, fostering certainty and predictability, trust and a shared sense of responsibility. While Article 1 does not explicitly mention **social fairness**, the EPBD integrates this principle into many of its provisions, promoting an inclusive and equitable transition toward better, more affordable and more resilient buildings.

A ZERO-EMISSION BUILDING STOCK BY 2050

The EPBD envisions a zero-emission building stock by 2050, *"taking into account the outdoor climatic conditions, the local conditions, the requirements for indoor environmental quality, and cost-effectiveness"* (Article 1§1). However, while the Directive defines the zero-emission building (ZEB) concept at the individual building level, it does not specify how this standard should apply to the entire building stock. For more details on the ZEB standard, see An updated standard for construction: zero-emission building.

Definition (Article 2§2): Zero-emission building

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.

Broadly following the ZEB definition, this vision implies that by 2050, the EU's building stock should, on average, exhibit very high energy performance, zero on-site carbon emissions from fossil fuels and minimal operational GHG emissions. Several provisions support this **average-based approach to achieving ZEB status at the stock level by 2050.**[28]

[28] Recitals 25, 27, 28, and Articles 1§1, 3§1, 3§2, 9§1, 9§2, 17§1, 17§6, 28, and Annex VII.

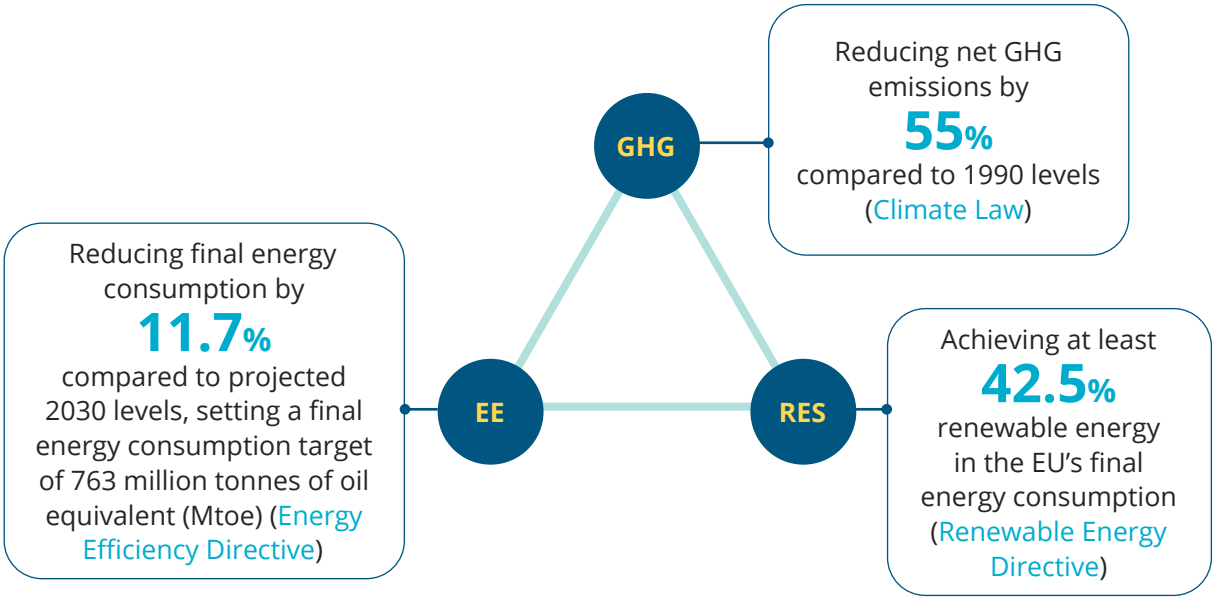
This means that not every individual building must be a ZEB, and that "energy-positive" buildings will help offset emissions from lower-performing structures. While the ZEB standard can be applied to renovated buildings, the Directive does not impose mandatory renovation requirements for existing buildings to reach ZEB levels by a specific deadline or trigger point.

BPIE RECOMMENDATIONS:

- As EPBD Article 1, which defines the overall objectives of the Directive, and most of the provisions throughout the Directive text refer to a zero-emission building stock by 2050, Member States should aim to reach that level of ambition, notably by applying the "energy efficiency first" principle.[29]
- However, adopting an average stock approach risks delivering it in an unbalanced way across different building segments, with some buildings having to compensate too much for others, and across territories. Member States should achieve a zero-emission building stock by 2050 but also aim at reaching ZEB standard within the residential and non-residential segments, and strive to renovate existing buildings to such levels. This will ensure that the benefits of building renovation and decarbonisation are delivered fairly within Member States and across Europe.
- To further future-proof their building stock, Member States should include climate resilience as an objective to be reached by 2050.

THE ROAD TO 2050 WITH INTERMEDIARY MILESTONES

The EPBD not only defines a vision for 2050 but also establishes milestones to guide progress, aligning with targets from other Fit for 55 policies. The milestones outlined thereafter mostly apply at the building stock or segment level, and should be understood in the context of the EU's 2030 energy and climate targets, which form a key stepping stone toward 2050.



[29] The principle is enshrined in the Energy Efficiency Directive Article 3 and defined in the Governance Regulation Article 2§18 as *"taking utmost account in energy planning, and in policy and investment decisions, of alternative cost-efficient energy efficiency measures to make energy demand and energy supply more efficient, in particular by means of cost-effective end-use energy savings, demand response initiatives and more efficient conversion, transmission and distribution of energy, whilst still achieving the objectives of those decisions".*

	Requirement	Scope	Provision	Recommendation
2045	National trajectory milestone (decrease primary energy use)		EPBD Article 9§2	See section 2.2
2040	Member States must describe their policies regarding the *"phasing out of fossil fuels in heating and cooling with a view to a complete phasing out of fossil fuel boilers by 2040"*		EPBD Annex II (mandatory indicator in NBRP template)	While the provision is, strictly speaking, an indicative target about the phase-out of fossil fuel *boilers*, Member States should understand it in a wider sense and plan for a complete phase-out of fossil fuel *use* in buildings as soon as possible, to enhance operational decarbonisation of their building stock.
	National threshold for worst-performing buildings		EPBD Article 9§1	See section 2.1
	National trajectory milestone (decrease primary energy use compared to 2020)		EPBD Article 9§2	See section 2.2
2035	20-22% trajectory milestone (decrease primary energy use compared to 2020)		EPBD Article 9§2	See section 2.2
2033	26% of worst-performing buildings must be renovated		EPBD Article 9§1	See section 2.1
2030	Member States must reach national GHG emissions reduction target (compared to 2005)		Effort Sharing Regulation Article 4§3 [30]	
	Member States must determine an indicative national share of renewable consistent with *"an indicative target of at least 49% [renewables in the EU] final energy consumption in buildings in 2030"*		RED Article 15a§1	This compares to a 28.9% renewable energy share in 2022.[31]
	All new buildings must adhere to ZEB standard		EPBD Article 7 and 11	See section 3
	16% of worst-performing buildings must be renovated		EPBD Article 9§1	See section 2.1
	16% trajectory milestone (decrease primary energy use compared to 2020)		EPBD Article 9§2	See section 2.2
2028	New public buildings must adhere to ZEB standard		EPBD Article 7 and 11	See section 3 and Deep Dive #1

Building stock · Public · Non-residential · Residential · New · Existing

[30] The national target applies to different sectors together (domestic transport, buildings, agriculture, small industry and waste). More information on the Effort Sharing Regulation and the levels of the national targets is available here.

[31] BPIE (2024), EU Buildings Climate Tracker 3rd edition: transforming buildings, empowering Europe: a pathway to prosperity, equity and resilience.

STRONG SOCIAL FAIRNESS CONSIDERATIONS AT THE CORE OF EU AND NATIONAL ACTION

While the EPBD sets a vision for a zero-emission building stock by 2050 and contains a roadmap to achieving it – including milestones related to GHG emission reductions, lower final energy demand and increased renewable energy share – the Directive goes beyond this and considers people living in and using buildings. **The EPBD establishes conditions to ensure a socially fair transition.**

This focus is particularly relevant given that the EPBD was proposed in December 2021, during the energy price crisis. Looking ahead, social fairness will remain a central issue, especially with major policy changes on the horizon, such as the introduction of ETS2 (emissions trading system for buildings and transport) as of 2027, which will add a carbon price to heating fuels in buildings. The European Commission has committed to keeping prices below €45 per tonne of CO_2 until 2030, but costs could rise above €200 per tonne afterward.[32] Besides, affordable housing has become a political priority for the 2024–2029 EU institutions, with the Commission announcing an EU Affordable Housing Plan for the first half of 2026.

Given these challenges, EPBD implementation is crucial – not only to reduce energy demand and decarbonise buildings but **to improve long-term living conditions for everyone**. The recast places a strong emphasis on social fairness, ensuring that **all provisions** – whether mandatory requirements, incentives or support measures – **are designed not just as protective mechanisms but as proactive solutions**. The table thereafter outlines the EPBD approach to ensure social fairness across four themes: availability, accessibility, inclusivity and affordability.[33]

[32] Prices between 2027 and 2030 will be managed through the release of additional allowances by the Commission – see here. Research shows that even with the Social Climate Fund intended to mitigate price impacts on vulnerable households, modelled ETS2 prices could be as high as €261 per tonne of CO_2 without strong and timely energy efficiency polices – see Günther et al. (2024), Carbon prices on the rise? Shedding light on the emerging EU ETS2.

[33] The table has benefited from reflections on RAP (2024), New action on energy poverty: implementing the new EU provisions.

**Looking ahead,
social fairness will remain a central issue,
especially with major policy changes on the horizon such as the introduction of ETS2, which will add a carbon price to heating fuels in buildings.**

Availability	Inclusivity
Ensuring a bigger focus on social considerations and a greater availability of measures to some parts of the population	**Planning measures and the supportive framework for and with specific parts of the population**
• Greater recognition of the social aspects of building decarbonisation policies, introducing legal definitions for specific concepts such as "energy poverty" (Article 2§27, referring to EED Article 2§52) and "vulnerable households" (Article 2§28). • Focus renovation policies on the worst-performing buildings, which are often occupied by people in energy poverty (requirement to deliver 55% of the residential trajectory by the renovation of the 43% worst-performing residential buildings - Article 9§2).	• National building renovation plans (Article 2, Annex II) must include measurement of energy poverty indicators, as well as a quantified estimation of the reduction of energy poverty as a result of measures. • National building renovation plans must be drawn in consultation with civil society bodies representing vulnerable households.
Accessibility	**Affordability**
Better targeting measures to audience needs (*exante* information and advisory support and *expost* safeguards and protections)	**Dedicate more and better designed funding to specific parts of the population**
• One-stop shop services and financial support mechanisms should prioritise people affected by energy poverty, and vulnerable and low-income households. • When defining penalties for non-compliance with renovation requirements, Member States should consider the financial situation of homeowners, particularly vulnerable households. • Member States should introduce specific safeguards to protect citizens, in particular tenants (e.g. imposing caps on disproportionate rent increases or providing rent support).	• The mandatory enabling framework (financial support and technical assistance) accompanying the introduction of minimum energy performance standards (Article 9§4) mentions specific categories of the population as priority targets (vulnerable households, people affected by energy poverty and people living in social housing). • Member States should ensure the affordability of information (energy performance certificates) and advisory services (renovation passports) and consider providing financial support to vulnerable households to enable them to acquire such tools.

A people-centred approach to EPBD implementation: This guide aims to present policy design options and a supportive framework that go beyond saving energy and decarbonising buildings, focusing on solutions that work for people.[34]

[34] An even more inclusive transition would benefit from a gender-responsive approach to policy design. Currently, gender aspects do not feature much in the EPBD, apart from some considerations regarding skills. Some insights could be drawn from early research on the topic – see Kronshage et al. (2024), Towards gender-responsive EU energy legislative acts for the buildings sector transformation by a structured Gender Impact Assessment.

1.2 NATIONAL BUILDING RENOVATION PLANS: A STRATEGIC COMPASS TO DIRECT ACTION

ARTICLE 3, ANNEX II

THE KEY PLANNING TOOL FOR BUILDING POLICIES

WHAT'S NEW, WHAT'S CHANGED?

The birth, evolution and achievements of the long-term renovation strategy

The long-term renovation strategy (LTRS) was first introduced in the 2012 Energy Efficiency Directive (EED). Member States were required to develop strategies to mobilise investment for renovating their national building stock. The strategy needed to include an overview of the building stock, cost-effective renovation approaches, policies for deep renovations, and an estimate of expected energy savings and benefits. The first version was due in 2014, and updates were required every three years (one was performed in 2017). In 2018, the LTRS was integrated into the EPBD as Article 2a and was strengthened. Member States were then required to transform their building stock into a highly energy-efficient and decarbonised stock by 2050. The strategy had to include a roadmap with measurable progress indicators for 2030, 2040 and 2050, and focus on cost-effective renovation approaches, deep renovations, addressing energy poverty and promoting smart technologies. A public consultation was required during the drafting process. The first version of the LTRS in accordance with the EPBD, which was due in 2020, showed some improvements compared to earlier versions, but the national strategies varied in their completeness and accurateness, as well as the heterogeneity of indicators and data sources chosen.[35]

[35] A review by BPIE of the 2020 LTRS showed that more than half of Member States had missed the deadline to submit their LTRS, and found that only one was deemed compliant, while the average score was 2.6 out of 5.

From long-term renovation strategy to national building renovation plan

The 2024 EPBD builds upon the strengths of the LTRS and further enhances it by renaming it as a national building renovation plan (NBRP). This change positions the NBRP as the central planning tool to guide Member States in their efforts to improve their building stock. The enhancements introduced by transitioning from LTRS to NBRP can be categorised into two main areas: improvements related to the process and those related to the content.

PROCESS CHANGE	CONTENT CHANGE
• **More inclusive input:** Public consultations that Member States organise for the purpose of drafting NBRP should gather input from different stakeholders, including subnational authorities and civil society organisations, especially those working with vulnerable households. • **Two-stage submission to improve quality:** Member States must first submit an initial draft which provides an opportunity for the Commission to undertake an assessment and provide feedback (country-specific recommendations), while the final submission ensures that the plan meets the required standards. • **Alignment with the NECP cycle:** To ensure coherence, the NBRP must be updated every five years in alignment with the national energy and climate plan (NECP) cycle. This alignment allows for consistent integration of building renovation strategies into broader climate and energy goals. • **Transparency and data sharing:** Member States are obligated to feed data on their building stock into the publicly accessible Building Stock Observatory. This transparency fosters accountability and encourages collaboration between national and EU levels.	• **Improved content:** Each NBRP must contain a certain number of points. Some were already included in the LTRS and are strengthened: an overview of the state of the building stock, a roadmap with national targets and measurable progress indicators, an overview of policies and measures to implement the roadmap, an outline of investment needs, and an estimate of expected benefits. More links to other EPBD provisions are drawn (e.g. policies to improve the renovation of existing buildings, or financial support provisions). The NBRP becomes a more holistic tool, touching upon social considerations as well, for example monitoring the state and evolution of energy poverty. • **More detailed planning and reporting based on a common template:** The EPBD introduces a common template for the NBRP, with mandatory and optional indicators (Annex II). The template is a detailed overview of parameters to be included in each section of the NBRP. Following a template should help Member States in their planning activity, as well as the Commission in its monitoring and evaluation tasks.

The NBRP is the central planning tool to guide Member States in their actions to improve their building stock.

WHY IS IT IMPORTANT?

Achieve the 2050 vision through effective policies

EPBD Article 3§1 clearly defines the objective of the NBRP: it is to provide a stable framework and strategic direction, guiding Member States in the renovation of their buildings towards achieving a zero-emission building stock by 2050. Experience has shown that while setting visions and targets is crucial, they are not sufficient to drive real change. Effective transitions require meticulous planning and forward-looking actions. In this regard, the NBRP should go beyond merely cataloguing existing measures; it must serve as a dynamic platform to enhance and adapt policies in response to evolving conditions and emerging challenges. The NBRP is ultimately about formulating effective and cost-efficient policy decisions to help achieve Member States' and the EU's overarching goals.

Provide (market) visibility to stakeholders

Developing a robust NBRP is critical to ensuring that national policies, along with the necessary supportive tools, are designed as a coherent framework, in an inclusive and comprehensive manner. A well-crafted NBRP aligns the actions of all stakeholders towards a common goal, providing clear visibility and business foresight. This enables a wide range of stakeholders – particularly building owners, investors and industry – to make informed decisions regarding either their own buildings or the entire building stock, while identifying priority segments and setting clear timelines for action.

Coordinate with other planning tools

Beyond being the central instrument in the building decarbonisation ecosystem, the NBRP interacts with other strategic planning tools, such as NECPs, social climate plans (SCPs), and local heating and cooling plans (LHCPs).[36] Through these interactions, the NBRP ensures consistency across various planning instruments and reinforces the strategic importance of reducing energy demand and decarbonising buildings within the broader energy and climate planning landscape, in accordance with the energy efficiency first principle.

Ensure stakeholder engagement and inclusion

The NBRP plays a vital role in fostering collaboration across the sector, facilitating the active involvement of public authorities, businesses and citizens alike. This inclusive approach builds broad support and sustained commitment to the transition towards a zero-emission building stock by 2050.

WHAT IS THE NBRP PROCEDURE AND TIMELINE?

The official EPBD requirements for the **NBRP process** can be broadly divided into two main parts:

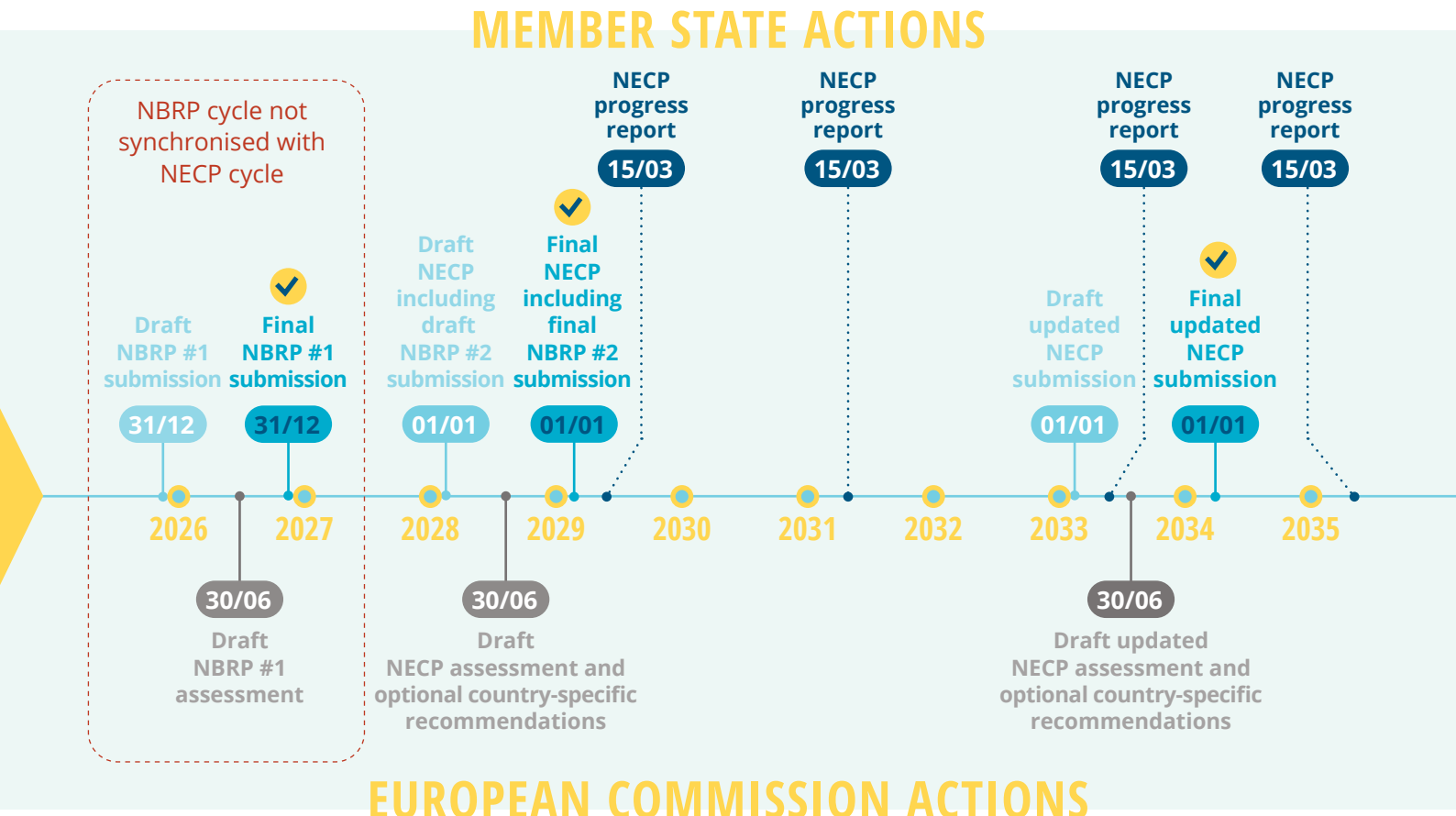
- **NBRP preparation:** Member States develop the draft plan:
  - **Gathering stakeholder input and feedback,** notably through a public consultation
  - **NBRP submission** by Member States to the Commission.
- **NBRP finalisation:** The Commission evaluates the draft plan, publishes its assessment and may provide country-specific recommendations. Member States then incorporate these suggestions (or if not, they explain why) and submit a final plan, before moving to delivery.

[36] For further details on this topic, see subsection "Step 3: Coordinate with other related planning instruments" in the next section.

Throughout this entire process, Member States should continuously implement the latest version of the plan (currently the 2020 national LTRS), and both Member States and the Commission actively monitor compliance and track progress.

This two-stage process represents an improvement compared to the LTRS process (which did not require a draft), where the Commission was neither required to provide an assessment nor to suggest country-specific recommendations.[37]

The NBRP process must follow a timeline outlined in the EPBD and coordinated with the timeline of the NECPs outlined in the Governance Regulation.



The timeline allows for only a one-year gap between the final version of the first NBRP (due 31 December 2026) and the draft second NBRP (due 1 January 2028). While this short timeframe may present administrative challenges, Member States are encouraged to use this period effectively by:

- Reflecting on the first year of NBRP implementation (2027) as a valuable opportunity to identify challenges and implement timely adjustments, enhancing the plan's overall effectiveness and responsiveness.
- Incorporating the Commission's recommendations (issued in June 2026) into their draft NBRP #2, if they were not already included in the final NBRP #1.

[37] The Commission (DG ENER and JRC) did provide non-binding assessments and highlighted good practices after reviewing the final long-term renovation strategies submitted by Member States, but there was no opportunity to integrate these suggestions quickly in an updated version of the strategy.

SET THE GROUND FOR AN EFFECTIVE NBRP THROUGH AN INCLUSIVE 360-DEGREE APPROACH

The first step to create an effective NBRP is to design and implement an inclusive 360-degree approach. There is no one-size-fits-all method for crafting the perfect plan, as each Member State has its own unique institutional structures and stakeholder engagement processes and traditions. However, valuable lessons and best practices can be drawn from previous iterations of the LTRS (2014, 2017, and 2020). Insights from other planning tools, such as the NECP, can further enhance this work. Thorough preparation and careful execution are needed at each stage of the process to lead to strong outcomes. By the time the draft NBRP is submitted, it will be well-developed and clearly defined, minimising the need for significant revisions after the Commission's assessment. More importantly, this approach will ensure the plan is actionable from the outset.

STEP 1 DECIDE ON THE ADMINISTRATIVE SET UP TO LEAD THE NBRP PROCESS

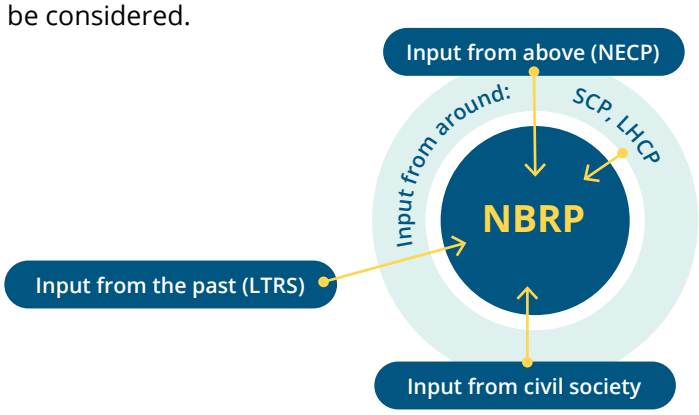
Although not required by the EPBD, Member States should carefully consider how to structure the administrative framework at the beginning of the NBRP process. More specifically, it is crucial to enhance cooperation and coordination at national level, given the broad range of topics covered within the plan. **Member States should establish a dedicated interministerial task force to lead the development of the NBRP**. This task force should adopt a whole-of-government approach and bring together representatives – from both the technical and political level – from relevant ministries (e.g. energy, climate, environment, housing and construction, industry, economy, finance, education, health, culture, and others where relevant). This will allow the decisions made under the NBRP drafting to be long-lasting even through potential future political shifts, as all parts of government at administrative level will have worked on the plan and will support its implementation.

The task force should be responsible for a range of activities related to the NBRP, from overall coordination (including with lower levels of government), consensus and political support building, continuous stakeholder consultation and communication (including to the wider public). Member States may also choose to expand the task force's responsibilities beyond planning. After the adoption of the NBRP, the task force could lead the implementation of EPBD measures that require collaboration across multiple government departments or levels (addressing market barriers – EPBD Article 17, coordinating the establishment and rollout of one-stop shops – EPBD Article 18), monitor delivery of policies, and collect, manage and report the relevant data (EPBD Article 22).

GOOD PRACTICE EXAMPLE: DENMARK

In preparing its LTRS in 2014, Denmark formed an interministerial task force to coordinate cross-cutting initiatives and work with stakeholders through six dedicated working groups. This collaborative approach was supported by an enabling framework that included strong political commitment, a clear legal basis, and well-defined responsibilities across ministries.[38]

But the NBRP is not developed in isolation; it exists within a broader landscape, which needs to be considered.



STEP 2 TAKE STOCK OF AND LEARN FROM PREVIOUS EXPERIENCES (LONG-TERM RENOVATION STRATEGIES)

Once the responsible task force is established, Member States can begin laying the foundation for the NBRP by reviewing all prior actions. This process includes **analysing past LTRS implementation**, which provides valuable data and insights into the effectiveness of policies in terms of energy savings, renovation rates and depth. It also highlights broader benefits unlocked while identifying obstacles that may have hindered the implementation of certain measures. Additionally, this review **should incorporate an analysis of how the public consultation process was undertaken** to ensure a comprehensive assessment. This retrospective analysis is **not only beneficial but also a legal requirement**. Member States must include, as an annex to their NBRP, *"the details of the implementation of its most recent LTRS or NBRP to its next NBRP, indicating whether its national targets have been achieved"* (Article 3§8). For Member States with limited experience, **best practices from other LTRSs in peer Member States can serve as valuable references**.[39]

GOOD PRACTICE EXAMPLE: SPAIN

In preparing its 2020 LTRS, Spain included an extensive and detailed point-by-point summary of progress concerning the implementation of the 2017 LTRS. This aspect received 5 points out of 5 in BPIE's assessment of the 2020 LTRS.[40]

[38] BPIE (2015), The Danish Way: How Denmark takes a leading role in Europe to renovate its building stock.
[39] Those Member States can draw upon documents or forums that share good practices, such as the EPBD Concerted Action Working Group, BPIE publications, or the Commission Staff Working Document (2022) Analysis of the national long-term renovation strategies.
[40] BPIE (2020), A review of EU Member States' 2020 long-term renovation strategies.

STEP 3 COORDINATE WITH OTHER RELATED PLANNING INSTRUMENTS

Valuable information on specific topics may also be sourced from other planning instruments that include building-related actions, such as social climate plans (stemming from the Social Climate Fund Regulation) and local heating and cooling plans (stemming from the Energy Efficiency Directive Article 25).

Social climate plans (SCPs)

SCPs are highly relevant to NBRP actions in addressing vulnerable households. SCPs are a key component of the Social Climate Fund (SCF) Regulation, designed to help Member States mitigate the social and distributional impacts of the emissions trading system extension to buildings, road transport and additional fuel sectors (ETS2). The SCP outlines how each Member State will use SCF funding (running from 2026 to 2032) to support vulnerable households, microenterprises and transport users affected by higher carbon pricing. Key elements of SCPs are the identification of vulnerable groups most affected by ETS2, the design of support measures (both temporary direct income support and structural investments to improve buildings), and indicators to track progress and effectiveness of measures.[41]

Given that **the submission deadlines for both plans are just six months apart (SCPs by June 2025 and NBRPs by December 2025)**, there is a strong case for exchanging information and promoting collaborative preparation, mostly enabling the SCP to input to the NBRP. Attention should be given to the definitions used, which overlap but are not exactly parallel, which may affect the two plans' target groups. For example, the definition of "vulnerable households" is consistent in its scope between the SCP and NBRP provisions, but while the SCP focuses on those *"significantly affected by the price impacts of the ETS2"*, the NBRP refers more broadly to those *"particularly exposed to high energy costs"*. **Member States should make the link and consider the SCP vulnerable households as one portion of the NBRP vulnerable households**, especially since these households often live in the worst-performing buildings. Regarding monitoring and reporting, the NBRP focuses on energy poverty and worst-performing buildings, while the SCP looks more broadly at vulnerable households besides energy poverty. **Member States should strive to report granular information on targets and actions for vulnerable households in their NBRP**, beyond energy poverty and worst-performing buildings.[42]

Local heating and cooling plans (LHCPs)

EED Article 25§6 incentivises coordination between NBRPs and LHCPs, which should be developed in municipalities with populations over 45,000 and in line with the energy efficiency first principle. That would set a strong precedent for bottom-up governance and allowing the **NBRP to be aligned with local realities**. LHCPs tend to focus more on infrastructure and clean technologies, rather than renovations, which remain the primary focus of the NBRP. Nonetheless, Member States can leverage LHCPs as a tool to progressively reduce the use of fossil fuels in buildings, which is one of the objectives of the NBRP too.

There are several opportunities to build synergies between NBRPs and LHCPs:

- While Member States should support regional and local authorities in drafting their

[41] See also the Commission Guidance on Social Climate Plans (2025).
[42] For more information on the interplay between NBRPs and SCPs, see CAN Europe & ECODES (2024), Planning a fair and ambitious Renovation Wave: tools and practices to build better lives through the implementation of the Fit for 55 strategy.

LHCPs, notably by providing national comprehensive heating and cooling assessments, this process could be used in a two-way direction to **gather input and feedback from these lower governance levels on the draft NBRP**.

- At the same time, stakeholders such as **energy communities and consumer-led initiatives should be seen as key contributors to both LHCPs and NBRPs**. A tailored input gathering and consultation method could enable these stakeholders to contribute to both plans to maximise effectiveness.
- **The NBRP (with a national perspective) could draw upon some data and indicators from the national comprehensive heating and cooling assessment** (EED Article 25§1 and Annex X), which includes data on technical building systems and heating and cooling infrastructure. The NBRP should also use some content developed for the LHCPs (with a local perspective), such as *"an analysis of heating and cooling appliances and systems in local building stocks, taking into account the area-specific potentials for energy efficiency measures and addressing the worst-performing buildings and the needs of vulnerable households" (EED Article 25§6h) and "how to finance the implementation of policies and measures and identify financial mechanisms allowing consumers to shift to renewable heating and cooling" (EED Article 25§6i).*

▶ *Other planning tools*

The NBRP drafting process should also be coordinated with two other planning instruments. First, **NBRPs should be aligned with national adaptation plans**. While climate resilience of buildings is a voluntary indicator under EPBD Annex II, Member States should leverage synergies by incorporating an overview of implemented and planned policies aimed at increasing resilience. For more information on climate adaptation and resilience in the built environment, see Deep Dive #4.

Second, there is **potential for more coordination in electricity grids and flexibility planning under the Electricity Market Design**. Entities responsible for defining non-fossil flexibility needs and those drafting building renovation plans should engage in structured exchanges to synchronise efforts. One method would be to ensure that transmission system operators and distribution system operators actively participate in the public consultation on the first draft NBRP. For more information on how to implement the EPBD to empower buildings to provide non-fossil flexibility to electricity grids, see Deep Dive #3.

Stakeholder participation in the NBRP process should be seen as an iterative process rather than a one-off consultation opportunity.

STEP 4 ORGANISE FOR STRONG CIVIL SOCIETY PARTICIPATION

Enabling strong stakeholder participation in the NBRP drafting process is essential for three reasons. First, it is a question of **democracy**: involving a broad and diverse panel of actors – including unconventional voices – enhances public acceptance and long-term support for measures, contributing to their stability over time. Second, it is a matter of **impact**: by including different perspectives from the onset of policy design, measures and their supportive framework are better targeted, better framed and better governed, so will be more successful.[43] And third, having a strong public consultation will be part of the Commission **evaluation** of NBRPs, which will include an assessment of whether the process has been *"sufficiently inclusive"*.

Stakeholder participation in the NBRP process should be seen as an iterative process rather than a one-off consultation opportunity. This section provides some recommendations on how to proceed with this approach.

▶ *Start the conversation early: get input from stakeholders before drafting*

Even before drafting the NBRP, the task force should proactively engage with stakeholders to get their input. These early discussions should focus on the broad vision and approach to the NBRP, as well as on specific NBRP sections, when relevant to the stakeholders in question. Given the limited time and resources available for organising numerous meetings, and while ensuring transparency and inclusivity, the task force could host **public pre-NBRP inception events.** These events would provide stakeholders with an open platform to share their perspectives. Stakeholders should also have an opportunity to provide **input on the NBRP drafting process itself, adopting a co-creation approach.** Engaging stakeholders at an early stage will help align the plan with real-world needs and expectations.

GOOD PRACTICE EXAMPLE: RENOLUTION ALLIANCE (BELGIUM)

The **RENOLUTION initiative** is the Brussels-Capital region's comprehensive strategy to accelerate the sustainable renovation of its building stock. Launched in 2021, RENOLUTION seeks to achieve an average energy performance level of 100 kWh/(m^2.y) for all housing in Brussels and energy neutrality for the tertiary sector. One key component of the initiative is that it is based on an alliance bringing together over 150 public, private and voluntary organisations from the construction, financial and associated sectors, as well as social partners. This collaborative approach addresses various aspects of building renovation, including regulations, urban planning, logistics, financing and the circular economy.

[43] EPBD.wise project (2024), What is needed for effective EPBD implementation: summary of policy needs.

Organise proper feedback through the official public consultation during the drafting process

EPBD Article 3§4 sets out the requirements concerning the official public consultation on the NBRP: *"to support the development of its national building renovation plan, each Member State shall carry out a public consultation on its draft national building renovation plan prior to submitting it to the Commission. The public consultation shall involve in particular local and regional authorities and other socioeconomic partners, including civil society and bodies working with vulnerable households. Each Member State shall annex a summary of the results of its public consultation to its draft national building renovation plan. The public consultation may be integrated as part of the public consultation undertaken pursuant to Article 10 of Regulation (EU) 2018/1999 [Governance Regulation]."*

Looking back at the assessment of the 2020 LTRS, **key elements of proper feedback can be identified: transparency, inclusivity and effectiveness.**[44]

1. An open and transparent feedback process

Public participation is a key requirement in the development of the NBRP. This should include **a combination of open and transparent stakeholder engagement channels and methods, such as online feedback mechanisms**. Easy to organise and scalable to a wider audience, online feedback, ideally through a dedicated webpage promoted on social media, enables diverse stakeholders to participate. **Public events** such as public hearings, stakeholder roundtables and targeted workshops can also be conducted, both online and in person. The participation of people with disabilities should be ensured.

The feedback process should also be transparent at the other end. The EPBD mandates that each *"Member State shall annex a summary of the results of its public consultation to its draft national building renovation plan"*. This summary should be seen as an opportunity to explain to stakeholders which feedback has been integrated into the draft plan, which suggestions were not incorporated and why and outline the next steps in the process.[45]

BPIE RECOMMENDATIONS:

To streamline online feedback and enhance transparency, Member States should consider several elements. First, consultation documents should be published and easily accessible on relevant online portals. They should be viewable online and downloadable in searchable PDF format, be compatible with screen reader tools, include alternative text for visual elements and be accessible for people with disabilities. A structured response template should be provided to help stakeholders provide organised feedback, including sections corresponding to different NBRP sections but also text boxes for open feedback. Finally, stakeholders should have access to the responses of other participants, fostering an open and informed discussion, and should be able to provide feedback on the consultation process itself.

[44] BPIE (2020), A review of EU Member States' 2020 long-term renovation strategies.
[45] EPBD.wise project (2024), What is needed for effective EPBD implementation: summary of policy needs.

GOOD PRACTICE EXAMPLES:

- In **Slovakia**, the draft LTRS was subject to public consultation via the publicly accessible web portal www.slov-lex.sk. This procedure included a standardised format and process for evaluating comments. Any entity or citizen could provide feedback on any part of the submitted material using an electronic form, and the LTRS authors were required to evaluate every comment received and to incorporate into the final strategy any accepted comments.[46]
- **Finland** successfully integrated two public hearings, one expert consultation and six workshops into its consultation process on the 2020 LTRS, ensuring that stakeholders' concerns were addressed in a transparent manner. More than 500 stakeholders attended these events. The enabling framework that allowed this best practice to emerge include a well-established tradition of public engagement in policy development, strong institutional support for multi-level governance and clear communication strategies to inform stakeholders.[47]
- The **EU Commission's "Have Your Say"** feedback portal provides an effective model for a transparent and structured public consultation platform. It allows stakeholders to review documents, submit comments and see feedback from others, promoting accountability and inclusive decision-making.

2. An inclusive feedback process

A broad range of stakeholders must be engaged in the development of the NBRP to ensure inclusivity and comprehensive representation. While EPBD Article 3 does not extensively list all stakeholders that should be involved, it requires that the *"public consultation shall involve in particular local and regional authorities and other socioeconomic partners, including civil society and bodies working with vulnerable households".*

To gather diverse feedback and ensure that no voices are left unheard, beyond those mentioned in the legal text, **Member States should start with a thorough identification and mapping of who will be affected, who can contribute and who should be consulted**.

[46] EPBD.wise project (2024), National Building Renovation Plans and Zero-Emission Buildings: policy needs and best practices.
[47] BPIE (2020), A review of EU Member States' 2020 long-term renovation strategies.

Broadly, the following stakeholder groups may be relevant:[48]

SOCIOECONOMIC PARTNERS (1)

- Financial institutions
- Business associations
- Individual businesses and companies (in construction, renovation, renewable energy)
- Real estate
- Representatives of professions (installers, architects, energy certifiers)
- Trade unions

SOCIOECONOMIC PARTNERS (2)

- Civil society organisations / non-governmental organisations
- Bodies working with vulnerable households
- Housing associations and tenants' unions
- (Energy) communities
- Consumer protection organisations
- Health-related organisations (patients' associations)
- Academic/research institutions
- Youth representatives
- Representatives of people with disabilities
- Citizens

PUBLIC AUTHORITIES

- Regional authorities
- Local authorities
- Cities
- One-stop shops
- Other public bodies

[48] Those highlighted in orange are the ones explicitly mentioned in EPBD Article 3.

GOOD PRACTICE EXAMPLES:

- **The BuildUpon project** is an EU project which started in 2015, led by the World Green Building Council, aimed at mapping and involving multiple stakeholders to strengthen LTRSs across different Member States through inclusive participation. Over the course of the project, more than 2,000 stakeholders were identified, and collaborative communities were built. BuildUpon offers structured methodologies for identifying and engaging relevant actors.
- **Slovakia** established a working group to promote an inclusive approach for its 2020 LTRS. The Ministry of Transport and Construction convened 32 entities, including government departments, civic associations, research bodies, and municipal representatives. Throughout the process, consultations were conducted through both in-person and written channels, ensuring effective stakeholder engagement.

After an initial mapping of stakeholders to consult, **Member States should leverage potential synergies with or learnings from consultation processes in the context of other planning tools**, allowing for greater coordination and the inclusion of non-traditional stakeholders in the NBRP process. These include:

- The NECP public consultation within the Multilevel Climate and Energy Dialogue, as hinted by EPBD Article 3 itself (Governance Regulation)
- The national network of experts on energy poverty (EED Article 24§4)
- Participatory decision-making processes in environmental matters (Aarhus Convention)
- Stakeholder involvement in EU Structural and Investment Funds programming (EU Code of Conduct on Partnership).

Another important point to ensure an inclusive feedback process is to **balance technical expertise with accessible, easy-to-understand information** to ensure broad stakeholder engagement, especially of those who do not usually participate in the LTRS/NBRP drafting process. Member States should consider the need for capacity-building before the consultation process begins, notably towards regional and local authorities lacking human resources, to enable meaningful and fruitful feedback.

3. An effective feedback process

To increase the effectiveness of the feedback process, **Member States should first carefully think about the timing.** The Governance Regulation Article 10 mandates that Member States provide timely information to the public and set reasonable consultation timelines to ensure meaningful participation.

BPIE RECOMMENDATIONS:

Member States should start by announcing early on some clear timetables for the consultation process and raise awareness on different channels about its opening (at least one month before). The draft NBRP could even be shared at that time, even if the consultation has not yet opened, to give stakeholders time to absorb its information and ask clarification questions before giving their feedback. Sufficient time should be given to the consultation itself (at least three months), considering the national context (holidays, planned elections). Finally, Member States should take sufficient time (at least two months) to consider feedback received and integrate it into their draft NBRP before submission.

GOOD PRACTICE EXAMPLE: NETHERLANDS

The Netherlands demonstrated an effective approach to public consultation for its 2020 LTRS by integrating it with broader climate policy planning. The consultation process started well in advance, at least 12 months before the deadline, enabling comprehensive and meaningful stakeholder engagement.

A second way to ensure an effective feedback process is for **Member States to present and test concrete policy design options**, notably concerning the EPBD Article 9 provisions. This will enable the NBRP authors to ensure policy decisions are not only based on modelling, but also on discussions with targeted population segments, enabling them to finetune the technical and economic feasibility of envisaged measures and exemptions.

Finally, an effective feedback process should be **well concluded and completed**. Outcomes of the public consultation should be reflected in the draft NBRP submitted to the Commission and an annex summarising the consultation results should be included as well. Finally, Member States should ensure that stakeholders can remain engaged and involved in the NBRP implementation and evaluation phase.

BPIE RECOMMENDATION:

The annex should include a summary of the consultation process itself (timeframe, outreach methods used, number and categories of stakeholders consulted), a summary of responses (per issues raised and per stakeholder group) and an explanation how responses influenced (or not) the draft plan.[49]

[49] Based on European Environmental Bureau (2023), Ten steps for public participation in NECPs.

STEP 5 USE AND CONTRIBUTE TO HIGHER-LEVEL ENERGY AND CLIMATE PLANNING (NECPS)

First, the NBRP drafting process can benefit from past work on NECPs. When preparing their first NBRP (draft due December 2025), Member States should consider integrating insights from their most recently updated NECP, which was due in June 2024. This will ensure initial alignment and coherence between the two planning instruments. More specifically, the NECP can inspire the NBRP on the role of buildings within broader energy and climate topics, as the NECP covers five broad dimensions (energy security; internal energy market; energy efficiency; decarbonisation; research, innovation and competitiveness) – all relevant for and impacted by building policies. Member States that have already integrated the 2023 EED recast requirements into their 2024 NECP update can leverage this information to inform the NBRP, particularly regarding public sector leadership in energy renovation of buildings. Where specific policies, measures and investment needs addressed in sections (c) and (d) of the NBRP are already included in the NECP, Member States have the option to reference these NECP sections directly in the NBRP (EPBD Article 3§2).

Second, the NBRP drafting process should feed back into the NECP drafting process – an input which will be facilitated as of 2028 with the alignment of the NBRP on the NECP timeline. This should help raise the importance of the contribution of building renovation and decarbonisation in all other sectors of the NECP, under the energy efficiency first principle.

BPIE RECOMMENDATION:

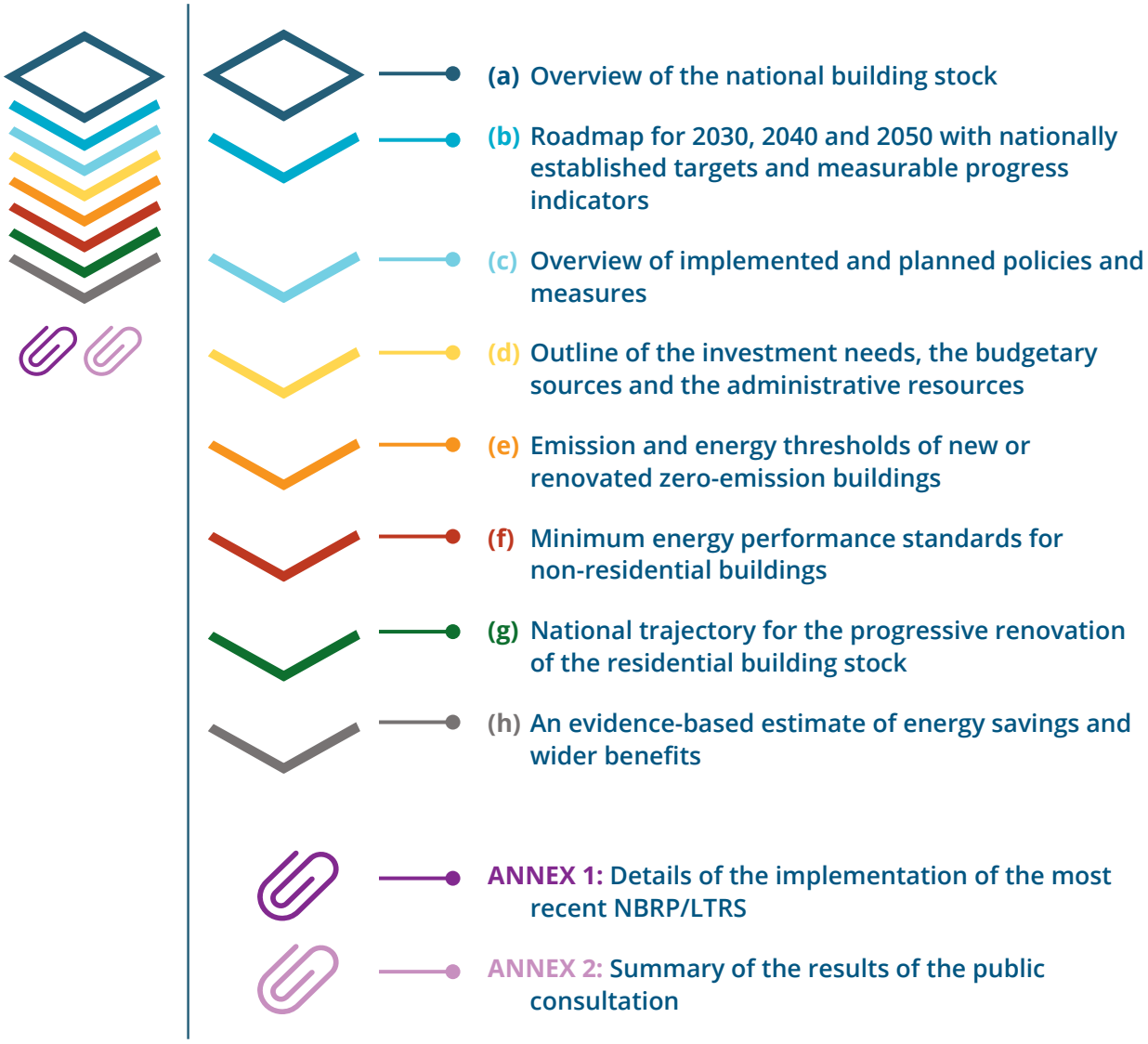
Member States that have consistently failed to adopt their 2020 LTRS or their 2024 NECP update in a timely manner[50] will likely find it difficult to submit an NBRP in 2026. This should be an important lesson – those Member States should seek additional support from the EU (e.g. through the Technical Support Instrument programme) and/or stakeholder community to draft their NBRP.

[50] As of 30 January 2025, five Member States had not yet submitted their final updated NECP due June 2024.

GET TO WORK: ELABORATE THE NBRP CONTENT

The NBRP is a much more holistic and detailed planning instrument than its predecessor, the LTRS, although it builds a lot on its content. This is notably thanks to the mandatory template included in EPBD Annex II, which spells out in more detail, through mandatory and optional indicators, the content of the plan.

NBRP CONTENT



This section describes each part in more detail, outlining the questions to which the NBRP should respond:

USE QUALITY DATA AS THE BASIS: WHERE ARE WE NOW?

Corresponding NBRP section: (a) overview of the national building stock

Member States should initiate the NBRP with a thorough understanding of technical details of their building stock, but also describing the market, social and policy aspects. The table thereafter outlines the requirements for this NBRP section, differentiating between data points that come from **Article 3**, indicators from **Annex II - (mandatory)** and **(optional)**.

TECHNICAL INFORMATION
Number of buildings and total floor area (m²): • per building type (including public buildings and social housing)[51] • per energy performance class[52] • per building age • per building size • per climatic zone • nearly zero-energy buildings • worst-performing buildings (including a definition) • the 43% worst-performing residential buildings • estimation of the share of buildings exempted pursuant to Article 9§6, point (b) • demolition (number and total floor area in m²)
Number of energy performance certificates: • per building type (including public buildings) • per energy performance class • per construction period
Annual renovation rates: number and total floor area (m²) • per building type • to nearly zero-energy and/or to zero-emission building levels • per renovation depth (weighted average renovation)[53] • public buildings

[51] EPBD Annex I §6 lists the following categories: *"single-family houses of different types, apartment block, offices, educational buildings, hospitals, hotels and restaurants, sports facilities, wholesale and retail trade services buildings, other types of energy-consuming buildings".*

[52] This should consider the EPC rescaling reform in accordance with EPBD Article 19.

[53] To be coherent with other EPBD provisions, renovation depth could be defined as: renovation to NZEB/ZEB standard, renovation resulting in over 60% reduction of primary energy use, renovation resulting in 30-60% reduction of primary energy use (medium renovation), renovation resulting in less than 30% reduction of primary energy use (light renovation) – see BPIE (2021), Deep renovation: shifting from exception to standard practice in EU policy.

TECHNICAL INFORMATION (continued)
Primary and final annual energy consumption (ktoe): • per building type • per end use[54] **Energy savings (ktoe):** • residential buildings • non-residential buildings • public buildings
Average primary energy use in kWh/(m².y) for residential buildings Primary energy use of a building corresponding to the top 15 % (substantial contribution threshold) and the top 30% (do no significant harm threshold) of the national building stock, as per Delegated Regulation (EU) 2021/2139 Share of renewable energy in the building sector (MW installed or GWh generated) for different uses Share of heating system in the building sector per boiler/heating system type Share of renewable energy in the building sector (MW installed or GWh generated), on-site and off-site Annual operational greenhouse gas emissions ($kgCO_2eq/(m^2.y)$), per building type Annual operational greenhouse gas emission reduction ($kgCO_2eq/(m^2.y)$), per building type Life-cycle global warming potential ($kgCO_2eq/m^2$) in new buildings, per building type

MARKET INFORMATION
Market barriers and failures (description): • split incentives • capacity of construction and energy sector • administrative • financial • technical • awareness • other
Evaluation of the capacities in the construction, energy efficiency and renewable energy sectors
Number of: • energy service companies • construction companies • architects and engineers • skilled workers • one-stop shops • SMEs in the construction/renovation sector • renewable energy communities and citizen-led renovation initiatives
Projections of the construction workforce: • retiring architects/engineers/skilled workers • architects/engineers/skilled workers entering the market • young people in the sector • women in the sector
Overview and forecast of the evolution of prices of construction materials and national market developments

[54] EPBD Annex I §1 lists the following uses: *"space heating, space cooling, domestic hot water, ventilation, built-in lighting and other technical building systems".*

SOCIAL INFORMATION
Share of vulnerable households
Evaluation of the capacities in the construction, energy efficiency and renewable energy sectors
Energy poverty (definition): • % of people affected by energy poverty • proportion of disposable household income spent on energy • population living in inadequate dwelling conditions (e.g. leaking roof) or with inadequate thermal comfort conditions
Reduction in energy costs (€) per household (average)

POLICY INFORMATION
Primary energy factors: • per energy carrier • non-renewable primary energy factor • renewable primary energy factor • total primary energy factor
Definition of nearly-zero energy building for new and existing buildings Overview of the legal and administrative framework
Cost-optimal minimum energy performance requirements for new and existing buildings

BPIE RECOMMENDATIONS:

- In addition to the required indicators, indicators labelled as "optional" in Annex II still play a crucial role in future policymaking and Member States should rather treat them as essential. This is because this analysis is a fundamental prerequisite for all subsequent sections of the plan, notably for the design of key elements of the EPBD which heavily depend on data (e.g. Article 9).
- Member States should also consider additional indicators which are not included in Annex II, but which are still of added value in giving a clear picture of the national building stock and contributing to a better design of policies: for example, per ownership type (public, private, mixed), per tenure type (owner-occupied, rented, mixed) and per location (urban, suburban, rural).[55]
- Member States are encouraged to take a meticulous approach to (new and updated) data collection and seek to go beyond compiling existing data. Efforts should prioritise data collection on worst-performing buildings, particularly in areas where data is lacking, such as the non-residential building segment, as well as ensuring transparency about data sources.
- Article 3 outlines that the first section of the NBRP should be based *"as appropriate, on statistical sampling and the national database for energy performance certificates pursuant to Article 22".* However, considering the low coverage of the building stock with EPCs in some Member States, some alternative methods should be considered. Member States should leverage new technologies such as artificial intelligence and machine learning to expand the knowledge of their building stock.

[55] BPIE (2019), Future-proof buildings for all Europeans: a Guide to implement the EPBD 2018/844.

GOOD PRACTICE EXAMPLES:

- **The French** IMOPE database (Indice de Modernisation et d'Occupation du Parc Existant Urbain), produced by the Urban Retrofit Business Service and recognised by the Ministry of the Economy, is a methodology developed for assessing and monitoring the building stock in urban areas. IMOPE compiles a variety of data sources, including cadastral information, energy performance certificates and satellite imagery. The approach can also be integrated into GIS (geographic information systems) and urban digital twins, enhancing visualisation and analysis capabilities.
- **Italy's 2020 LTRS** provides a detailed overview of the national building stock, presented by climatic zones, size, age, energy consumption and conservation status with a very good level of detail for both the residential and non-residential sectors. A national portal on the energy performance of buildings was established in 2020, collecting in a unique digital public database all the information on the Italian building stock, including an estimate of the current annual renovation rate and of a "virtual deep renovation rate".[56]

FOCUS ON MARKET BARRIERS AND FAILURES

Past BPIE research[57] gives more details about how to define certain barriers and market failures:

- Administrative barriers: emerging from the existing legal framework, including overlaps between laws or absence of them, and complicated administrative processes.
- Financial barriers: lack of public funding, taxation issues, high initial costs of investment, longer payback periods, subsidised energy prices (which affect investment decisions).
- Technical barriers: lack of knowledge of the existing building stock.
- Awareness barriers: lack of communication about deep renovation benefits.
- Capacity barriers: lack of certain professionals needed for buildings renovation, insufficient technical capacity of workforce, knowledge gaps to develop effective renovation projects.[58]
- Split-incentive barriers: lack of distribution of financial obligations and benefits from investment in building energy efficiency between different renovation actors (such as owners and tenants).
- Other barriers: including supply chain barriers (lack of sustainable building materials, and renewable equipment) and R&D barriers (lack of sufficient pilot projects to develop effective approaches to renovation).

By embracing advanced data analytics and ensuring a robust understanding of the current building stock, Member States can develop more effective, data-driven renovation strategies that align with the long-term objective(s) for transforming the building stock.

[56] EPBD.wise project (2024), National Building Renovation Plans and Zero-Emission Buildings: policy needs and best practices.
[57] BPIE (2019), Future-proof buildings for all Europeans: a Guide to implement the EPBD 2018/844.
[58] For more guidance on what skills and dynamics to consider for the workforce mapping and barriers, see Joint Research Centre (2022), Skills for the Energy Transition.

SET THE VISION AND THE MILESTONES: WHERE DO WE WANT TO GO?

Corresponding NBRP sections: (b) roadmap for 2030, 2040 and 2050 with nationally established targets and measurable progress indicators, (f) minimum energy performance standards for non-residential buildings, and (g) national trajectory for the progressive renovation of the residential building stock

NBRP section (b) aims at establishing **a roadmap towards the 2050 climate neutrality goal**, defined through two cumulative approaches:

- *"A highly energy-efficient and decarbonised national building stock"*
- *"The transformation of existing buildings into zero-emission buildings by 2050".*

The roadmap should adopt a forward-looking approach and include:

- **Nationally established targets for 2030 and 2040**, *"as regards the annual energy renovation rate, the primary and final energy consumption of the national building stock and its operational GHG emission reductions"*
- **Specific timelines by 2040 and 2050 for non-residential buildings** to comply with lower maximum energy performance thresholds (Article 9§1)
- **Measurable progress indicators** (including for reducing numbers of people affected by energy poverty)
- **An evidence-based estimate of expected energy savings and wider benefits**, including those related to indoor environmental quality.

The table thereafter outlines the requirements for this NBRP section, differentiating between indicators from **Annex II (mandatory)** and **(optional)**. BPIE has reordered some of these indicators. Annex II also includes in section (b) three indicators related to wider benefits, which are dealt with in this analysis in a separate subsection – see below. Ultimately, section (b) should outline what the NBRP aims to achieve on different aspects, in a quantified/ modelled way.

ANNEX II SECTION (B)
Targets for annual renovation rates: number and total floor area (m^2): • per building type • worst-performing buildings • the 43 % worst-performing residential buildings
Targets for expected share (%) of renovated buildings: • per building type • per renovation depth
Information pursuant to Article 9§1: • criteria to exempt individual non-residential buildings • estimated share of exempted non-residential buildings • estimation of equivalent energy performance improvements due to exempted non-residential buildings
Targets for expected primary and final annual energy consumption (ktoe): • per building type • per end use
Expected energy savings, per building type

ANNEX II SECTION (B)
The Member State's contribution to the Union's energy efficiency targets in accordance with Article 4 of Directive (EU) 2023/1791 [on energy efficiency] attributable to its building stock's renovation (share and figure in ktoe)
Targets for the increase in the share of renewable energy in accordance with Article 15a of Directive (EU) 2018/2001 [renewables directive]
Numerical targets for the deployment of solar energy in buildings
Share of energy from renewable sources in the building sector (MW installed or GWh generated)
The Member State's contribution to the Union's renewable energy targets in accordance with Directive (EU) 2018/2001 attributable to its building stock's renovation (share, MW installed or GWh generated)
Targets for expected operational greenhouse gas emissions ($kgCO_2eq/(m^2.y)$), per building type
Targets for expected operational greenhouse gas emission reduction (%), per building type
Split between emissions covered by Chapter III [stationary installations], Chapter IVa [emissions trading system for buildings, road transport and additional sectors] of Directive 2003/87/EC, and other stock
Targets for expected whole-life-cycle greenhouse gas emission ($kgCO_2eq/(m^2.y)$) in new buildings, per building type

BPIE RECOMMENDATIONS:

- Member States should include in section (b) of their NBRP, parts (f) and (g) from Article 3 and corresponding Annex II mandatory indicators (maximum energy performance thresholds for non-residential MEPS and the national residential trajectory, including the 2030 and 2035 milestones). Linking these two Article 9 related indicators to the roadmap helps identifying their contribution to the 2030 and 2040 nationally established targets for the entire building stock.
- Member States should consider additional indicators to complete the roadmap:
  - The Member State's contribution to the EU 2030 and 2040 climate targets, although not required by Annex II. The 2030 target is to reduce net GHG emissions by 55% compared to 1990, while the 2040 target is not yet defined at EU level.
  - The indicative targets of *"at least 49% [renewables in the EU] final energy consumption in buildings in 2030"* and *"a complete phasing out of fossil fuel boilers by 2040"*.

GOOD PRACTICE EXAMPLE: FINLAND

- Drawing from its 2020 LTRS experience, Finland's roadmap integrates measurable progress indicators for 2030, 2040 and 2050 and well-defined milestones, each broken down per building category. These align with EPBD requirements and provide a structured framework for national planning. Information related to the evolution of the building stock, expected changes in primary and final energy consumption, and CO_2 emissions reduction trajectories are included.[59]

APPLYING THE ENERGY EFFICIENCY FIRST PRINCIPLE IN NBRPS

The energy efficiency first (EE1) principle is a cornerstone of the EU energy system, ensuring that demand-side solutions are considered on an equal footing with supply-side measures.[60] By prioritising energy efficiency, the EE1 principle provides a long-term perspective on reducing future energy needs and optimising the overall size of the energy system. Initially introduced in the Governance Regulation as a guiding principle for drafting NECPs, the EE1 principle has now been fully integrated into the EED as Article 3.[61] This article mandates the application of the EE1 principle in key planning decisions and investment choices, reinforcing its role in shaping energy policies. For effective implementation, NECPs and NBRPs must be well coordinated, ensuring that the projected evolution of the national building stock is fully integrated into the planning of the five dimensions of the Energy Union (energy efficiency; energy security; internal energy market; research, innovation and competitiveness; and decarbonisation). Similarly, the NBRP itself should reflect and apply the EE1 principle, especially in section (b).

[59] BPIE (2020), A review of EU Member States' 2020 long-term renovation strategies.
[60] For more information on the energy efficiency first principle and its application, see Commission Recommendation (EU) 2021/1749, Energy Efficiency First: from principles to practice — guidelines and examples for its implementation in decision-making in the energy sector and beyond.
[61] See Commission Recommendation (EU) 2024/2143, Guidelines for the interpretation of Article 3 of Directive (EU) 2023/1791 as regards the energy efficiency first principle.

OUTLINE AN ACTION PLAN: HOW TO REACH OUR VISION?

Corresponding NBRP sections: (c) overview of implemented and planned policies and measures, and (e) emission and energy thresholds of new or renovated zero-emission buildings

Section (c) of the NBRP should **outline both existing and future policies and measures designed to materialise the roadmap, identifying barriers to their implementation – as identified in section (a) – and assessing their expected impact**. BPIE recommends to cluster section (c) with section (e) of the NBRP, laying down the thresholds for operational GHG emissions and annual primary energy demand of a new or renovated ZEB pursuant to Article 11 – as the ZEB standard is one measure contributing to the roadmap. The table thereafter outlines the **policies and measures for which Member States must or may give information** in this NBRP section.

RENOVATION POLICIES
(a) the identification of cost-effective approaches to renovation for different building types and climatic zones, considering potential relevant trigger points in the life cycle of the building
(b) national minimum energy performance standards pursuant to Article 9 and other policies and actions to target the worst-performing segments of the national building stock, including safeguards as referred to in Article 17§19
(c) the promotion of deep renovation of buildings, including staged deep renovation
(l) the improvement of buildings owned by public bodies, including policies and measures pursuant to Articles 5, 6 and 7 of Directive (EU) 2023/1791

DECARBONISATION POLICIES
(f) the decarbonisation of heating and cooling, including through district heating and cooling networks, and the phasing out of fossil fuels in heating and cooling with a view to a complete phasing out of fossil fuel boilers by 2040
(h) the promotion of renewable energy sources in buildings in line with the indicative target for the share of energy from renewable sources in the building sector laid down in Article 15a§1 of Directive (EU) 2018/2001
(i) the deployment of solar energy installations on buildings

CIRCULAR, MATERIAL AND WHOLE-LIFE CARBON POLICIES
(g) prevention and high-quality treatment of construction and demolition waste in accordance with Directive 2008/98/EC, in particular as regards the waste hierarchy, and the objectives of the circular economy
(j) the 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
(e) the removal of hazardous substances including asbestos

ZERO-EMISSION BUILDING POLICIES
• 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[62]

SOCIAL AND MULTIPLE BENEFITS POLICIES
(d) empowering and protecting vulnerable customers and the alleviation of energy poverty, including policies and measures pursuant to Article 24 of Directive (EU) 2023/1791, and housing affordability
(k) the promotion of district and neighbourhood approaches and integrated renovation programmes at district level, which may address issues such as energy, mobility, green infrastructure, waste and water treatment and other aspects of urban planning and may take into account local and regional resources, circularity and sufficiency
(g) the role of renewable energy communities and citizen energy communities in district and neighbourhood approaches
(m) the promotion of smart technologies and infrastructure for sustainable mobility in buildings
(a) the increase in the climate resilience of buildings
(d) the increase in resilience against disaster risks, including risks related to intense seismic activity
(c) the increase in fire safety
(i) addressing the improvement of indoor environmental quality
(f) accessibility for persons with disabilities

INFORMATION AND ADVISORY SERVICES
(e) the creation of one-stop shops or similar mechanisms pursuant to Article 18 for the provision of technical, administrative and financial advice and assistance
(p) awareness-raising campaigns and other advisory tools

CONSTRUCTION MARKET POLICIES
(o) addressing skills gaps and promoting education, targeted training, upskilling and reskilling in the construction sector and energy efficiency and renewable energy sectors (whether public or private), with a view to ensuring that there is a sufficient workforce with the appropriate level of skills corresponding to the needs in the building sector, with a special focus on the underrepresented groups
(q) promotion of modular and industrialised solutions for construction and building renovation
(b) the promotion of the energy services market
(h) addressing mismatches in human capacities

GENERAL POLICIES
(n) addressing market barriers and market failures

[62] These four indicators stem from Article 3 section (e).

The table thereafter outlines the requirements for the NBRP section (c), differentiating between mandatory elements and optional elements when Member States describe all the previously mentioned policies and measures.

MANDATORY ELEMENTS	OPTIONAL ELEMENTS
• name of policy or measure • short description (precise scope, objective and conditions of operation) • quantified objective • type of policy or measure (e.g. legislative, economic, fiscal, training, awareness) • planned budget and funding sources • entities responsible for implementing the policy • expected impact • status of implementation • date of entry into force • implementation period	• administrative resources and capacities • area(s) covered • worst-performing • minimum energy performance standards • energy poverty, social housing • public buildings • residential (single-family, multi-family) • non-residential • industry • renewable energy sources • phasing out of fossil fuels in heating and cooling • whole-life-cycle greenhouse gas emissions • circular economy and waste • one-stop shops • renovation passports • smart technologies • sustainable mobility in buildings • district and neighbourhood approaches • skills, training • awareness campaigns and advisory tools

BPIE RECOMMENDATIONS:

- Policies and measures outlined in section (c) should be designed in **alignment with key EPBD provisions** to ensure a comprehensive and effective approach.
  - They should target worst-performing buildings, both in the residential and non-residential segments, to support delivery of Article 9.
  - They should also support vulnerable households, whether through information, advice, financial support or social safeguards.
  - Policies and measures should also proportionally support more (staged) deep renovations, in accordance with Article 17§16, as well as the development of EPCs, renovation passports and one-stop shops.
- Policies and measures should be described with a **sufficient level of detail,** notably thanks to some of the optional elements (per building category), in a "policy package" approach, bringing together regulation with a supportive framework. Member States should also specify how each policy and measure will be monitored, enforced and reported, and how it interacts with others, either existing or planned.

GOOD PRACTICE EXAMPLE:

The Commission Staff Working Document Analysis of the national long-term renovation strategies, published in 2022, outlines a number of good practices by Member States. It describes policies and measures in various fields: 1) strengthening information, legal certainty and incentives for public and private owners and tenants to undertake renovations; 2) ensuring adequate and well-targeted funding; 3) increasing the capacity to prepare and implement projects; scaling up technical assistance and making it closer to regional and local actors; 4) creating green jobs, upskilling workers and attracting new talent; 5) creating a sustainable built environment; 6) placing an integrated, participatory and neighbourhood-based approach for smart buildings, integrating renewable energy.

RESOURCE THE ACTION PLAN: HOW DO WE SUPPORT OUR ACTIONS?

Corresponding NBRP section: (d) outline of the investment needs, the budgetary sources and the administrative resources

Once the NBRP has laid down an overview of the situation, a roadmap with milestones, and policies and measures to achieve them, **section (d) tackles the resource aspects of planning, touching upon both financial and human resources**. More precisely, the section should *"outline the investment needs for the implementation of the NBRP, the financing sources and measures, and the administrative resources for building renovation".*

Financial resources: a long-term investment strategy

Section (d) of the NBRP should first **outline the scale of investment required** to achieve the plan's objectives. Annex II specifies that Member States should adopt a long-term perspective and describe *"total investment needs for 2030, 2040, 2050 (in million EUR)*" – this is key to ensure stability. Second, Member States should **identify funding sources**, whether public or private, and specify which amount comes from which budgetary line. Section (d) should be closely linked with:

- Section (a), describing market barriers and failures, which might affect the effectiveness of investments
- Section (c), matching all policies and measures with a budget and funding source, thereby defining how much total financing would be needed and for what.

BPIE RECOMMENDATIONS:

- Among public funds available, Member States should make use of both EU-level funds (e.g. Structural and Cohesion Policy Funds, Social Climate Fund (SCF)) and national budgets (e.g. ETS revenues).
- Member States should also consider potential new sources of funding from the EU level, such as updated programmes under the next Multiannual Financial Framework (MFF) (2028-2034) and the pan-European investment platform for affordable housing managed by the European Investment Bank (EIB). If not entirely clear by the deadline for the first draft NBRP (December 2025), information about the EIB-led platform should be more accurate by the deadline for the first final NBRP (December 2026). Regarding the potential sources of funding under the MFF, the NBRP should at least include a placeholder, which can be updated once the EU budget is adopted. By clearly identifying financial needs and gaps, Member States can also advocate for increased EU budget allocations for building renovations and expanded Union-level investment actions to support their NBRPs.
- Member States should leverage private sector investment, as public funding alone will not suffice. This is particularly the case for the Social Climate Fund dedicated to vulnerable households. As the SCF disbursements are to be planned by June 2025, six months ahead of the draft NBRP timeline, this leaves sufficient time for Member States to identify complementary budget sources to be dedicated to vulnerable households.
- To ensure an optimal deployment of funds, Member States should draw differentiated investment strategies tailored to both the building segment and the target audience of the financial support.
- For more information on financial support, see EPBD Article 17 and section 4.4 of this publication.

Human resources: building capacity and improving skills

A robust approach to enhancing the sector's readiness to deliver should focus on administrative resources at all governance levels and consider industry capacity and skills development.

Boost administrative resources at all governance levels

To strengthen administrative capacity, particular attention should be given to boosting the one-stop shop framework,[63] as well as knowledge and know-how at regional and local level, where more than 200,000 new local jobs are needed to fully decarbonise buildings.[64] The NBRP section (d) is thus the ideal place to develop a human resource strategy for administrations, whether at national or subnational level.

[63] For more information, see section 4.3.
[64] Energy Cities (2022), Human capacity in local government: the bottleneck of the building stock transition.

Focus on skills development

A well-trained workforce is fundamental to the success of building renovation and decarbonisation measures. The importance of education and training is underscored in EPBD Article 17§12, which highlights the need for national action on this issue, particularly through the involvement of one-stop shops. The EPBD plays a crucial role in workforce development, with Article 29§3 requiring Member States to provide guidance and training to stakeholders on energy performance, renewable energy sources, and district heating and cooling. Member States must also provide a comprehensive assessment of skilled workers and future gaps in NBRP section (a) while section (c) focuses on education, training, and reskilling policies and measures.

Enhance industry capacity

A key driver for the success of NBRP implementation is sufficient capacity within industry to deliver the materials and technologies at the right volume and pace. It is therefore key to foster innovation in the sector, notably with serial renovation solutions and prefabricated approaches, which have demonstrated significant potential in reducing both cost and duration of building renovation works. **The NBRP drafting process, by providing visibility and certainty, is an ideal opportunity to evaluate which portions of the building stock are most suited to these approaches, launch pilot programmes, and support industry to scale up these processes.**[65]

BPIE RECOMMENDATIONS:

- To maximise impact, Member States should align EPBD actions related to skills to EED Article 5 (support for public bodies), EED Article 28 (establishing networks to align professional qualifications with market needs), and RED Article 18 (certification schemes for installers of renewable heating and cooling systems).
- While EPBD Article 29§3 requires Member States to ensure the provision of guidance and training to a wide range of actors responsible for implementing the Directive, on topics such as energy performance, renewable sources, and district heating and cooling, it leaves Member States with the option of providing training on adaptation to climate change. However, to equip the workforce and local authorities for emerging challenges, it is recommended that the mandatory training topics be expanded to include climate-resilient buildings. This is particularly relevant as climate adaptation efforts are highly context-specific and require enhanced capacity and resources at the local level.

[65] For more information see BPIE (2022), Industrial prefabrication solutions for building renovation: innovations and key drivers to accelerate serial renovations in Europe", and BPIE (2022), Recommendations for industrialised renovations

DOCUMENT THE POSITIVE IMPACTS: WHY DO WE ACT?

Corresponding NBRP section: (h) an evidence-based estimate of energy savings and wider benefits

Beyond the commonly tracked indicators such as energy consumption reduction, the expected wider benefits of building renovation should not be overlooked.

EPBD Article 3§2h requires Member States to draw up *"an evidence-based estimate of expected energy savings and wider benefits, including those related to indoor environmental quality"*. Annex II does not include wider benefits as a separate section but integrates just a few of them within section (b): percentage reduction of people affected by energy poverty (as mandatory indicator), creation of new jobs and increase in GDP in share and billion euros (as optional indicators).

BPIE RECOMMENDATION:

Member States should not limit themselves to the benefits included in Article 3 and Annex II but should rather ensure a more comprehensive approach based on five categories (see thereafter).[66] Extensive research exists on identifying, quantifying and monetising multiple benefits to support Member States in providing evidence-based estimates of benefits.[67]

MACROECONOMIC BENEFITS	• GDP increase • Impact on public finances • Reduction of energy import bills
MICROECONOMIC BENEFITS	• Energy bill reduction • Increase in property values • Job creation
SOCIETAL BENEFITS	• Energy poverty reduction • Physical and mental benefits • Increased well-being (indoor air quality, thermal comfort, daylight, acoustic comfort, connection to natural spaces, design appeal) • Improved productivity
ENVIRONMENTAL BENEFITS	• Energy savings • Reduced GHG emissions • Improved outdoor air quality
ENERGY SYSTEM BENEFITS	• Increased energy security • Avoided new generation capacity • Reduced electricity peak loads

[66] These categories and benefits are based on and extended from those in BPIE (2019), Future-proof buildings for all Europeans: a Guide to implement the EPBD 2018/844.

[67] To highlight a few: on job creation – BPIE for Renovate Europe (2020), Building renovation: a kick-starter for the EU recovery; on health benefits – BPIE (2024), Healthy Buildings Barometer 2024: how to deliver healthy, sustainable, and resilient buildings for people.

GOOD PRACTICE EXAMPLE: LITHUANIA

Lithuania's 2020 LTRS includes both monetised and non-monetised assessments of economic and social benefits, ensuring a balanced and transparent evaluation framework. The total value of the monetised benefits is estimated at around €75 billion between 2021 and 2050. Lithuania also calculated that every €1 million invested is expected to create between 19 and 37 jobs per year.[68]

FINALISE THE NBRP AND MOVE TOWARDS IMPLEMENTATION

Once Member States have put in place the right process and developed the content of their NBRP, they must submit a first draft to the Commission by 31 December 2025. The section below outlines the end-of-process steps related to NBRPs.

Address Commission recommendations on the draft NBRP

In accordance with EPBD Article 3, **the Commission must assess the draft NBRP and may issue country-specific recommendations. These recommendations** will be provided no later than six months before the final NBRP submission deadline or, in the case of the first NBRP, within six months of the draft submission, i.e. by 30 June 2026. In its evaluation, the Commission will focus on key aspects including the ambition level of targets, the adequacy of measures and resources to achieve the targets, the social impacts of measures (efforts to reduce energy poverty and the prioritisation of worst-performing buildings) and whether indicators in Annex II were fulfilled. Finally, it will also assess whether the public consultation has been inclusive enough. **Member States are required to address the Commission's recommendations in their final NBRP**. If certain recommendations are not implemented, Member States must provide justifications for their decisions.

BPIE RECOMMENDATIONS:

- Member States should use the task force set up at the start of the NBRP process to deal with recommendations received in a coordinated way. Member States should consider not only the Commission recommendations but also any feedback received from stakeholders on its draft NBRP as submitted.
- All recommendations play a critical role in enhancing the quality, ambition and feasibility of the NBRP. Member States should prioritise their full integration into the final NBRP; where this is not possible, they should outline how they will design additional or complementary policies in other building segments or targeted to different audiences to achieve the same objectives.

[68] Joint Research Centre (2022), Assessment of first LTRS under EPBD Article 2a.

Set a strong monitoring, reporting, verification and evaluation framework

The submission of the final NBRP should not mean the end of planning until the next update or revision. Indeed, Member States must report on the implementation of the NBRP through their **integrated NECP progress reports, due 15 March of every uneven year.** The first progress report of the NBRP would then be due 15 March 2029. Monitoring of progress at national level should also take place through the provision of information regarding the implementation of the previous LTRS/NBRP as an annex to the most recent NBRP.

Additionally, two other progress-tracking requirements exist for the Commission which have no fixed deadlines but should be conducted at regular intervals:

- Annually: monitoring of the energy performance of the EU building stock, publishing findings in the **EU Building Stock Observatory.**
- Every two years: reporting on overall progress in renovating national building stocks as part of the **State of the Energy Union.**

To track implementation effectively, it is essential to establish robust monitoring, reporting, verification and evaluation processes. Many **indicators under EPBD Annex II lack specific quantitative requirements,** making it difficult to monitor progress. For example, there is no specific indicator to track whether one-stop shops successfully target vulnerable households.

BPIE RECOMMENDATIONS:

Member States should consider NBRPs as living documents that should evolve based on measured progress and developments. They should continuously collect and update data on their building stock, track the implementation of policies and measures in both quantitative and qualitative ways, and assess alignment between the NBRP and actual progress. New funding opportunities or technological advancements should be incorporated as soon as possible and necessary adjustments made before the next official revision to maintain relevance and effectiveness. To support these efforts, the dedicated NBRP task force should expand its mandate from plan preparation to ongoing monitoring and implementation, ensuring a structured, permanent and proactive approach.

TO GO FURTHER ON NATIONAL BUILDING RENOVATION PLANS
ADDITIONAL READING

- Commission (2019), Recommendation 2019/786 Building renovation
- BPIE (2020), A review of EU Member States' 2020 long-term renovation strategies
- BPIE (2021), The road to climate neutrality: are national long-term renovation strategies fit for 2050?
- Our Buildings project (2021), Long-term renovation strategies as key instruments to guide local renovation: lessons learned from good practices around Europe – financing, data collection, and tailored approaches
- Joint Research Centre (2022), Assessment of the first long-term renovation strategies under the Energy Performance of Building Directive (Art. 2a)
- Commission (2022), Staff Working Document 375 final Analysis of the national long-term renovation strategies
- CAN Europe & ECODES (2024), Planning a fair and ambitious Renovation Wave: tools and practices to build better lives through the implementation of the Fit for 55 strategy
- EPBD.wise project (2024), National Building Renovation Plans and Zero-Emission Buildings: policy needs and best practices

2 POLICIES TO IMPROVE THE RENOVATION OF EXISTING BUILDINGS

QUICK LINKS FOR THIS CHAPTER

BE ON THE LOOKOUT FOR:

Definitions | BPIE recommendations | Good practice examples | Focus

WHAT IS NEW, WHAT HAS CHANGED AND WHY IS IT IMPORTANT?

The 2024 EPBD introduces more precise requirements for renovating existing buildings to enhance the energy performance of the entire building stock. This is achieved in two ways: at the individual building level for non-residential buildings and at the stock level for residential buildings. Both requirements entail a specific focus on renovating the worst-performing buildings.

Minimum energy performance standards (MEPS), a new EU-level measure, have been introduced for non-residential buildings. These standards, based on national thresholds, prioritise the renovation of the worst-performing buildings. Member States must implement MEPS **to ensure that 26% of the lowest-performing non-residential buildings are upgraded** starting with the first tranche of 16% by 2030, and the second tranche of 10% by 2033. For the first time, **the EPBD also sets a quantitative target for residential building renovations at the national level**. Member States are required to achieve a 16% improvement in the average primary energy use of the national residential segment by 2030 compared to 2020, and a 20-22% improvement by 2035 compared to 2020.

As different provisions apply to various subsegments of the building stock, **it is crucial to first determine in which segment a building or building unit is, to identify the specific requirements it must meet**. The EPBD provides a legal definition only for residential buildings.

Definition (Article 2§18): residential building or building unit

A room or suite of rooms in a permanent building or a structurally separated part of a building which is designed for all-year habitation by one private household.

Consequently, a non-residential building is defined as any building that does not fall under the residential segment. It is estimated that non-residential buildings represent 9% of the total EU building stock in terms of number of buildings, but 32% of the total floor area.[69]

Categories of non-residential buildings based on their use (EPBD Annex I §6)

Offices, educational buildings, hospitals, hotels and restaurants, sports facilities, wholesale and retail trade services buildings.

EPBD Recital 34 recalls that for **mixed-use buildings,** with both residential and non-residential units, Member States are allowed to choose whether to treat them as entirely residential or entirely non-residential. It is recommended that Member States adopt a uniform approach based on the proportion of the floor area dedicated to each segment and apply it consistently to all buildings – avoiding an individual case-by-case analysis and decision.[70] However, considering the EPBD now applies different requirements to buildings based on their use, it would make more sense **to differentiate the units based on their use.**

[69] Building Stock Observatory data from 2020, based on MODERATE project.
[70] For example, if a building includes 10% or less floor area dedicated to non-residential use, the building is deemed to be a residential building.

OWNERSHIP	PRIVATE		
Use	Non-residential	Residential	Multi-unit building with differentiated use
Applicable requirements	Minimum energy performance standards (EPBD Article 9§1)	National trajectory for the progressive renovation of the residential stock (EPBD Article 9§2)	Consider energy use of units based on their use and accordingly apply Article 9§1 or 9§2 requirements to the units
In case of public ownership, EPBD Article 9 and EED Article 6 requirements apply.			

EPBD Article 9 requirements are key. These measures aim to overcome the split-incentive challenge, such as tenant-landlord dynamics, by providing clear responsibilities, with timed pathways, creating visibility. This will increase the renovation rate and improve building performance progressively, while allowing flexibility on how to achieve it, with nationally determined policies tailored to different building categories. Ultimately, these EPBD provisions will boost economic activity in the renovation sector. **Additionally, EPBD Article 9 requirements focus on worst-performing buildings.** Prioritising the renovation of those buildings helps to maximise energy savings and GHG emissions reduction potential, lower energy bills for occupants, address energy poverty, and provide certainty for property owners and managers.

EPBD Article 9 requirements increase the renovation rate and improve building performance progressively, boosting economic activity in the sector, while allowing flexibility on how to achieve goals

2.1 MINIMUM ENERGY PERFORMANCE STANDARDS FOR NON-RESIDENTIAL BUILDINGS *ARTICLE 9§1*

Some key steps are required to implement MEPS in a logical sequence, where resolving one question informs the approach to the next. The process involves addressing the following questions:

1. How can buildings subject to the requirements be identified?
2. How should the ambition level be set for the identified buildings?
3. What are the optimal policy packages – including measures, exemptions and support frameworks – to achieve the ambition levels?
4. How can a fair and effective governance system be designed to ensure compliance and successful implementation?

IDENTIFY THE WORST-PERFORMING BUILDINGS BASED ON QUALITY DATA

STEP 1 CHOOSE THE METRIC(S)

Member States must choose between primary energy use or final energy use, expressed in kWh/(m².y), to determine the MEPS thresholds. They may also include additional indicators such as non-renewable and renewable primary energy use, as well as operational GHG emissions.

Definition (Article 2§9): primary energy

Energy from renewable and non-renewable sources which has not undergone any conversion or transformation process.

Definition (Article 2§58): energy use or energy consumption

Energy input to a technical building system providing an "Energy Performance of Building" service [i.e. according to EPBD Article 2§56: heating, cooling, ventilation, domestic hot water and lighting and others for which the energy use is taken into account in the calculation of the energy performance of building] intended to satisfy an energy need [i.e. according to EPBD Article 2§57: the energy to be delivered to, or extracted from, a conditioned space to maintain the intended space conditions during a given period of time, disregarding any technical building system inefficiencies].

For non-residential MEPS, thresholds can be expressed in either primary energy use or final energy use, whereas the residential segment trajectory is solely based on a reduction of primary energy use. Thresholds for ZEBs are also expressed in primary energy use only. It is therefore recommended to **at least express the MEPS thresholds in primary energy use** to ensure some comparability between the requirements for non-residential and residential buildings in accordance with EPBD Article 9. The choice between primary and final energy as a metric has significant implications for the measures that are incentivised. If only primary energy use is chosen, it will favour stronger actions on supply decarbonisation. If only final energy use is chosen, it will lead to more actions to reduce energy needs. It is therefore recommended to **use both primary and final energy use to ensure a balanced approach.**

BPIE RECOMMENDATION:

Member States should select (at a minimum) primary energy use to determine the MEPS thresholds, but (ideally) both primary energy use and final energy use to simultaneously drive decarbonisation of the supply and reduction of energy demand through energy efficiency.

STEP 2 ESTABLISH A DRAFT BASELINE OVERVIEW

Member States must establish an overview of the non-residential building stock as it was on 1 January 2020. This baseline is fixed on the situation at this date and should not evolve. Updates to the baseline should only be allowed if new or corrected data becomes available for the 2020 reference year. However, by 2025, no large data corrections should be expected, due to the typical time lags in data reporting.[71]

According to the EPBD, **the overview shall be *"based on available information and, where appropriate, on statistical sampling".*** As a first source of information on their non-residential building stock, Member States should consult the overview of the national building stock which should be included in all past national long-term renovation strategies, and the one to be prepared for the first draft NBRP. Data collection can be based on EPCs: beyond the EPC class, it is the underlying input data that needs to be extracted from the EPC. However, EPC coverage of the non-residential segment is quite low.

This means that **complementary methods are needed**. Different criteria which can be considered as a proxy to estimate the energy performance of the building, such as the age of the building or metered consumption (as provided by energy utilities based on energy bills), can be used.[72] Other more innovative approaches such as AI-powered tools could be leveraged to increase the speed of the non-residential stock mapping, if performed under certain quality conditions. Finally, once in place, the database for the energy performance of buildings, to be established by May 2026 pursuant to EPBD Article 22, could serve to further refine the overview of the non-residential building segment.

GOOD PRACTICE EXAMPLE:

- **Building and Housing Registry (Denmark):** The Building and Housing Registry (BBR) is a national database that contains comprehensive and publicly accessible information on both commercial buildings and housing, and their condition. The variables include use, location, year of construction, layout, technical conditions, electrical installations and tenancy. It is regularly updated by municipalities, based on construction permits and property changes, and building owners are engaged in ensuring that data is correct. This data is actively used by building sector stakeholders for purposes such as property tax, housing subsidies, property valuation and trading. Read more on the BBR website and Denmark's Data Overview.
- **National Buildings Database, non-domestic building (England and Wales, UK):** The UK is developing a National Building Database. To obtain a more complete picture of the non-domestic building stock in England and Wales (with particular focus on hospitality buildings in the pilot phase), a data-driven methodology was used to combine information from Valuation Office Agency records, Inter-Department Business Register data and EPCs. This methodology allowed for classification of buildings by different conditions such as type of building activities, spatial conditions, geographical distribution, building age, rural/urban. The modelling meant certain characteristics of buildings could be derived even when not recorded by specific records or databases. A survey was also conducted to collect more detailed information on buildings beyond the database. The analysis gave a valuable understanding of the composition of the non-domestic building stock, its energy consumption dynamics across different building types, as well as its complexity and issues (e.g. almost a quarter of non-domestic premises share a building with domestic premises, and many non-domestic buildings are protected by heritage or conservation status). Read more on the UK government website.

[71] For example, Eurostat data is usually available for the previous year and corrections are rarely added after a two-year timespan.
[72] For metered consumption, it is important to correct the effects on measured data from weather and user behaviour.

STEP 3 EXCLUDE THE BUILDINGS UNDER "GENERAL EXEMPTIONS" TO FINALISE THE BASELINE OVERVIEW

EPBD Article 9§6 allows Member States to exempt certain categories of non-residential buildings from MEPS compliance. These exemptions constitute "general exemptions", distinct from those based on an individual case-by-case assessment.[73]

Buildings eligible under the "general exemptions" category include:

- *Buildings officially protected as part of a designated environment or because of their special architectural or historical merit, or other heritage buildings, in so far as compliance with the standards would unacceptably alter their character or appearance, or if their renovation is not technically or economically feasible*
- *Buildings used as places of worship and for religious activities*
- *Temporary buildings with a time of use of two years or less, industrial sites, workshops and non-residential agricultural buildings with low energy demand and non-residential agricultural buildings which are used by a sector covered by a national sectoral agreement on energy performance*
- *Stand-alone buildings with a total useful floor area of less than 50 m²*
- *Buildings owned by the armed forces or central government and serving national defence purposes, apart from single living quarters or office buildings for the armed forces and other staff employed by national defence authorities.*

While Member States may choose to exempt certain buildings from this list from MEPS compliance, if they do so, then they must exclude those buildings from the baseline.

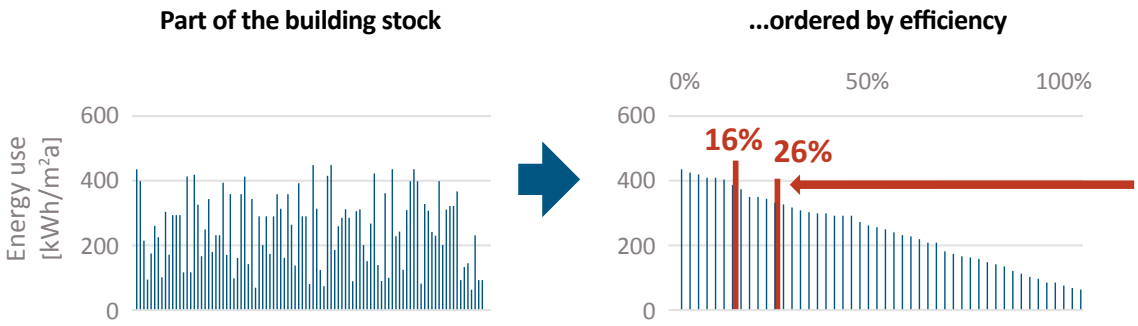
BPIE RECOMMENDATION:

Member States should avoid broad exclusion without proper evaluation: some buildings under this category may still have significant energy performance improvement potential, provided the design of the MEPS is appropriate (which is allowed and even incentivised by the EPBD).

[73] For more information on these, see "Step 3: Limit exemptions and adjustments" in the subsection "Offer optimal policy packages" below.

STEP 4 IDENTIFY THE 16% AND 26% WORST-PERFORMING NON-RESIDENTIAL BUILDINGS WITHIN THE BASELINE OVERVIEW

Based on the established non-residential building stock overview, Member States must identify the 16% and 26% worst-performing buildings. The EPBD does not specify whether the 16% and 26% thresholds should be determined by the number of buildings or the total floor area. Each option has advantages and drawbacks in terms of ease of data collection and impacts on compliance checking methods.[74]



An important point to consider is the high heterogeneity of the non-residential building stock. Different building categories, as for example outlined in EPBD Annex I §6, have very different energy use levels.[75] According to the EPBD, *"Member States may set the maximum energy performance thresholds with reference to the national non-residential building stock as a whole or per building type or category of building."* A certain level of granularity is therefore allowed to **better identify the 16% and 26% worst-performing buildings in each category** of the non-residential building segment.

Besides giving **a more accurate picture of the non-residential building segment**, this approach will minimise the effect of outliers, the *very* worst-performing buildings, on the threshold-setting exercise. It will also ensure more effective MEPS implementation, as it will enable the **design of policy packages that are more targeted** to each subcategory of the segment, whether in terms of measures, financial support or compliance strategies. However, **a balance must be found in this segmentation exercise.** With too few categories, Member States will lack sufficient granularity to tailor policies effectively. But with too many categories, Member States will increase the complexity of implementing policies and monitoring their impact.

Finally, when Member States have identified the 16% and 26% worst-performing buildings within their non-residential stock(s), they may express these two tranches through EPC classes. In this approach, **EPCs can serve as the output metric to communicate the thresholds to the wider public (provided there is a correspondence between the two)**. However, the 16% and 26% tranches are not based on the number of buildings within the two lowest EPC classes (i.e. F and G).

[74] Based on the graph on page 30 of Öko-Institut e.v. (2023), Minimum Energy Performance Standards for Non-Residential Buildings: EU requirements and national implementation.

[75] High intensity non-residential buildings would include hospitals and offices as well as wholesale and retail trade services buildings. Educational buildings, hotels, restaurants and sports facilities would typically consume less.

BPIE RECOMMENDATION:

Member States should express the 16% and 26% tranches in terms of *number* of worst-performing non-residential buildings and determine the two tranches within each category of non-residential buildings. Finally, they should, if possible, communicate the tranches using EPC classes.

SET THE MEPS AMBITION LEVEL(S)

STEP 1 DETERMINE THE MINIMUM AMBITION LEVEL TO COMPLY WITH EPBD ARTICLE 9§1

Once Member States have determined which buildings fall under the scope of Article 9§1, i.e. the 26% worst-performing non-residential buildings, they must ensure their improvement through a two-step process. **By 2030, the worst-performing 16% must be improved and by 2033, an additional 10% of the worst-performing buildings must be improved.** The EPBD's objective for these buildings is to move them out of the lowest-performing tranche(s), **without mandating a specific performance level they must achieve – only that they must improve beyond the defined threshold**. For example, if the 16% worst-performing buildings are those consuming more than 350 kWh/(m^2.y) in primary or final energy, then by 2030, they must be upgraded to have a primary or final energy use below 350 kWh/(m^2.y).

The EPBD states that if Member States choose to exempt certain non-residential buildings based on individual criteria,[76] they ***"must ensure that equivalent energy performance improvements are achieved elsewhere in the non-residential stock to compensate for these exemptions"***. When setting the ambition level for improving the 16% and 26% worst-performing buildings, Member States should take this requirement into account. If additional energy performance improvements are needed to offset exemptions, **the target should be set higher than just meeting the threshold.** For example, if the 16% worst-performing buildings are those consuming more than 350 kWh/(m^2.y) in primary or final energy, then by 2030, instead of merely falling below this threshold, they should be upgraded to achieve a consumption level below 300 kWh/(m^2.y) to compensate for exemptions elsewhere in the stock.

BPIE RECOMMENDATION:

When setting the ambition level to be achieved by the worst-performing non-residential buildings, Member States should aim at improving them not only past this threshold but past a more ambitious level to compensate for the individual exemptions in other parts of the non-residential stock.

[76] For more information on these, see "Step 3: Limit exemptions and adjustments" in the subsection "Offer optimal policy packages" below.

THE LINK BETWEEN MEPS AND MINIMUM ENERGY PERFORMANCE REQUIREMENTS (MEPR)

EPBD Recital 31 and Article 9§5 clarify the connection between MEPS and MEPRs. MEPS ensure that the renovation of worst-performing buildings takes place (acting as a trigger for renovation), while MEPRs ensure that a certain renovation depth is achieved. More precisely, if a building is renovated due to MEPS, then its building elements must comply with MEPRs for building elements (EPBD Article 5), which are set according to cost-optimal levels. And if MEPS trigger a major renovation, then the entire building must comply with MEPRs for buildings (EPBD Article 8), also set according to cost-optimal levels.

Definition (Article 2§22): major renovation

The renovation of a building where either (a) the total cost of the renovation relating to the building envelope or the technical building systems is higher than 25 % of the value of the building, excluding the value of the land upon which the building is situated; or (b) more than 25 % of the surface of the building envelope undergoes renovation.

STEP 2 DETERMINE THE OPTIMAL AMBITION LEVEL TO COMPLY WITH BROADER EU PROVISIONS

Member States should consider a broader approach to the EPBD requirements to incentivise a higher level of ambition for worst-performing buildings beyond the minimum threshold. The EPBD mandates Member States to *"establish specific timelines for non-residential buildings to comply with **lower maximum energy performance thresholds by 2040 and 2050**, in line with the pathway for transforming the national building stock into zero-emission buildings."* Since non-residential building requirements extend beyond 2033, it is essential to incorporate long-term goals into the national threshold-setting exercise. Member States should also reflect on the overarching long-term vision and objectives for the building stock, including the complete phase-out of fossil fuel boilers by 2040 (EPBD Annex II) and the target of at least 49% renewables in the EU's final energy consumption in buildings by 2030 (RED III Article 15a§1).

Second, Member States can leverage the link with the energy savings obligation from EED Article 8, which requires them to achieve cumulative and progressively more energy savings over designated periods (e.g. 2021-2030) and across all economic sectors, including buildings.[77] Normally, savings achieved under EED Article 8 must be additional to EU law, meaning that improvements required by other EU regulations cannot count towards energy savings obligation targets.[78] However, **savings from implementing MEPS under EPBD** Article 9 are exempt from this additionality criterion and **can be fully counted towards the energy savings obligation.** This provides a strategic opportunity for Member States to maximise synergies between energy savings obligations and strong renovation measures.

[77] The annual energy savings rate as set in the 2023 Energy Efficiency Directive increases from 0.8% between 2021 and 2024 to 1.3% from 2024 to 2026, 1.5% from 2026 to 2028 and 1.9% from 2028 to 2030.

[78] For more information on the additionality rule, see section 7.3 of the Commission Recommendation (EU) 2019/1658 on transposing the energy savings obligations under the Energy Efficiency Directive.

Member States should also consider the broader benefits of high-performance non-residential buildings, particularly in terms of indoor environmental quality and productivity – for more information about how indoor environmental quality features in the EPBD, see Deep Dive #5. Numerous studies highlight the advantages of deep renovations in specific building categories. In schools, enhanced building design, including increased daylight exposure and improved ventilation, can boost student performance by up to 18%.[79] In hospitals, better building conditions can reduce patient stays, lower mortality rates by 19% and cut medical costs by up to 21%. Public healthcare expenditure could be reduced by as much as €80 billion annually through improved daylight exposure and better indoor air quality.[80] These benefits provide additional incentives for Member States to pursue deep renovations beyond the minimum required ambition.

Finally, Member States should strive to future-proof non-residential buildings. The EPBD mandates Member States to address climate adaptation in buildings undergoing major renovations (Article 8§3) – which would be the case for some worst-performing non-residential buildings having to comply with EPBD Article 9§1. However, instead of merely "addressing" the issue, Member States should establish clear requirements that integrate both mitigation and adaptation strategies. For a detailed exploration of adaptation and resilience, see Deep Dive #4.

BPIE RECOMMENDATION:

When setting the ambition level to be achieved by the worst-performing non-residential buildings, Member States should prioritise bringing targeted buildings to a higher energy performance level immediately rather than just taking them out of the lowest two tranches by the set deadlines. Non-residential buildings subject to Article 9§1 should ideally be deeply renovated to meet ZEB standard or undergo a staged deep renovation process. Early communication of the 2040 and 2050 thresholds will enhance long-term visibility and incentivise renovating the worst-performing buildings, ideally in fewer steps, to higher levels than the thresholds. Member States can subsegment the non-residential stock (e.g., hospitals, hotels) and apply differentiated renovation targets, requiring some categories to meet higher energy performance standards from the start, while improving others more progressively.

[79] BPIE (2018), Buildings 4 people.
[80] BPIE (2024), Healthy Buildings Barometer 2024: How to deliver healthy, sustainable, and resilient buildings for people.

STEP 3 REFLECT MEPS AMBITION LEVELS AND RELATED INFORMATION IN THE NBRP

In accordance with EPBD Article 3, Member States must include in their NBRP information related to MEPS for non-residential buildings. More precisely, the plan should describe:

- The maximum energy performance thresholds for 2030 and 2033
- The progressively lower maximum energy performance thresholds for 2040 and 2050
- Energy savings (in ktoe) achieved in non-residential buildings
- Criteria for exempting individual non-residential buildings
- Estimated share of exempted non-residential buildings (from both general and individual exemptions)
- Estimated equivalent energy performance improvements needed resulting from exemptions of individual non-residential buildings
- Overview of implemented and planned policies and measures: national MEPS as well as other policies and actions targeting the worst-performing segments of the national building stock

Since the NBRP process follows a two-stage cycle (draft and final versions) that includes Commission recommendations and repeats every five years, **Member States should adjust their announced MEPS thresholds and ambition levels in a timely manner:**

- Between the draft and final NBRP (December 2025 – December 2026): adjust the 2030, 2033, 2040 and 2050 MEPS levels.
- Between the first and second NBRP (December 2026 – January 2029): adjust the 2033, 2040 and 2050 MEPS levels.
- At the NBRP update (2033/2034): adjust the 2040 and 2050 MEPS levels.

OFFER OPTIMAL POLICY PACKAGES

STEP 1 ESTABLISH MEPS WITH OPTIMAL DESIGN FEATURES

Member States should set MEPS for non-residential buildings, ensuring that the worst-performing buildings leave the 26% tranche (at a minimum) or achieve higher ambition levels (at best). But what exactly are MEPS, and how should they be designed?

Definition (Article 2§4): Minimum energy performance standards

Rules that require existing buildings to meet an energy performance requirement as part of a wide renovation plan for a building stock or at a trigger point on the market such as sale, rent, donation or change of purpose within the cadastre or land registry, in a period of time or by a specific date, thereby triggering the renovation of existing buildings.

To design MEPS effectively, **Member States should first reflect on the segmentation of the non-residential building stock into smaller categories** (e.g. hotels, hospitals). They should also consider factors such as ownership structure, investment capacity and building size. Some subsegments, like large commercial buildings with professional energy managers, are easier to regulate. Greater granularity in MEPS design based on these criteria will help balance feasibility and acceptability.

Second, **Member States should align MEPS with broader EPBD provisions affecting non-residential buildings, particularly the "solar mandate"**. EPBD Article 10 requires Member States to ensure the installation of suitable solar energy systems by 31 December 2027 on existing non-residential buildings with a useful floor area of over 500 m², in four cases: (1) the building undergoes a major renovation, (2) renovation works require an administrative permit, (3) roof works are carried out, and (4) a technical building system is installed. Synergies between MEPS and Article 10 should be considered, since many of the worst-performing buildings in the 26% tranche (subject to MEPS) will also need to comply with EPBD Article 10. Another requirement to consider for non-residential buildings subject to MEPS is RED Article 15a, which requires Member States to mandate minimum levels of renewable energy sources in buildings undergoing major renovations. Finally, Member States should consider additional EPBD provisions specific to non-residential buildings, such as the requirement that *"where technically and economically feasible, non-residential buildings are equipped with building automation and control systems"*. This applies to buildings with an effective rated output exceeding 70 kW for heating, air-conditioning, or ventilation systems by 31 December 2029 (EPBD Article 13§9).

By considering these provisions when designing their MEPS scheme, **Member States can enhance policy coherence** and improve energy performance in non-residential buildings.

GOOD PRACTICE EXAMPLE:

- **Tertiary Decree (France):** In France, tertiary buildings – including educational institutions, offices and healthcare facilities – over 1,000 m² must reduce their final energy consumption (compared to a 2010 baseline) by 40% by 2030, 50% by 2040 and 60% by 2050. Alternatively, buildings can meet an energy consumption level equivalent to newly constructed buildings of the same category. The Tertiary Decree (Éco Énergie Tertiaire) covers approximately 68% of the non-residential segment. As of 2022, energy consumption has been reduced by 22% compared to 2010 – more than half of the 2030 target.[81] Compliance requires reporting through the OPERAT platform, which tracks progress. For more details, visit the French government website.

- **MEPS for offices (Netherlands):** The Netherlands EPC system has been in place since 2008. Various property transactions, such as sales or rentals, require an EPC, resulting in a widespread classification of buildings based on their energy performance. This system enables the effective regulation of MEPS. Since 2023, office buildings with an EPC rating below class C cannot be used, with a few exceptions. This regulation is a key step toward achieving climate-neutral offices by 2050. As of January 2024, 77% of Dutch office buildings have an EPC rating of C or higher.[82] Non-compliance can lead to penalties or an order to cease building use. To encourage deeper renovations, the government provides financial and tax incentives.

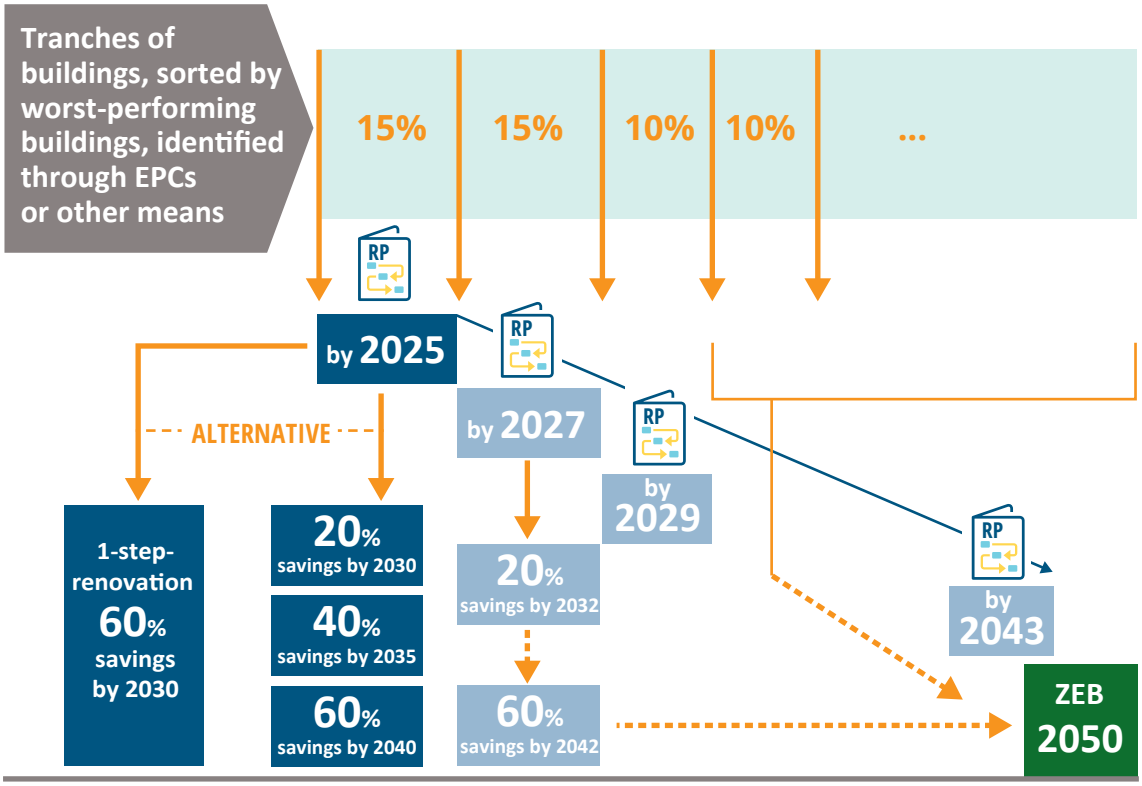
[81] ADEME data.
[82] Odyssee-Mure database.

STEP 2 SET UP A SUPPORTIVE FRAMEWORK

While designing MEPS, Member States should not rely solely on mandatory policies. They should also **establish a supportive framework to facilitate compliance and encourage ambition.** EPBD Article 9§4 requires Member States to support compliance through the following measures.

Financial support: The EPBD requires Member States to *"provide appropriate financial measures and design integrated financing schemes that incentivise deep and staged deep renovations"*. For more information on financial support, see section 4.4.

Advisory services, technical assistance and training: The EPBD mandates Member States to *"provide technical assistance, including through one-stop shops"* to support compliance. One-stop shops are essential for communication and early engagement with obligated building owners, well ahead of compliance deadlines. Renovation passports, though not explicitly mentioned in EPBD Article 9§4, should also be used as a tool to guide staged deep renovations in non-residential buildings and ensure a smooth transition to compliance. This could notably be the case in smaller non-residential buildings, which less often employ professional energy managers. The figure thereafter shows an example of a MEPS scheme issuing renovation passports progressively, starting from the worst-performing building tranches and aiming at reaching ZEB level by 2050.[83] For more information on renovation passports and one-stop shops, see sections 4.2 and 4.3.



[83] More information in BPIE (2023), Minimum Standards, Maximum Impact: how to design fair and effective MEPS for buildings in Europe.

GOOD PRACTICE EXAMPLE: TERTIARY DECREE (FRANCE)

The French energy agency ADEME has supported 13,000 private companies subject to the Tertiary Decree in meeting their obligations. This has been achieved by establishing dedicated one-stop shops offering personalised building audits and tailored advice on how to reduce energy consumption.

Removing non-economic barriers

Member States must remove non-economic barriers, such as split incentives, to ensure a smoother rollout of MEPS in non-residential buildings. This can also be done through incentives and **support for industrialised approaches to renovations,** building capacity in the market to accelerate implementation and scale up measures.

BPIE RECOMMENDATION:

When designing the supportive framework around MEPS obligations, **Member States should optimise it based on a sub segmentation of the non-residential stock,** as different categories have different needs and challenges. Those might also be linked to the ownership structure and size of the building.

A targeted approach will help ensure the right mix of financial support, advice and information is being given. **Member States should use the supportive framework not just for compliance but also to encourage higher ambition**. That means either offering incentives for buildings to meet MEPS ahead of deadlines or providing additional support for buildings that achieve higher energy performance than required at the compliance deadline.

STEP 3 USE EXEMPTIONS AND ADJUSTMENTS SPARINGLY

Member States may exempt certain categories of buildings from complying with MEPS under the "general exemptions" outlined in EPBD Article 9§6. These include:

- *Buildings officially protected as part of a designated environment or because of their special architectural or historical merit, or other heritage buildings, in so far as compliance with the standards would unacceptably alter their character or appearance, or if their renovation is not technically or economically feasible.*
- *Buildings used as places of worship and for religious activities.*
- *Temporary buildings with a time of use of two years or less, industrial sites, workshops and non-residential agricultural buildings with low energy demand and non-residential agricultural buildings which are used by a sector covered by a national sectoral agreement on energy performance.*
- *Stand-alone buildings with a total useful floor area of less than 50 m².*
- *Buildings owned by the armed forces or central government and serving national defence purposes, apart from single living quarters or office buildings for the armed forces and other staff employed by national defence authorities.*

BPIE RECOMMENDATION:

General exemptions should not be granted by default. Instead, Member States should apply more granular criteria to assess whether exemptions are necessary for these categories of buildings, while still aiming for staged deep renovations, as some tailored solutions exist. Member States should also tailor their policy packages accordingly to these categories of buildings.

GOOD PRACTICE EXAMPLE: VILLA CASTELLI (ITALY)

Renovating historic buildings is not only possible but also highly beneficial and should not be overlooked, even when exemptions are allowed. A notable example is Villa Castelli in Italy, where the renovation led to a 90% reduction in energy demand while fully respecting conservation requirements. In this case, protected elements such as the façade remained untouched, while non-heritage components, such as windows, were replaced. The renovation significantly improved liveability, reduced energy bills and made the building comfortably usable in winter – something previously difficult due to severe heat loss. For more details, visit the Renovate Europe website.

Member States may also exempt specific non-residential buildings on a case-by-case basis, under the "individual exemptions" framework. However, these exemptions should require a clear approval process with strict conditions, based on the criteria below (outlined in EPBD Article 9§1), and should be declared by Member States in their NBRP:

1. ***Considering the building owner's ability to invest:*** The EPBD authorises Member States to exempt individual buildings due to *"serious hardship"*. This covers situations where the building owner faces economic difficulties, making investment unfeasible. Some Member States define hardship conditions within their taxation frameworks, as unforeseen financial emergencies. EPBD Recital 26 recalls that the hardship exemptions apply only for as long as the hardship persists.
2. ***Considering the building itself:*** The EPBD authorises Member States to exempt individual buildings considering their *"future use"*. This covers planned demolition (Recital 26) but also planned conversion into a residential unit.
3. ***Considering both the owner's and building's situation:*** The EPBD authorises Member States to exempt individual buildings *"in case of an unfavourable cost-benefit assessment for the overall renovation of the building"*. However, any individual renovation measures with a favourable cost-benefit assessment must still be implemented.

BPIE RECOMMENDATION:

Member States should strive to build their cost-benefit assessment on existing instruments, such as the updated cost-optimal methodology (EU reference framework to be available as of 30 June 2025). Member States should also aim to identify synergies with energy audits undertaken in accordance with EED Article 2§32, Article 11 and Annex VI. Those energy audits are due by 11 October 2026, and then every four years, and might be performed on the same buildings under the scope of EPBD Article 9§1.

To ensure exemptions do not undermine the overall impact of MEPS, the EPBD has introduced three safeguards. Member States must:

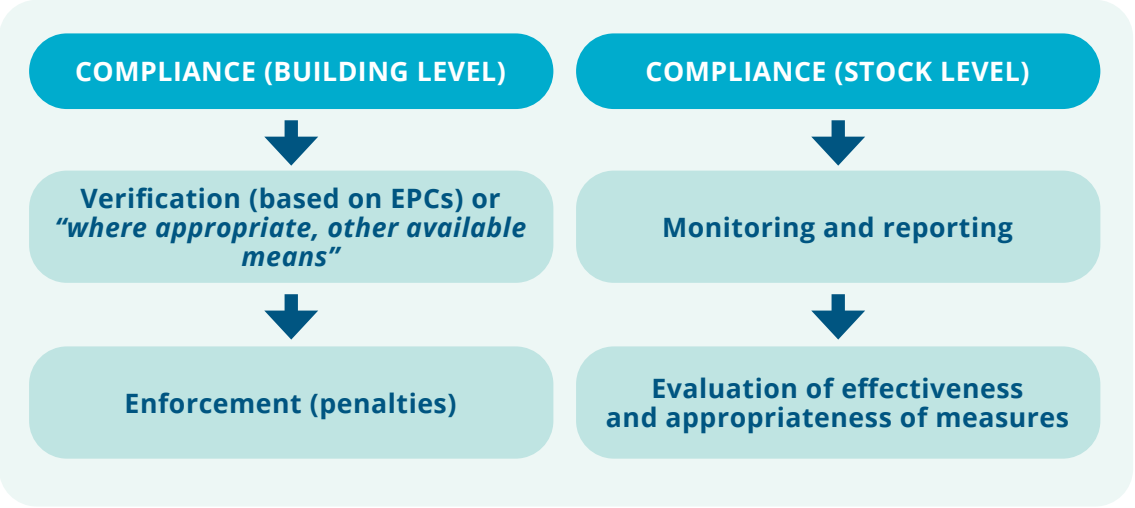
- Avoid exempting a *"disproportionate number"* of non-residential buildings.
- *"Ensure equal treatment between non-residential buildings."* This means no specific subsegment (e.g. all office buildings) could be exempted as a category on principle. Exemptions should be based on individual building characteristics, not general building categories.
- Compensate for individual buildings exempted by ensuring equivalent energy performance improvements in other parts of the non-residential building stock. This compensation mechanism does not apply to buildings exempted under general exemptions, as these are removed from the MEPS baseline.

If building exempted under 'general exemptions'	**Then building removed from baseline**
If building exempted under 'individual exemptions'	**Then building compensated through energy performance improvements in other parts of non-residential stock**

Finally, **the EPBD allows Member States to apply an adjustment mechanism if parts of the non-residential stock are *"seriously damaged by a natural disaster"***. The EPBD does not provide a legal definition of what is considered a natural disaster, but references are made to seismic activity (Annex II), earthquakes and floods (Article 9§2). In these cases, Member States may temporarily adapt their energy performance thresholds to reflect the damage and swap some of the buildings from the two lowest-performing tranches under EPBD Article 9§1 with disaster-affected buildings. Member States must report such adjustments and specify their expected duration in their NBRP.

DESIGN A FAIR AND EFFECTIVE GOVERNANCE SYSTEM ENSURING DELIVERY

An effective governance mechanism ensures compliance by verifying requirements both at the individual building level and through broader assessments at the building stock level.



STEP 1 ENSURE COMPLIANCE AT INDIVIDUAL BUILDING LEVEL

Verification

EPBD Article 9 states that *"compliance of individual non-residential buildings with the thresholds shall be checked on the basis of EPCs or, where appropriate, other available means"*. **By default, compliance should be verified using EPCs**. However, there are pros and cons to using EPCs for compliance in the non-residential sector.

PROS	CONS
• EPCs are familiar to building owners. • Less affected by occupant behaviour compared to the residential sector. • MEPS tranches can be clearly expressed through EPC ratings.	• Limited EPC coverage in the non-residential segment. • EPCs are undergoing reform under the EPBD, creating potential inconsistencies. • No legal liability for EPC quality and reliability in all Member States.

Because of these limitations, **the EPBD allows for *"other available means"* to verify compliance where appropriate.** While the directive does not specify minimum quality criteria for these alternatives, they should be carried out by an independent expert to ensure reliability. **Other compliance proxies** could include:

- Checking whether a list of eligible renovation measures was effectively implemented
- Follow-up on energy audits in accordance with EED Article 11
- Site inspections or digital verification tools, as outlined in EPBD Article 23§8: *"Member States shall put in place inspection schemes or alternative measures such as digital tools and checklists to certify that the delivered construction and renovation works meet the designed energy performance and are compliant with the minimum energy performance requirements laid down in the building codes or equivalent regulations."*

▶ *Enforcement*

EPBD Article 9§7 requires **Member States to ensure MEPS implementation, including by setting penalties.** There are some key considerations for an optimal enforcement system. First, Member States must reflect on the segmentation of the non-residential building stock, considering ownership structure, investment capacity and the ambition level of MEPS. Some non-residential categories are easier to regulate, such as large commercial buildings with professional energy managers. Penalties can take different forms, such as fines, rental bans or progressive warnings, but they must be *"effective, dissuasive, and proportionate"* (EPBD Article 34). When defining penalties, Member States need to consider the financial situation of building owners. For all situations, early communication is crucial – building owners and managers must be informed about MEPS well in advance through campaigns, workshops and consultations in the NBRP process. Finally, Member States must also clearly determine responsibilities in the enforcement procedures:

- ***Who controls compliance, imposes and collects penalties?*** This should be a dedicated national authority, regional agencies, municipalities or third parties, but should not rely on building owners to self-certify.
- ***When should compliance checks occur?*** At regular intervals, linked or not to other reporting obligations? To improve monitoring, subsidies could be leveraged: buildings benefiting from financial support could be required to demonstrate compliance to get financial support disbursed.

Compliance should be seen as the other side of the coin to the supportive framework.

GOOD PRACTICE EXAMPLE: COMPLIANCE MECHANISM FOR MEPS FOR OFFICES (NETHERLANDS)

The Netherlands can be seen as an example for non-residential MEPS enforcement. Key success factors included:

- A clear and early announcement of the MEPS requirement to reach minimum EPC class C (2018 for 2023), based on a well-defined scope (offices larger than 100m²) and exemptions (change of use, technical or financial unfeasibility).
- Government communication and support, through information campaigns, technical guidance and financial incentives.
- Strong engagement from banks, which played a key role in informing building owners and in integrating MEPS into loan conditions – non-compliant buildings became high-risk investments, encouraging landlords to act.
- Gradual enforcement with warnings sent ahead of progressive penalties (as of 2023, non-compliant offices cannot be leased or used, and municipalities can impose fines).

STEP 2 ENSURE COMPLIANCE AT NON-RESIDENTIAL STOCK LEVEL

Monitoring and reporting by Member States

Member States should systematically monitor the achievement of MEPS requirements for non-residential buildings at the stock level and report their progress within their NBRP. Specifically, they should declare energy savings achieved in non-residential buildings (measured in ktoe) and provide an overview of implemented and planned MEPS policies and additional actions targeting the worst-performing segments of the building stock. Member States must report on their MEPS progress within the NECP progress reports, due by 15 March 2031 and every two years thereafter. Since the NBRP process follows a two-stage cycle – with draft and final versions incorporating Commission recommendations and updating every five years – Member States should adjust their MEPS thresholds and ambition levels accordingly:

- Between the draft and final NBRP (December 2025 – December 2026): adjust 2030, 2033, 2040 and 2050 MEPS levels.
- Between the first and second NBRP (December 2026 – January 2029): adjust 2033, 2040 and 2050 MEPS levels.
- At the NBRP update (2033/2034): adjust 2040 and 2050 MEPS levels.

GOOD PRACTICE EXAMPLE: OPERAT DATABASE (FRANCE)

OPERAT *(Observatoire de la Performance Énergétique, de la Rénovation et des Actions du Tertiaire)* is France's official digital platform for reporting, collecting and monitoring energy performance in tertiary sector buildings. Developed and managed by the national energy agency ADEME, it serves as a key tool for tracking compliance with the Tertiary Decree, which mandates progressive energy reduction targets for non-residential buildings over 1,000 m². Some of the key features of OPERAT are:

- A centralised reporting system: All obligated building owners must annually declare their energy consumption via OPERAT, and the platform generates digital compliance certificates
- Performance benchmarking and automated feedback: OPERAT allows users to compare their building's energy performance against sectoral benchmarks and provides customised feedback and recommendations.
- Multi-user access and shared responsibility: Landlords and tenants can jointly manage reporting obligations, ensuring a collaborative approach to energy savings, while the platform enables differentiation of energy usage between owners (structural elements) and tenants (operational elements).

Overall, OPERAT reduces administrative burdens by digitising compliance tracking, while helping France to fine-tune policies based on real-world performance data. The tool also includes a clear and detailed user guide.

Evaluation of effectiveness and appropriateness of measures by the Commission

The Commission plays a crucial role in assessing and providing recommendations to ensure that Member States meet their MEPS obligations effectively. This involves conducting ambition gap and delivery gap assessments at different stages of the NBRP/NECP cycles. The **ambition gap analysis** should take place during the Commission assessment of the draft NBRP, together with issuing country-specific recommendations. Those suggestions should not only address the ambition level of MEPS but also evaluate the comprehensiveness and effectiveness of the supportive framework and compliance mechanisms. It is therefore key that Member States include as much detail as possible on their planned policies, defined thresholds and ambition levels, as well as the supportive framework, in the draft NBRP due December 2025. The Commission should also conclude **a delivery gap assessment**, taking stock of achieved results on non-residential MEPS as part of its assessment of the NECP progress reports (due 2031). The Commission should assess whether some subsegments of the non-residential stock require more support based on initial results, their ownership structure and financial capacity. By ensuring timely and robust assessments, the Commission can help Member States close ambition and delivery gaps, ultimately driving stronger energy performance improvements in the non-residential building sector.

TO GO FURTHER ON
MEPS FOR NON-RESIDENTIAL BUILDINGS
ADDITIONAL READING

- **Öko-Institut e.v. (2023),** Minimum Energy Performance Standards for Non-Residential Buildings: EU requirements and national implementation
- **BPIE (2023),** Minimum Standards, Maximum Impact: how to design fair and effective MEPS for buildings in Europe
- **BPIE (2024),** Wärmewende in Europa: Gute Praxis aus ausgewählten Ländern & Empfehlungen für Deutschland
- **EPBD.wise project (2024),** Article 9: MEPS and trajectories for progressive renovation

2.2 NATIONAL TRAJECTORY FOR THE PROGRESSIVE RENOVATION OF THE RESIDENTIAL STOCK *ARTICLE 9§2*

The EPBD establishes a binding quantitative target for enhancing the energy performance of national residential building stocks. Member States must achieve a 16% reduction in the average primary energy use of this segment by 2030 and a 20-22% reduction by 2035, relative to 2020 levels. To ensure focus on the worst-performing buildings, a sub-target mandates that at least 55% of the total improvement must come from the 43% least-efficient residential buildings.

This section outlines the key steps required to implement Article 9§2 in a logical sequence, where resolving one question informs the approach to the next. The process involves addressing the following questions:

1. How to obtain an overview of the residential stock?
2. How to establish the renovation trajectory, especially considering that a large part must be delivered in the worst-performing buildings?
3. What are the optimal policy packages – including measures, exemptions and support frameworks – to achieve the ambition levels?
4. How can a fair and effective governance system be designed to ensure compliance and successful implementation?

OBTAIN AN OVERVIEW OF THE RESIDENTIAL STOCK BASED ON QUALITY DATA

STEP 1 CHOOSE THE METRIC(S)

Member States must express the trajectory as a reduction in average primary energy use, i.e. kWh/(m².y). However, setting a trajectory based solely on primary energy use has limitations, linked to the impact of eligible measures used to achieve the trajectory. First, changing the primary energy factor[84] alters primary energy use values without reflecting real efficiency gains and improvements to the building itself, missing the benefits of renovation. Second, reduction in primary energy use can be achieved by adjusting the energy source supplying buildings, i.e. shifting to renewables. Improvements would be more substantial if actions on energy demand reduction are undertaken in a coordinated way with supply-side action.

Another point which needs to be clarified is which energy uses are included in the trajectory by using primary energy use as a metric. For example, within their EPCs, some Member States define primary energy use only for heating, while others account for all energy uses. A consistent and transparent approach is essential, and it is recommended Member States **include in the primary energy use metric used to determine the trajectory all energy uses mentioned in EPBD Annex I** (space heating, space cooling, domestic hot water, ventilation, built-in lighting and other technical building systems).

Definition (Article 2§9): primary energy

Energy from renewable and non-renewable sources which has not undergone any conversion or transformation process.

Definition (Article 2§58): energy use or energy consumption

Energy input to a technical building system providing an EPB service [i.e. according to EPBD Article 2§56: heating, cooling, ventilation, domestic hot water and lighting and others for which the energy use is taken into account in the calculation of the energy performance of building] intended to satisfy an energy need [i.e., according to EPBD Article 2§57: the energy to be delivered to, or extracted from, a conditioned space to maintain the intended space conditions during a given period of time, disregarding any technical building system inefficiencies].

[84] The primary energy factor (PEF) is a coefficient that expresses the ratio between primary energy (the total energy required to produce and deliver energy) and final energy (the energy consumed by end-users). It helps account for energy losses occurring during extraction, conversion, transportation and distribution. The PEF quantifies how much primary energy input is needed to deliver one unit of final energy to consumers. A lower PEF indicates higher efficiency, while a higher PEF means greater energy losses in the supply chain.

Member States may choose to use additional metrics besides primary energy use: operational GHG emissions ($kgCO_2eq/(m^2.y)$), non-renewable primary energy use and renewable primary energy use. Using supplementary indicators beyond primary energy use can add value by providing a more comprehensive picture of both energy efficiency and decarbonisation. Member States should be encouraged to incorporate these additional metrics, but those should not replace primary energy use, which remains the mandatory metric. If Member States use additional metrics, all milestones from 2020 to 2050 should be expressed with all indicators chosen, and progress must be tracked accordingly.[85]

FOCUS ON THE LINK BETWEEN THE PRIMARY ENERGY USE TRAJECTORY (EPBD ARTICLE 9§2) AND THE EU ENERGY EFFICIENCY TARGET EXPRESSED IN PRIMARY ENERGY (EED ARTICLE 4)

The EU energy efficiency target for 2030, set out in EED Article 4, is expressed as an absolute reduction in both final and primary energy consumption, to 763 Mtoe and 992.5 Mtoe respectively. Compared to 2023 levels, this means the EU must reduce its overall primary energy consumption by around 22%.[86] These targets are then distributed among Member States based on various criteria, forming their national energy efficiency contributions (formula in EED Annex I). Although the EU energy efficiency target in primary energy is indicative at EU level, while it is binding for final energy, it encourages Member States to take action to reduce their primary energy across a range of sectors. In this context, reducing the primary energy use of the national residential stock will contribute significantly to achieving Member States' national energy efficiency contributions. Member States should see EPBD Article 9§2 and trajectory objectives as a way to simultaneously make progress on their EED-related national energy efficiency contribution for primary energy.

STEP 2 USE VARIOUS DATA SOURCES TO GET A QUALITY OVERVIEW OF THE RESIDENTIAL STOCK

According to the EPBD, **Member States shall establish an overview of the residential building stock as in the year 2020**, *"based on available information and, where appropriate, on statistical sampling."* The baseline overview should include all residential buildings, even those which might get exempted from complying with requirements (in accordance with EPBD Article 9§6).

The default option is to use existing "traditional" data sources *("available information")*. First, Member States should consult the overview of the national building stock from past national LTRSs, information included in NECPs and ongoing work on the first draft NBRP to cross-check information reported there. Second, Member States should refer to Eurostat data, especially regarding primary energy use and final energy use. Third, Member States should refer to their **national EPC database**. Beyond the EPC class, it is crucial to extract the underlying input data for each residential building. Member States should however exclude, for the purpose of establishing a residential stock baseline, EPC data on recently constructed

[85] For more information about milestones, see next subsection "Step 1: Estimate the trajectory, considering milestones and the 2050 vision" in section "Establish the renovation trajectory".
[86] See data from Eurostat, December 2024.

residential buildings as this might distort the overview of the performance of the segment.

Besides existing overviews of the stock for planning tools, Eurostat data and EPC databases, Member States should **use complementary data sources to refine the overview of residential buildings** for the purpose of establishing the trajectory. Although the residential segment is usually more covered with EPCs than the non-residential segment, it is probably not enough the give a comprehensive assessment of the situation. Additionally, it always adds value to cross-check different sources to increase the quality of the overview:

- Energy bills and metered consumption (provided by utilities), provided data is corrected for weather and user behaviour impacts
- Cadastral data and building permit registers (useful for identifying non-renovated buildings)
- Research results (e.g. the HOTMAPS database or EPISCOPE).

All these sources can help gather data on different criteria which can be considered as proxies to estimate the energy performance of the building (e.g. construction year, location, geometric characteristics, U-values of certain building elements).

Another option, which can be used as an alternative or as a complement to the default option, is to use statistical sampling. Statistical sampling uses a selected subset of data points from a larger set to analyse and draw conclusions about the whole set. By using statistical techniques, the sample is chosen in a way that ensures its representativeness. This method is relevant in cases where existing datasets on the whole residential stock are insufficiently complete or lack quality in parts. Statistical sampling might rely on **additional data collection**, for example through surveys and censuses, interviews with professionals (architects, developers, researchers), satellite imagery and digital building logbooks. The Building Stock Observatory and the database for the energy performance of buildings, to be established by Member States by May 2026 in accordance with EPBD Article 22, will play a key role in refining the residential stock overview, once ready.

BPIE RECOMMENDATION:

Member States should consider as many data sources as possible to select the most reliable and cross-check and correct the data possessed, refining the overview of the residential stock as in 2020. They should ensure datasets used are high quality, that data is complete, reliable, representative, and will be available in the next decades.

More than enabling Member States to establish an overview of the residential segment as in 2020, data sources and indicators should help identify specific subsegments, notably the 43% worst-performing residential buildings.

STEP 3 IDENTIFY THE BUILDINGS TO BE RENOVATED ANNUALLY, INCLUDING THE 43% WORST-PERFORMING BUILDINGS

The EPBD requires Member States to **identify either the number of buildings/building units or the floor area to be renovated annually**, to achieve the trajectory milestones. Each approach has implications. Using floor area takes the building size into account, potentially leading to a concentration on fewer but larger buildings. This can make compliance checking easier but might lead to too much focus on multi-apartment buildings at the expense of single-family houses. Using the number of buildings or building units allows for easier communication especially towards owners but may lead to a more complex compliance mechanism. All in all, the choice between numbers of buildings or floor area can result in different policy outcomes, most notably between either targeting a smaller number of large buildings for deep renovation or spreading efforts across a greater number of smaller buildings with lower individual energy savings.

BPIE RECOMMENDATION:

Member States should consider different criteria (data availability, characteristics of their residential stock in terms of size and category [multi-apartment buildings vs. single-family houses], methods of communication, and ease of compliance) when choosing to identify and target either the number of buildings/building units or the floor area to be renovated annually.

This choice can be further impacted by the fact that **Member States must also identify the 43% worst-performing residential buildings, either in number of buildings/building units or in terms of floor area.** This is because at least 55% of the trajectory must be achieved through the renovation of these buildings. It is important to note here that the 43% worst-performing residential buildings must be identified amongst all residential buildings, not amongst categories of residential buildings. This might mean, for example, that in one member state a large portion of the 43% worst-performing residential buildings are single-family houses in the countryside, but in another they are large multi-apartment buildings located in cities.

BPIE RECOMMENDATIONS:

- Member States should aim to get an overview of other characteristics of the 43% worst-performing residential buildings besides their energy performance, such as ownership structure, location and category (single-family house or multi-apartment building). This is key to design the right kind of regulatory measures and tailor the supportive framework as much as possible, as well as complying with the EPBD requirement mandating Member States to *"not disproportionately exempt rental residential buildings"*.
- Considering the limited national resources, Member States should aim to focus their efforts within the 43% worst-performing subsegment on buildings where there is the highest cost-benefit ratio potential. At the same time, they should also ensure that vulnerable households, who often live in the very worst-performing buildings, benefit from renovations with corresponding financial and technical support.

ESTABLISH THE RENOVATION TRAJECTORY, LARGELY TO BE DELIVERED IN WORST-PERFORMING BUILDINGS

STEP 1 ESTIMATE THE OVERALL TRAJECTORY, CONSIDERING MILESTONES AND THE 2050 VISION

Member States must establish the national trajectory for the **progressive renovation of the residential stock from 2020 to 2050, with milestones every five years from 2030 onwards.** The ultimate objective is to achieve a **zero-emission building stock by 2050**. This goal applies to the entire building stock of both residential and non-residential buildings. However, EPBD Article 9§2 mentions twice the objective of reaching a *residential* zero-emission building stock by 2050 – this should be understood as the guiding goal for setting the trajectory. In any case, not all existing buildings must be renovated to ZEB level by 2050.

To ensure this transition towards a zero-emission building stock by 2050, Member States must follow intermediary milestones for reducing the average primary energy use of the residential segment. Two milestones are set within the EPBD: **a reduction of at least 16% by 2030, and a reduction of at least 20-22% by 2035 (both compared to 2020).**

Member States must set **three additional milestones (2040, 2045 and 2050),** *"equivalent to, or lower than the nationally determined value derived from a progressive decrease in average primary energy use from 2030 to 2050, in line with the transformation of the residential building stock into a zero-emission building stock"*. A progressive decrease model allows for flexibility in early years, while a linear model would lead to a steady reduction over the 20-year period (2030-2050). In that context, Member States should consider that the trajectory must be aligned with the nationally established targets for 2030 and 2040 contained in the NBRP, the 2030 energy efficiency national contribution set in accordance with the EED, and the indicative 49% renewable energy share in final energy consumption in buildings by 2030, in accordance with the RED.

The EPBD allows Member States to use an adjustment mechanism to adapt the 2030 and 2035 milestones (16% and 20-22%). To trigger this adjustment, Member States must prove that fossil fuel use in the residential sector is below 15% on average. However, they must still ensure that the milestones are equivalent to or lower than the nationally determined value derived from a linear (not progressive) decrease in the average primary energy use from 2020 to 2050.

When setting their trajectories, Member States should pay attention to **the issue of demolition and reconstruction.** New builds account for only 0.1% of the total EU building stock every year but should however not be accounted for as fulfilling the trajectory, especially the minimum 55% of energy savings that need to be achieved through the renovation of the 43% worst-performing residential buildings. To ensure the trajectory accurately represents renovation-driven primary energy savings, the effects of demolition and new construction on the average performance of the stock should be excluded.

BPIE RECOMMENDATION:

Member States should define intermediary milestones in 2040 and 2045 to ensure steady progress to reach a zero-emission building stock by 2050, avoiding postponing actions towards the end of the period. By defining strong milestones, clearly outlining them in advance, and avoiding relying on demolition and reconstruction, Member States will deliver true action on the ground to improve the residential stock.

STEP 2 DETERMINE THE CONTRIBUTION OF WORST-PERFORMING BUILDINGS

Once Member States have determined their primary energy use reduction trajectory in the residential segment between 2020 and 2050, they must clarify the specific **minimum 55% contribution to energy savings from the 43% worst-performing residential buildings. Member States may include the renovation of buildings** affected by *"natural disasters"* within this 55% sub-target.[87] The minimum 55% sub-target, which should be fulfilled at each milestone of the trajectory, ensures that renovation efforts prioritise the most energy-inefficient buildings, often occupied by households in energy poverty. This focus is crucial for maximising energy and emissions reductions while promoting social fairness. The remaining 45% of energy savings can be achieved through a combination of further improvements in the 43% worst-performing tranche, or renovation within the 57% of residential buildings with better energy performance.

TRAJECTORY FOR THE PROGRESSIVE RENOVATION OF THE RESIDENTIAL STOCK

at least -16% (2020-2030) and -20/22% (2020-2035)

Minimum 55% savings
from the renovation of
SPECIFIC RESIDENTIAL BUILDINGS

43%
WORST-PERFORMING RESIDENTIAL BUILDINGS*

Maximum 45% savings
from the renovation of
OTHER RESIDENTIAL BUILDINGS

Also eligible buildings = 57% BEST-PERFORMING RESIDENTIAL BUILDINGS

* As well as residential buildings affected by natural disasters

[87] EPBD Article 9§2 only explicitly refers to "earthquakes and floods" as natural disasters.

Once the trajectory milestones, including its worst-performing buildings sub-target, have been expressed in primary energy use reduction, **Member States need to determine the "renovation intensity"**. This means they should define a ratio of number of buildings to be renovated and corresponding renovation depth, to achieve both the overall trajectory milestones and the worst-performing buildings sub-target milestones. This will in turn influence the design of policy measures and the supportive framework (see next section).

FOCUS ON THE LINK BETWEEN THE WORST-PERFORMING BUILDINGS SUB-TARGET (EPBD ARTICLE 9§2) AND THE ENERGY POVERTY RINGFENCING WITHIN ENERGY SAVINGS OBLIGATIONS (EED ARTICLE 8)

EED Article 8§3 requires Member States to allocate a share of their cumulative end-use energy savings under the energy savings obligation to specific target groups: people affected by energy poverty, vulnerable customers, low-income households and, where applicable, social housing residents. This "ringfencing" corresponds to the proportion of each Member State's population in energy poverty, as reported in their NECPs. If no estimate is provided in the NECP, the ringfencing is determined using the numerical average of four indicators. Consequently, Member States with higher levels of energy poverty must dedicate a larger share of their energy savings obligation to these target groups. A key policy instrument to meet this sub-target is boosting energy renovations of the worst-performing buildings, often occupied by these groups of the population.[88]There are thus clear synergies between the energy savings obligation ringfencing target from EED Article 8§3, and the focus on worst-performing residential buildings within EPBD Article 9§2.

STEP 3 REPORT THE TRAJECTORY AND RELATED INFORMATION IN THE NBRP

In accordance with EPBD Article 3, Member States must include in their NBRP information related to the trajectory for the progressive renovation of the residential building stock. More precisely, Member States must describe the data sources and methodology used to:

- Characterise the residential building stock and assess its energy performance, including the identification of the 43% worst-performing residential buildings.
- Establish the trajectory and milestone values, both for the overall residential stock and for the worst-performing residential sub-target.
- Calculate the number of buildings, building units or floor area to be renovated annually.

Member States must ensure that the sub-target of fulfilling at least 55% of the trajectory through the renovation of the 43% worst-performing residential buildings is met at each milestone (2030, 2035, etc.). This means compliance with this sub-target must be reported and monitored continuously.

[88] For the list of policy measures suggested to alleviate energy poverty, see the Commission Recommendation (EU) 2019/1658 Appendix V, on transposing the energy savings obligations under the Energy Efficiency Directive.

As per EPBD Article 9§2, the trajectory must be established by 29 May 2026 and reported in the final NBRP. However, the first draft NBRP must be submitted by 31 December 2025, creating a potential timing misalignment. To ensure swift implementation, Member States should strive to include draft national trajectories in the first draft NBRP rather than waiting until the final NBRP. This would allow the Commission to review and assess the draft trajectory as part of its evaluation of draft NBRPs, facilitating early adjustments if necessary.

OFFER OPTIMAL POLICY PACKAGES

After Member States have identified their residential building stock, determined the 43% worst-performing buildings, estimated the overall trajectory and sub-target milestones, and reported this information in their NBRPs, the next step is to **establish optimal policy packages to ensure effective delivery of the trajectory.**

To meet the trajectory and the sub-target for the worst-performing buildings, the EPBD requires that Member States *"put in place measures such as MEPS, technical assistance, and financial support measures."* **Member States must put in place measures to effectively deliver the trajectory** – this cannot be left to the market only. They have a transparency obligation towards building owners and occupants and should provide clarity about what the trajectory means for their buildings. The EPBD offers flexibility to Member States as to which measures to implement; along with specific policy obligations such as MEPS, there are several delivery options available to Member States.

BPIE RECOMMENDATION:

For successful implementation, the trajectory should not rely solely on one type of measure. Instead, it should be delivered through comprehensive and tailored policy packages, combining regulatory measures (such as MEPS) to set clear efficiency improvement obligations, technical assistance to guide citizens, and financial support to make renovations economically more appealing. A package approach also maximises impact by providing more certainty and support to building owners.

STEP 1 IDENTIFY ELIGIBLE MEASURES TO FULFIL THE TRAJECTORY: IMPROVING THE ENERGY PERFORMANCE OF RESIDENTIAL BUILDINGS

Building renovation: the default eligible measure to fulfil the trajectory

Increasing the renewable share in the energy supplied to the building from outside its boundaries can also reduce its primary energy use and improve its energy performance, so is eligible to fulfil the trajectory. However, as EPBD Article 9§2 states, the trajectory should lead to the *"progressive renovation of the residential building stock"*. Several other parts of the provision refer specifically to *"renovation efforts"*.[89] This means that to be deemed eligible, any measure to fulfil the trajectory should have an **impact, preferably through renovation, on the energy performance of residential buildings.**

The EPBD does not provide a legal definition for what constitutes a "renovation". The Directive officially defines "deep renovation" (Article 2§20) and "major renovation" (Article 2§22). Under both definitions, the renovation transforms the building or building units by upgrading certain building elements. EPBD Article 2§17 defines a "building element" as *"a technical building system or an element of the building envelope"*, with EPBD Article

[89] EPBD Article 9§2 refers to the *"renovation of the 43% worst-performing residential buildings"*, as well as to the *"renovation efforts to achieve the required decrease in the average primary energy use of the entire residential building stock"*. Finally, Member States also need to identify the number of buildings, building units or floor area *"to be renovated"* annually.

2§6 further defining technical building systems as *"technical equipment of a building or building unit for space heating, space cooling, ventilation, domestic hot water, built-in lighting, building automation and control, on-site renewable energy generation and energy storage, or a combination thereof, including those systems using energy from renewable sources"*. This would mean that **measures that improve the building envelope and/or the technical building systems are eligible to fulfil the residential trajectory.**

A clear framework for the use of primary energy factor adjustments

Definitions (Article 2§11-12-13):

- **Non-renewable primary energy factor:** *an indicator that is calculated by dividing the primary energy from non-renewable sources for a given energy carrier, including the delivered energy and the calculated energy overheads of delivery to the points of use, by the delivered energy.*
- **Renewable primary energy factor:** *an indicator that is calculated by dividing the primary energy from renewable sources from an on-site, nearby or distant energy source that is delivered via a given energy carrier, including the delivered energy and the calculated energy overheads of delivery to the points of use, by the delivered energy.*
- **Total primary energy factor:** *the sum of renewable and non-renewable primary energy factors for a given energy carrier.*

The primary energy factor (PEF) is a coefficient that expresses the ratio between primary energy (the total energy required to produce and deliver energy) and final energy (the energy consumed by end-users). It helps account for energy losses occurring during extraction, conversion, transportation and distribution. The PEF quantifies how much primary energy input is needed to deliver one unit of final energy to consumers. A lower PEF indicates higher efficiency, while a higher PEF means greater energy losses in the supply chain.

EPBD Annex I§2 establishes that determining PEFs is a national competence, while Member States can use the average EU PEF for electricity (included in the EED Article 31§3). It also states that the *"calculation of primary energy shall be based on regularly updated and forward-looking primary energy factors (distinguishing non-renewable, renewable and total) or weighting factors per energy carrier, which have to be recognised by the national authorities and taking into account the expected energy mix on the basis of its national energy and climate plan."*

For EPBD Article 9§2, this means that if Member States refer to changes in PEFs with a view to fulfilling the residential trajectory, they must demonstrate that:

- The PEF reported in the NBRP (in accordance with Annex III mandatory indicator under (a) overview of the national building stock) aligns with the one included in the latest NECP for 2030 (i.e. the final updated NECP, due June 2024).
- These changes are credible, i.e., they reflect the real situation of the energy mix at national level and align with reported measures under the NECP concerning grid decarbonisation.

STEP 2 DEVISE OPTIMAL POLICY MEASURES

After having clarified which measures are eligible to fulfil the residential trajectory, and under which conditions, it is key to highlight which measures are optimal in this context. This will enable Member States to simultaneously comply with requirements and maximise benefits.

Balance supply-side and demand-side measures for maximum impact

When designing policies to fulfil Article 9§2 requirements, Member States must find the best balance between demand-side measures (reducing the energy demand in residential buildings) and supply-side solutions (switching the supply to renewables, whether through the grid or generated on-site). **As "renovation" is specifically mentioned for delivering the minimum 55% of the trajectory within the 43% worst-performing residential buildings, action on the grid should not be the main instrument to deliver savings for this sub-target.** Rather, the least efficient buildings should benefit from a significant reduction of energy demand, which would result in a reduction in both primary energy use and GHG emissions, greater energy system stability, and improved comfort and lower energy bills for occupants.

BPIE RECOMMENDATION:

(Deep) renovation – addressing both building envelope and technical building systems – is the most effective way to reduce energy demand, lower costs for consumers and meet the trajectory requirements. While renewable integration, especially into the grid, will play a role, renewables cannot be the only strategy for improving the residential building stock. Reducing energy needs is critical.

Further segment the residential stock for more effective renovation measures

To ensure the success of renovation measures, and ultimately fulfil their trajectory, Member States should further segment their residential building stock and tailor packages accordingly. **This segmentation should consider the building category** (single-family homes vs. multi-family homes) **as well as ownership profiles** (owner-occupied, landlord-tenant arrangements, social housing). Policies cannot be one-size-fits-all. Instead, they must be carefully calibrated to reflect the structural characteristics of buildings and the financial and decision-making dynamics of different ownership models and be combined with optimal advisory services and financial support.

The table thereafter shows, for each Member States and on average in the EU, the percentage of the population living in owner-occupied vs. tenant-occupied residential buildings, as well as the distribution of the population between single-family houses and flats in multi-family homes.[90]

[90] Data from Eurostat (2023). If shares of building category between single-family and multi-family houses don't add to 100% it is because some Member States have created an "other" category (e.g. living on a boat, in a caravan...).

	Occupancy: % of population		Building category: % of population living in	
	Owning	Renting	Single-family houses	Multi-family homes
Austria	51	49	52	48
Belgium	72	28	77	23
Bulgaria	85	15	53	47
Croatia	91	9	77	23
Cyprus	70	30	72	28
Czechia	77	23	49	51
Denmark	60	40	66	34
Estonia	82	18	39	61
Finland	70	30	62	38
France	63	37	67	33
Germany	47	53	36	63
Greece	73	27	42	58
Hungary	90	10	73	27
Ireland	70	30	90	10
Italy	74	26	43	57
Latvia	83	17	35	64
Lithuania	89	11	40	58
Luxembourg	72	28	60	40
Malta	83	17	41	58
Netherlands	71	29	79	19
Poland	87	13	58	42
Portugal	78	22	53	47
Romania	95	5	65	35
Slovakia	93	7	58	42
Slovenia	75	25	73	27
Spain	76	24	34	66
Sweden	64	36	52	48
EU average	**69**	**31**	**52**	**48**

Based on a granular overview of their residential stock regarding ownership and category, Member States should devise **different renovation scenarios for each subsegment or subgroup**, assuming a group of similar buildings with the same ownership profile would "respond" similarly to the same **package of regulatory, advisory and financial measures.** Here, the results of the consultation undertaken when preparing the draft NBRP will be key, as they will inform national authorities about needs, wishes and challenges of different parts of the population (for more information on the NBRP consultation, see subsection "Set the ground for an effective NBRP" in section 1.2). Other aspects that Member States should reflect upon when designing policy packages to fulfil the residential trajectory are the capacity of the construction and energy sector, and available budgetary resources – both should be outlined in the NBRP.

▶ *Use the opportunity to introduce national MEPS in the residential segment*

Amongst the regulatory measures that Member States may introduce to fulfil the trajectory are MEPS. **The EPBD authorises a wide variety of MEPS designs**, enabling Member States to tailor them to the ownership structure, ability to invest, and categories of the residential stock (single-family vs. multi-family homes).[91] This will enable Member States to balance executability and acceptability, designing MEPS that can be tailored to the owners' or occupants' needs. Several examples of residential MEPS exist in various Member States.

Definition (Article 2§4): Minimum energy performance standards

Rules that require existing buildings to meet an energy performance requirement as part of a wide renovation plan for a building stock or at a trigger point on the market such as sale, rent, donation or change of purpose within the cadastre or land registry, in a period of time or by a specific date, thereby triggering the renovation of existing buildings.

GOOD PRACTICE EXAMPLES:

- **Energy Efficiency Standard for Social Housing (Scotland, UK):** The Energy Efficiency Standard for Social Housing (EESSH) is a minimum energy performance standard for social housing in Scotland, introduced in 2014. The first milestone, set for December 2020, required all social housing to meet at least EPC class C or D, depending on the dwelling type and fuel source. Today, 88% of buildings comply with this requirement. The second phase, EESSH2, currently under discussion, aims for all social housing to reach EPC class B by December 2032. For further details, visit the Scottish government website.

[91] For more ideas on how to design MEPS, including in the residential segment, see BPIE (2023), Minimum standards, maximum impact: how to design fair and effective minimum energy performance standards.

- **Minimum energy performance standards for rental properties (France)** France has implemented progressive energy efficiency standards for residential buildings through several key laws, aiming for all residential buildings to transition to *Bâtiment Basse Consommation* (BBC), France's equivalent of a nearly zero-energy building, by 2050. A key driver of this transition is the "decency decree" applying to the rental market. This means that as of 2023, rented properties must have a maximum final energy consumption of 450 kWh/(m^2.y). As of 2025, to be allowed to be rented, properties must be minimum EPC class G. This then improves to EPC class F as of 2028 and class E as of 2034. Additionally, rent increases have been prohibited for properties in EPC classes F and G since 2022. While there is no formal monitoring system, landlords found in violation may face legal consequences and be required to complete renovations. Tenant complaints play a crucial role in enforcement. To support these measures, France offers financial assistance through the subsidy programme *MaPrimeRénov'* and other programmes.[92]

- **Energy performance standards for residential buildings (Flanders, Belgium)** In 2022, Flanders introduced a mandatory renovation for the least energy-efficient residential buildings (EPC classes E and F) upon full ownership transfer. Adapted at the end of 2024, the provision now requires residential buildings that are bought to at least meet EPC class D within six years of transfer. Another measure applies to rental properties: detached houses/single-family houses must be minimum EPC class E as of 2030 (then D as of 2035 and C as of 2040), while apartments must be minimum EPC class D as of 2030 (then C as of 2035). The Flemish Coalition Agreement clearly draws a link between these regulatory measures on one side, and communication and support on the other.[93]

BPIE RECOMMENDATIONS:

- Member States should introduce MEPS in the residential segment, making full use of the flexibility offered by the EPBD to tailor them to both the building category and the ownership profile. This will also help them prepare for potential future measures under the EPBD review process (by end 2028), which will include an assessment by the Commission *"whether further binding measures at Union level, in particular mandatory MEPS across the whole building stock, need to be introduced, including in order to ensure that the values for 2030 and 2035 set out in Article 9§2 can be achieved"* (Article 28).

- Member States should also seek to future-proof residential buildings, whether they introduce MEPS or other policy measures to fulfil the trajectory requirement. While the EPBD requires Member States to address, amongst others, the issue of adaptation to climate change for buildings undergoing major renovation (Article 8§3), they should widen the scope to all buildings being renovated. Member States should go beyond merely *"addressing"* the issue to set requirements for integrated mitigation and adaptation solutions, building on synergies between these two objectives. For more solutions and measures to increase the climate resilience of buildings, Member States should use the EU Technical Guidance for adapting buildings to climate change, and consider in particular the Best Practice Guide.

[92] BPIE (2024), Wärmewende in Europa: Gute Praxis aus ausgewählten Ländern & Empfehlungen für Deutschland.
[93] Flemish Government (2024), Policy Note on Energy & Climate for 2024-2029.

FOCUS ON THE LINK BETWEEN THE PRIMARY ENERGY USE TRAJECTORY (EPBD ARTICLE 9§2) AND THE ENERGY SAVINGS OBLIGATION (EED ARTICLE 8)

The energy savings obligation, outlined in EED Article 8, requires Member States to achieve a specified amount of cumulative energy savings over set periods. For the current period (2021–2030), the required savings progressively increase, calling for additional measures.[94] The obligation allows energy savings to be delivered across all economic sectors, including buildings. Importantly, savings counted under EED Article 8 must be additional to those mandated by existing EU law. However, certain exemptions apply. Notably, energy savings achieved through building renovation, including the implementation of MEPS under EPBD Article 9, are fully eligible for the energy savings obligation without needing to meet the additionality requirement. This provision encourages Member States to leverage synergies and promote strong policy measures, such as MEPS, including for residential buildings.

STEP 3 SET UP A SUPPORTIVE FRAMEWORK

In line with a package approach, Member States should set up a diverse framework to support compliance with the policy measures they put in place to fulfil the residential trajectory and its milestones. More specifically, Article 9§4 requires Member States to introduce an enabling framework to support the delivery of the trajectory, but especially if they choose to introduce national MEPS. In fact, when Member States decide to set up MEPS for residential buildings, they must put in place technical assistance and financial support. Article 9§4 outlines two ways to support policy delivery: **financial support and technical assistance.**

Financial support is about providing **appropriate financial measures**, notably to vulnerable households, people affected by energy poverty and people living in social housing, but also about designing integrated financing schemes **providing incentives for deep and staged deep renovations.**

Definition (Article 2§27): energy poverty

As defined in Article 2§52 of the 2023 Energy Efficiency Directive (2023/1791): a household's lack of access to essential energy services, where such services provide basic levels and decent standards of living and health, including adequate heating, hot water, cooling, lighting, and energy to power appliances, in the relevant national context, existing national social policy and other relevant national policies, caused by a combination of factors, including at least non-affordability, insufficient disposable income, high energy expenditure and poor energy efficiency of homes.

Definition (Article 2§28): vulnerable households

Households in energy poverty or households, including lower middle-income households, that are particularly exposed to high energy costs and that lack the means to renovate the building that they occupy.

[94] The annual energy savings rate in the 2023 EED increases from 0.8% between 2021 and 2024 to 1.3% from 2024 to 2026, 1.5% from 2026 to 2028 and 1.9% from 2028 to 2030.

BPIE RECOMMENDATIONS:

- Member States should preferably blend the two approaches, focusing financial support on the optimal overlap between priority categories of buildings and priority groups of people. The financial support should contribute to the deep renovation of the worst-performing buildings occupied by people in energy poverty, vulnerable households and other key groups, as mentioned previously.
- Financial support should tackle the upfront costs of renovation, for example through on-bill schemes, pay-as-you-save schemes or energy performance contracting, as recalled in Article 17§19.
- Financial support should comply with the "higher impact, higher support" principle outlined in EPBD Article 17§16. Financial support targeting vulnerable households could be based on revenue streams from the Social Climate Fund, which targets the same population groups – for more information, see section 4.4.

The second way to support policy delivery is by providing technical assistance. Article 9§4 **refers to one-stop shops** that should specifically target vulnerable households and people living in social housing,[95] as well as to the **removal of non-economic barriers** including split incentives. For more information about one-stop shops, see section 4.3.

BPIE RECOMMENDATIONS:

- The link between one-stop shops and delivering measures to fulfil the residential trajectory is essential, as one-stop shops can help communicate the vision for the residential segment as well as upcoming milestones. Member States should also make best use of renovation passports in this context – see section 4.2.
- Member States should also boost industrialised approaches to renovation, for example using off-site prefabricated elements, to speed up renovation processes, helping to reduce non-economic barriers.[96]

Article 17§19 requires Member States to introduce **effective safeguards *"to protect in particular vulnerable households,*** *including by providing rent support or by imposing caps on rent increases".* Those safeguards should then be reported as a mandatory indicator under the overview of implemented and planned policies and measures in the NBRP, particularly when they are introduced in relation to policies targeting the worst-performing buildings, including to fulfil the trajectory and MEPS.

[95] For specific recommendations on how to design socially fair one-stop shops that are designed to support vulnerable households, see the section on "Renovation and renewable heating and cooling" in BPIE for Green European Foundation & Heinrich Böll Foundation (2024), Boosting participation in the energy transition: five actions areas for the new EU policy cycle.

[96] BPIE (2022), Recommendations for industrialised renovation.

BPIE RECOMMENDATION:

While the EPBD specifically gives examples of safeguards targeting tenants, Member States should reflect on the ownership profile of their residential segment to design safeguards that benefit "vulnerable households" at national level. This might mean introducing safeguards for both owners and tenants, depending on their income profile and who is targeted by policy measures.

STEP 4 LIMIT EXEMPTIONS

EPBD Article 9§2 also requires Member States to pay specific attention to rental residential buildings: *"in their renovation efforts, Member States shall not disproportionately exempt rental residential buildings or building units."* This should ensure that both tenants and owners can benefit from the renovation activities undertaken to fulfil the trajectory, whether MEPS or other measures.

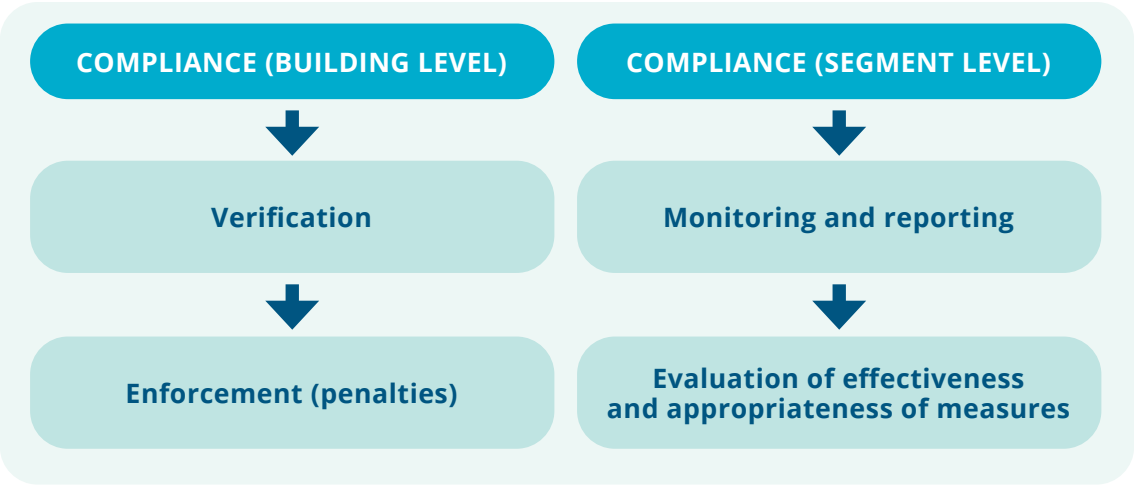
BPIE RECOMMENDATION:

Member States should avoid broad exclusions without proper evaluation: some rental buildings may still have significant energy performance improvement potential, provided the design of the policy measure, including MEPS, is appropriate (which is allowed and even incentivised by the EPBD).

An effective governance mechanism ensures compliance by verifying requirements both at the individual building level and through broader assessments at the building stock level.

DESIGN A FAIR AND EFFECTIVE GOVERNANCE SYSTEM ENSURING DELIVERY

An effective governance mechanism ensures compliance by verifying requirements both at the individual building level and through broader assessments at the building stock level.



STEP 1 ENSURE COMPLIANCE AT INDIVIDUAL BUILDING LEVEL

Verification

EPBD Article 9§2 does not specify methods to check compliance at individual building level, considering the flexibility given to Member States to introduce policy measures, financial support and technical assistance to deliver on the residential trajectory and its milestones. **Compliance checking will thus depend on the delivery options chosen at national level.** Member States should identify compliance methods in line with policy measures introduced (MEPS or others), as well as with financial support and technical assistance provided. For example, introducing MEPS at the trigger point of selling a building might make verification easier, as this is a moment in the life of a building during which several other checks are legally performed to validate the transaction. Compliance at individual building level **will also depend on what metrics Member States have chosen to express their national trajectory** (either the number of buildings/building units or the floor area to be renovated annually).

As for compliance checking for non-residential buildings, **the default option would be to rely on EPCs**. However, there are pros and cons to using EPCs for compliance in the residential segment.

PROS	CONS
• Broader EPC coverage compared to the non-residential segment. • EPCs are familiar to building owners. • MEPS, if introduced at national level for residential buildings, can be clearly expressed through EPC ratings.	• More affected by occupant behaviour compared to the non-residential segment. • EPCs are undergoing reform under the EPBD, creating potential inconsistencies. • No legal liability for EPC quality and reliability in all Member States.

Considering these limitations, **Member States may decide to use other compliance proxies**, such as:

- Checking whether a list of eligible renovation measures was effectively implemented.
- Site inspections or digital verification tools, as outlined in EPBD Article 23§8: *"Member States shall put in place inspection schemes or alternative measures such as digital tools and checklists to certify that the delivered construction and renovation works meet the designed energy performance and are compliant with the minimum energy performance requirements laid down in the building codes or equivalent regulations."*

▶ *Enforcement*

EPBD Article 9§7 requires **Member States to ensure MEPS implementation, including by setting penalties**. There are some key considerations for an optimal enforcement system.

First, Member States must reflect on the segmentation of the residential stock, considering ownership structure, investment capacity and the ambition level of policy measures selected, including MEPS. Penalties can take different forms, such as fines, rental bans or progressive warnings, but they must be *"effective, dissuasive, and proportionate"* (EPBD Article 34). When defining penalties, **Member States need to take into consideration the financial situation of building owners.** More specifically, Article 9§7 requires Member States to consider whether they had *"access to adequate financial support [...], in particular vulnerable households"*. This, amongst others, will ensure that the residential trajectory is delivered in a socially fair way.

For all situations (MEPS or other policy measure), **early communication is crucial** – building owners must be informed about the trajectory measures and milestones well in advance through campaigns, workshops (which can be performed by one-stop shops) and consultations in the NBRP process.

Finally, Member States must also clearly **determine responsibilities in the enforcement procedures:**

- ***Who controls compliance, imposes and collects penalties?*** This should be a dedicated national authority, regional agencies, municipalities or third parties, but should not rely on building owners to self-certify. However, when asked to prove compliance to the responsible authority, it should be easy for owners to do so.
- ***When should compliance checks occur:*** at regular intervals, linked or not to other reporting obligations? To improve monitoring, subsidies could be leveraged: buildings benefiting from financial support could be required to demonstrate compliance to get financial support disbursed.

Compliance should be seen as the other side of the coin to the supportive framework.

STEP 2 ENSURE COMPLIANCE AT RESIDENTIAL SEGMENT LEVEL

Monitoring and reporting by Member States

First, Member States need to report, through their NBRP, on what they commit to, and more specifically on the *"methodology used, and data gathered for estimating the [overall trajectory milestone] values"*, as well as specific values for the sub-target (55% of savings from 43% worst-performing residential buildings). Annex II indicators also require Member States to lay down the number as well as total floor area targets for annual renovation rates for the 43% worst-performing residential buildings.

Second, Member States should monitor what they achieve and report this through the NBRP. To do so, Member States should rely on data sources used to draw the overview of the residential segment and to express the milestones values (e.g. Eurostat, EPC databases, etc.). Specifically, Annex II requires Member States to declare the energy savings achieved in residential buildings (measured in ktoe), as well as to provide an overview of implemented and planned national MEPS, and other policies and actions to target the worst-performing buildings.

The reporting is part of NECP progress reports, due by 15 March 2031 and every two years thereafter. Since the NBRP process follows a two-stage cycle – with draft and final versions incorporating Commission recommendations and updating every five years – Member States should adjust their ambition levels accordingly:

- Between the draft and final NBRP (December 2025 – December 2026): adjust 2030, 2035, 2040, 2045 and 2050 milestones.
- Between the first and second NBRP (December 2026 – January 2029): adjust 2035, 2040, 2045 and 2050 milestones.
- At the NBRP update (2033/2034): adjust 2040, 2045 and 2050 milestones.

Third, Member States should monitor the potential social impacts, in accordance with EPBD Article 9§4, which requires a specific focus on impacts of MEPS on vulnerable households. Member States should extend the monitoring of social impacts to all measures put in place to fulfil the trajectory, besides MEPS. The default monitoring method is to rely on Annex II indicators, such as the proportion and reduction of people affected by energy poverty (with a definition), the proportion of disposable household income spent on energy, and the share of the population living in inadequate dwelling conditions (e.g. leaking roof) or with inadequate thermal comfort. Additionally, Member States should cross-check with monitoring activities performed under other (social) policies, and in coordination with regional and local governance levels.

Evaluation of effectiveness and appropriateness of measures by the Commission

The Commission plays a crucial role in assessing and providing recommendations to ensure that Member States meet their residential trajectory and milestones effectively. This involves conducting ambition gap and delivery gap assessments at different stages of the NBRP/NECP cycles.

The **ambition gap analysis** should take place during the Commission assessment of the draft NBRP, together with issuing country-specific recommendations (expected June 2026). Those suggestions should not only address the ambition level of the trajectory, its milestones and the sub-target for worst-performing buildings but also evaluate the comprehensiveness and effectiveness of the supportive framework and of compliance mechanisms. It is therefore key that Member States include as much detail on their planned policies, defined ambition levels and supportive framework in the draft NBRP due December 2025.

The Commission should also conclude a **delivery gap assessment**, taking stock of achieved results on the national residential trajectories as part of its assessment of the NECP progress reports (due March 2031). The Commission should assess all aspects of Article 9§2, i.e. whether the overall trajectory milestones have been achieved but also the milestones related to the sub-target on worst-performing buildings. The Commission can then evaluate whether some subsegments of the residential stock require more action and/or support based on initial results, their ownership structure and financial capacity. More specifically, the Commission recommendations *"may include a more extensive use of MEPS"* (Article 9§2).

By ensuring timely and robust assessments, the Commission can help Member States close ambition and delivery gaps, ultimately driving stronger energy performance improvements in the residential segment.

TO GO FURTHER ON THE RESIDENTIAL TRAJECTORY
ADDITIONAL READING

- **BPIE (2023),** Minimum Standards, Maximum Impact: how to design fair and effective MEPS for buildings in Europe.
- **BPIE (2024),** Wärmewende in Europa: Gute Praxis aus ausgewählten Ländern & Empfehlungen für Deutschland **(in German).**
- **Réseau CLER (2024),** Decency Decree: how to implement it? A guide for local authorities **(in French)**
- **Réseau CLER and others (2024),** Position Paper: proposals for new norms for deep renovations to reach EU objectives **(in French).**
- **EPBD.wise project (2024),** Article 9: MEPS and trajectories for progressive renovation.
- **BPIE (2025),** Making choices for home renovation: A guide for an effective implementation of EPBD Article 9.2.

DEEP DIVE #1

The leading role of public buildings

EED ARTICLE 6 AND EPBD ARTICLES 7§1, 9, 10§3, 20§1, 21§1, ANNEX II

WHAT IS NEW, WHAT HAS CHANGED AND WHY IS IT IMPORTANT?

Although representing a small share of the whole building stock, public buildings have traditionally led the way in implementing new or more ambitious standards.[97] For example, new public buildings had to implement the NZEB standard earlier than other new buildings (2019 vs. 2021). There are two key reasons for this. First, public buildings must set a high standard, as they are funded by taxpayers and serve the public. Second, piloting innovative technologies and processes within a specific subsegment of the building stock can help pave the way for replicability and broader adoption in both non-residential and residential buildings.[98]

Public buildings can be either residential or non-residential, since the ownership structure does not preclude the use. The EPBD does not define "public buildings" but refers to them as ***"buildings owned by public bodies"***, with public bodies being defined in the EED. The Commission Guidance Note on EED Articles 5-6-7 further explains aspects of the definition below.

Definition (EED Article 2§12): public bodies

National, regional or local authorities and entities directly financed and administered by those authorities but not having an industrial or commercial character.

PUBLIC BUILDINGS LEADING THE RENOVATION WAVE

A twin implementation of EED Article 6 and EPBD Article 9

Buildings owned by public bodies must implement both EED Article 6 and EPBD Article 9, as these are cumulative obligations. This means public residential buildings must comply with EED Article 6 while also being accounted for in the national trajectory for the progressive renovation of the residential building stock, in accordance with EPBD Article 9§2. Similarly, public non-residential buildings must adhere to EED Article 6 and meet the minimum energy performance standards set by EPBD Article 9§1. The interaction between these two articles follows a push-and-pull approach: EPBD Article 9 establishes a baseline by targeting the phase-out of the worst-performing buildings, while EED Article 6 emphasises the public ownership nature of these buildings, demanding exemplary ambition levels in energy efficiency.

[97] For example, central government buildings (one portion of public buildings) are estimated to represent around 2% of the EU's final energy consumption. Data from the European Commission (2021), Impact Assessment Report accompanying the EED proposal.

[98] This is helped by the fact that the observed median payback time for energy efficiency investments in public buildings is around eight years compared to 12-14 years in residential buildings. Data from the European Commission (2021), Impact Assessment Report accompanying the EED proposal.

A stronger renovation requirement for public buildings (EED Article 6)

Member States must ensure that at least 3% of the total floor area of buildings owned by public bodies and with a useful floor area of 250m² is renovated each year, up to either NZEB or ZEB standards, depending on the national choice.[99] This requirement mandates a deep renovation, as defined by the EPBD, of public buildings. Furthermore, in line with EPBD Article 17, Member States are obligated to provide enhanced fiscal, financial, administrative and technical support for these renovations (for more details on financial support, see section 4.4). For buildings occupied by public bodies but not owned by them, the EED requires public authorities to negotiate with the building owner, particularly at key points in the building's life cycle, to establish an agreement ensuring that the building reaches at least NZEB or ZEB standard.

GOOD PRACTICE EXAMPLES: DEEP RENOVATIONS OF PUBLIC BUILDINGS

SPL OSER projects (France): The SPLR OSER, a publicly owned energy service company in France, designs and implements deep renovations for public buildings. Examples include the deep renovation of a library in Montmélian (with a 50% reduction in primary energy consumption), of a town hall in Cran-Gevrier and a cultural centre in Meyzieu (both 70% savings).

Horizon 2020 PEDIA project (Cyprus): The project upgraded 25 schools to NZEB standard, achieving on average a 65% reduction in primary energy use.

Flexibilities and alternative approach (EED Article 6)

The EED allows Member States to exempt certain public buildings from the requirements, taking national circumstances into account, but only under specific conditions. First, social housing may be excluded if renovations would lead to a rent increase that is not offset by a reduction in energy bills. Second, certain building types – such as those with architectural or historical value, buildings owned by armed forces or buildings used for religious activities – can be renovated to a performance level below NZEB/ZEB while still counting towards the annual 3% renovation rate required in EED Article 6. Third, new buildings owned by public bodies can count toward fulfilling Article 6 if they replace buildings demolished within the previous two years, though specific criteria must be met to qualify for this exemption (see EED Article 6§4).

Additionally, the EED allows Member States to adopt an alternative approach within Article 6, provided it achieves the same level of energy savings as the default approach. This alternative requires Member States to issue a renovation passport for buildings under the scope of EED Article 6 and ensure that these buildings are renovated to NZEB standards by 2040 at the latest. For more information on renovation passports, see section 4.2 and EPBD Article 12. The EED also specifies that selling buildings is not an eligible action, whether under the default or alternative approach.

[99] The baseline is set at 1 January 2024.

BPIE RECOMMENDATIONS:

- Member States should opt for the default approach or, if they choose the alternative, ensure that renovations are carried out as soon as possible. The default approach is the most advantageous way to meet the obligations of this article, as it guarantees that public buildings will reach a high-performance standard in the near term, bringing immediate benefits to society. If Member States choose the alternative approach, they should ensure that the initial steps of the renovation roadmap outlined in the renovation passport are implemented before 2030, with the NZEB standard achieved well before the 2040 deadline.[100]
- Member States should prioritise the renovation of social housing to support vulnerable households, so should not exclude it from EED Article 6 requirements. More generally, as they are free to choose which buildings to include in the 3% every year, they should focus on the worst-performing public buildings in the early years of EED implementation, aligning this with the requirements of EPBD Article 9 to maximise overall impact.

GOOD PRACTICE EXAMPLE: RENOCALLY PROJECT

The Renocally project supported municipalities in Bulgaria, Romania and Slovakia in getting a renovation passport for the deep renovation of their public buildings – see for example the Prahova medical centre in Romania. The project also issued guidelines for local authorities, helping them to use renovation passports in the long term.

FUTURE-PROOFING PUBLIC BUILDINGS

In addition to the specific renovation requirements under EED Article 6, public buildings are also subject to stricter construction and decarbonisation standards. **Firstly, public buildings must meet the ZEB construction standard ahead of other new buildings**, starting on 1 January 2028, compared to the 1 January 2030 deadline for other buildings (EPBD Article 7§1). The EPBD further encourages public bodies to aim for ZEB standards in any new buildings they occupy, even if they do not own them.

Public buildings are also expected to lead in the decarbonisation of energy supply, particularly with solar energy installations. EPBD Article 10§3 mandates that Member States deploy solar installations on all new public buildings with a useful floor area greater than 250m² by 31 December 2026. Existing public buildings must meet the requirement by sequenced deadlines: those larger than 2000m² by 31 December 2027, larger than 750m² by 31 December 2028 and larger than 250m² by 31 December 2030. This requirement should be coordinated with the Renewable Energy Directive Article 15a§4, which requires

[100] This would be in line with the advice included in the Commission Guidance, indicating that alternative measures delivering equivalent energy savings should be long-lasting – see section 5.3.1 in Commission Recommendation 2024/1716 (2024), Guidelines for the interpretation of Articles 5, 6, and 7 of Directive 2023/1791.

Member States to ensure that public buildings set an example in terms of renewable energy use, for example by *"providing for the roofs of public or mixed private-public buildings to be used by third parties for installations that produce energy from renewable sources"*.

PUBLIC BUILDINGS' EXEMPLARY ROLE FOR DATA COLLECTION AND INFORMATION SHARING

An inventory of public buildings

EED Article 6 requires Member States to establish and publicly share an inventory of all buildings with a useful floor area over 250m² that are either owned or occupied by public bodies. This inventory must be created by 11 October 2025 and updated every two years. To ensure synergies with the EPBD, this inventory should be aligned with the overview of building stock that Member States must provide under their NBRP (EPBD Article 3) and with their national databases (EPBD Article 22). The public buildings inventory and the EPBD-related data may be aggregated into the EU Building Stock Observatory.

GOOD PRACTICE EXAMPLE: ENERGY MANAGEMENT SYSTEMS IN PUBLIC BUILDINGS FOR DATA COLLECTION

Several Member States have mandated energy management systems for public building owners to enhance data collection. For instance, Bulgaria and Slovenia require such systems for public buildings exceeding 250m². In Ireland, public bodies and schools must report their annual energy performance to an information system overseen by the Sustainable Energy Authority of Ireland.[101]

The NBRP template (EPBD Annex II) includes mandatory indicators related to public buildings, such as the number of public buildings (including social housing) and their total floor area, the number of EPCs for public buildings, and the number and floor area of renovated public buildings along with corresponding energy savings. Annex II also encourages Member States to report on all implemented and planned policies and measures that specifically apply to public buildings, as well as on the progress made toward fulfilling the requirements of EED Article 6.

Transparency of information: a public good

Public buildings are subject to more stringent requirements regarding the issuance and display of EPCs. EPBD Article 20§1 mandates Member States to ensure an EPC is issued for all existing buildings owned or occupied by public bodies. Unlike other non-public buildings, this requirement is not linked to specific trigger points, such as major renovations. Additionally, EPBD Article 21§1 requires Member States to ensure that public buildings that are occupied by public bodies and frequently visited by the public display their EPC *"in a prominent location clearly visible to the public"*. EPBD Recital 69 provides examples of such buildings, such as town halls, schools and theatres. All in all, the EPBD ensures that public buildings not only lead by example in meeting energy performance requirements but also **demonstrate their commitment to the public. This visibility helps raise awareness about the benefits of higher energy performance for the wider public.**

[101] Odyssee-Mure database

TO GO FURTHER ON PUBLIC BUILDINGS
ADDITIONAL READING

- **PURE-NET Public Real Estate Network** website.
- **Coalition for Energy Savings (2023),** The new 2023 Energy Efficiency Directive: Guidance and recommendations for national planning and implementation.
- **Renocally project (2024),** Enabling local authorities to lead the decarbonisation of existing buildings: challenges and opportunities for developing building renovation passports in support of public authorities in Central and Eastern Europe.
- **European Commission (2024),** Recommendation 2024/1716 setting out guidelines for the interpretation of Articles 5, 6, and 7 of Directive (EU) 2023/1791

3 AN UPDATED STANDARD FOR CONSTRUCTION (ZERO-EMISSION BUILDING) AND THE PROGRESSIVE INTEGRATION OF LIFE-CYCLE THINKING

ARTICLE 2§2, 6, 7, 10, 11, ANNEX I AND II

QUICK LINKS FOR THIS CHAPTER

BE ON THE LOOKOUT FOR:

Definitions | BPIE recommendations | Good practice examples | Focus

3.1 A FUTURE-PROOF STANDARD FOR CONSTRUCTION AHEAD OF THE NEXT DECADE

WHAT IS NEW, WHAT HAS CHANGED AND WHY IS IT IMPORTANT?

In 2010, the EPBD introduced the concept of nearly zero-energy buildings (NZEBs) as a standard for construction. This standard became mandatory as of 1 January 2019 for all new buildings occupied and owned by public authorities and as of 1 January 2021 for all new buildings. The 2024 EPBD introduces an updated standard: the **zero-emission building (ZEB). This standard will replace NZEB as the benchmark for new construction and will become mandatory starting in 2028 for buildings owned by public bodies and 2030 for all buildings.** These buildings will be easily identifiable through an EPC classification of A.

The definition of ZEB is critical for new buildings but also impacts existing buildings, particularly through the framework for deep renovations. However, a newly constructed ZEB and a renovated ZEB are not identical. Member States may adjust the maximum energy demand thresholds for buildings renovated to ZEB standards (Article 11§4).

Definition (Article 2§3): Nearly zero-energy building

A building with a very high energy performance, as determined in accordance with Annex I, which is no worse than the 2023 cost-optimal level reported by Member States pursuant to Article 6§2 and where the nearly zero or very low amount of energy required is covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or energy from renewable sources produced nearby.

Definition (Article 2§2): Zero-emission building

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.

Definition (Article 2§20): Deep renovation

A renovation which is in line with the "energy efficiency first" principle, which focuses on essential building elements, and which transforms a building or building unit:

(a) before 1 January 2030, into a nearly zero-energy building

(b) from 1 January 2030, into a zero-emission building

Definition (Article 2§5): Public bodies

As defined in Article 2§12 of the 2023 Energy Efficiency Directive (2023/1791): national, regional or local authorities and entities directly financed and administered by those authorities but not having an industrial or commercial character.

Establishing a clear and effective definition for ZEB and ensuring its timely implementation is critical. Buildings usually have a lifespan of around 50 to 70 years, so buildings constructed as of 2030 will still be standing at the end of the century. This underscores the importance of making them future-proof, reflecting on technological advancements and avoiding costly future interventions.

Small numbers, big impact: the number of new buildings constructed annually in the EU is relatively small, estimated at just 0.1% of the total building stock.[102] Despite these modest numbers, getting the standard for new buildings right is crucial, as it sets the stage for broader adoption of innovative technologies and practices that can later inform and transform existing buildings. This is especially the case considering that the definition of "deep renovation" refers to the ZEB standard. **This section however focuses on ZEB as the new definition for construction,** a mandatory standard which tackles both operational and embodied emissions.

[102] This figure is based on approximately 269,000 construction permits issued in 2021 (source: Eurostat), compared to the 220 million buildings across the EU (source: European Commission).

WHAT IS THE TIMELINE FOR INTRODUCING ZEBS?

2025	2026	2028	2030
By 31/12: Member States to report in their draft NBRP #1 the draft maximum energy demand thresholds and draft maximum operational GHG emissions thresholds	**As of 29/05:** Where public bodies intend to occupy a new building that they do not own, they shall aim for that building to be a ZEB **By 30/06:** Commission may recommend adaptations of the ZEB thresholds (as part of country-specific recommendations on draft NBRP) **By 31/12:** Member States report in their final NBRP #1 the final ZEB thresholds	**As of 01/01:** new buildings owned by public buildings to be ZEB	**As of 01/01:** *all* new buildings should be ZEB

BPIE RECOMMENDATION:

To ensure the successful adoption and implementation of ZEB standards, it is essential to carefully plan for their introduction well in advance of the compliance deadlines. The delays and gaps experienced with the implementation of NZEB standards serve as a critical lesson, emphasising the importance of early action.[103]Member States should set a clear preparation timeline, focusing first on finalising and publishing the national legislative framework and definitions for ZEB (2025-2026), then turning to stakeholder engagement to prepare the market (2026-2029). This second phase should include communication campaigns to both professionals and building owners, as well as training programmes for architects, designers, builders, real estate professionals and professionals constructing ZEB-compliant buildings. By starting early and prioritising communication and training, Member States can avoid delays, ensure smooth implementation of ZEB standards, close the performance gap, and create a pathway for replicating it to existing buildings being deeply renovated.

[103]Three Member States failed to introduce the necessary legislation on time before the January 2021 deadline according to BPIE (2021), Nearly Zero: a review of EU Member State implementation of new build requirements.

3.2 A VERY HIGH ENERGY PERFORMANCE LINKED TO COST-OPTIMALITY AND NZEBS

A ZEB is first defined in terms of its energy demand, as *"a building with a very high energy performance, in accordance with Annex I, requiring zero or a very low amount of energy"*. While it is up to Member State to set the **maximum energy demand thresholds for a ZEB**, including by setting different thresholds per building type and climatic zone, certain conditions must be respected.

ZEB THRESHOLDS MUST BE SET IN ACCORDANCE WITH ANNEX I

A ZEB must achieve a very high level of energy performance, as outlined in Annex I of the EPBD, which provides the "common general framework for the calculation of the energy performance of buildings". This performance is quantified through a maximum threshold for energy demand (EPBD Article 11), expressed as **a numerical indicator of total primary energy use in kWh/(m².y)**. Energy demand covers uses such as **heating, cooling, ventilation, domestic hot water, lighting and other technical building systems.**

ZEB THRESHOLDS MUST BE SET AT A HIGHER AMBITION LEVEL THAN NZEB THRESHOLDS

ZEB thresholds must be at least **10% lower than the national NZEB threshold** for total primary energy use in effect as of **28 May 2024**. Furthermore, the NZEB threshold itself must not exceed the **2023 national cost-optimal level** (Article 2§3). This **"NZEB-10%" condition** applies not only to the initial ZEB thresholds set up in 2025 but also to all future ZEB updates, ensuring that the maximum energy demand for ZEBs can never exceed the NZEB thresholds established on **28 May 2024**. Member States that do not currently express their NZEB thresholds in primary energy use must first convert their thresholds into this metric. Once converted, they will then reduce the value by **10%** to determine the appropriate ZEB threshold. This approach ensures consistency and compliance across all Member States.

GOOD PRACTICE EXAMPLE:

Based on the recommended NZEB values, the recommended ZEB thresholds would be as follows:[104]

Recommended maximum energy demand thresholds expressed in net primary energy use in kWh/(m².y)

Climate zone	Offices		Single-family house	
	NZEB	ZEB	NZEB	ZEB
Mediterranean	20-30	18-27	0-15	0-13.5
Oceanic	40-55	36-49.5	15-30	13.5-27
Continental	40-55	36-49.5	20-40	18-36
Nordic	55-70	49.5-63	40-65	36-58.5

[104] Commission Recommendation 2016/1318, Guidelines for the promotion of nearly zero-energy buildings and best practices to ensure that, by 2020, all new buildings are nearly zero-energy buildings.

ZEB THRESHOLDS MUST BE SET WITH A VIEW TO ACHIEVING THE MOST RECENT COST-OPTIMAL LEVELS

ZEB maximum energy demand thresholds should be established with a view to meet or be lower than the most recent cost-optimal levels (for more information on cost-optimality, see Deep Dive #2). Given the timeline for transposition, where ZEB thresholds must be calculated by May 2026 and incorporated into the NBRP (draft due December 2025 and final version by end of 2026), **the thresholds must, at a minimum, align with the 2023 cost-optimal levels,** as determined by the cost-optimal methodology introduced in 2012.[105]

Definition (Article 2§32): cost-optimal level

The energy performance level which leads to the lowest cost during the estimated economic life cycle, where:
(a) the lowest cost is determined taking into account:
(i) the category and use of the building concerned;
(ii) energy-related investment costs on the basis of official forecasts;
(iii) maintenance and operating costs, including energy costs taking into account the cost of greenhouse gas allowances;
(iv) environmental and health externalities of energy use;
(v) earnings from energy produced on-site, where applicable;
(vi) waste management costs, where applicable; and
(b) the estimated economic life cycle is determined by each Member State and refers to the remaining estimated economic life cycle of a building where energy performance requirements are set for the building as a whole, or to the estimated economic life cycle of a building element where energy performance requirements are set for building elements.
The cost-optimal level shall lie within the range of performance levels where the cost-benefit analysis calculated over the estimated economic life cycle is positive.

ZEB thresholds must be updated whenever cost-optimal levels are revised. With the EU cost-optimal methodology scheduled for revision in 2025, **ZEB thresholds will need to align with the 2028 cost-optimal levels.** Since cost-optimal levels are reviewed every five years, this ensures a progressive enhancement of ZEB thresholds over time, driving continuous improvement in building energy performance.

BPIE RECOMMENDATIONS:

When setting the ZEB maximum energy demand threshold, Member States should bear in mind that a building with high energy performance standards (minimising its own energy needs) will be better positioned to economically provide flexibility services – see Deep Dive #3. Member States are encouraged to set ZEB maximum energy demand thresholds in line with Annex I, with a view to quickly achieving the most recent cost-optimal levels, but also at much lower levels than NZEB-10%.[106]

[105] Commission Delegated Regulation 244/2012, A comparative methodology framework for calculating cost-optimal levels of minimum energy performance requirements for buildings and building elements.
[106] The EPBD requires the ZEB thresholds to be at least lower than the national 2024 NZEB thresholds but does not prevent Member States from setting ZEB thresholds at an even lower level than NZEB-10%.

Timeline of requirements linked to cost-optimality and ZEB energy demand thresholds

2023	2025	2026	2028	2030	2033
Member States update cost-optimal levels	**By 30/06:** Commission Delegated Act to revise the cost-optimal methodology **By 31/12:** draft ZEB thresholds included in draft NBRP based on 2023 cost-optimal levels	**As of 29/05:** where public bodies intend to occupy a new building that they do not own, they shall aim for that building to be a ZEB **By 30/06:** Commission may recommend adaptations of ZEB thresholds (as part of country-specific recommendations on draft NBRP) **By 31/12:** final ZEB thresholds included in final NBRP	**As of 01/01:** new *public* buildings should be ZEB **By 30/06:** Member States update cost-optimal levels (based on 2025 methodology) and subsequently adjust ZEB thresholds	**As of 01/01:** ***all*** new buildings should be ZEB	**By 30/06:** Member States update cost-optimal levels and subsequently adjust ZEB thresholds

BPIE RECOMMENDATION:

Member States are required to revise their ZEB thresholds following updates to their cost-optimal levels. Given the short timeframe between the deadline for revising cost-optimal levels (June 2028) and the entry into force of the ZEB standard for all buildings (January 2030), it is advisable that Member States update their cost-optimal levels as soon as possible after the EU methodology is made available. **Ideally, this update should be completed by the deadline for the final NBRP (December 2026).**

DEEP DIVE #2

Recalibrating the cost-optimal methodology towards societal gains

WHAT IS THE COST-OPTIMAL METHODOLOGY AND WHY IS IT IMPORTANT TO GET IT RIGHT?

In general, cost-optimality is the process of finding the most cost-effective way to achieve a specific goal. It is a fundamental principle in decision-making for businesses, governments and individuals alike. In the EU's cost-optimal methodology for energy efficiency in buildings, the upfront costs of energy-saving measures are weighed against long-term benefits. When applied to individual buildings, the aim is to achieve the best value over time by balancing financial feasibility for owners with the pursuit of high energy performance. Ultimately, it focuses on delivering the best possible energy efficiency for a given investment.

In line with the cost-optimality provisions introduced in the EPBD 2010, the Commission established in 2012 a framework at the EU level known as the cost-optimal methodology (step 1). Member States are then required to apply this methodology to determine the cost-optimal energy performance levels for both new buildings and existing buildings being renovated (step 2). When setting standards or requirements for individual buildings, Member States must ensure that these standards align with the corresponding cost-optimal levels — for newly constructed ZEBs they must be at least equal to or below the cost-optimal level, and for existing buildings undergoing major renovation they should be equal to the cost-optimal level – with a 15% deviation allowed (step 3).

Definition (Article 2§22): major renovation

The renovation of a building where either (a) the total cost of the renovation relating to the building envelope or the technical building systems is higher than 25% of the value of the building, excluding the value of the land upon which the building is situated; or (b) more than 25% of the surface of the building envelope undergoes renovation.

The 2024 EPBD introduces in its Article 6 a revision to the cost-optimal methodology, outlined in Annex VII, to be further specified in a Commission Delegated Act by 30 June 2025. First, the update to the cost-optimal methodological framework offers an opportunity to address some of its existing challenges and provide a more balanced evaluation of the costs and benefits, especially environmental and health externalities, associated with construction and renovation. Second, the 2024 EPBD added an explicit link between the cost-optimal methodology and higher-level and long-term ambitions for the building stock.[107] Ultimately, this will enable the setting and achievement of higher energy performance levels across all buildings.

BPIE RECOMMENDATION #1:

Correct key economic variables impacting the results of the cost-optimal calculations

Discount rates are used to compare the value of monetised costs and benefits over time. The lower the discount rate, the higher value is being given now to benefits that will occur later in time. The updated cost-optimal methodology should **encourage Member States to lower their current discount rates by exploring options below 2%.** This approach would better reflect the long-term benefits of building renovation, supporting the transition to a highly energy-efficient building stock.

Recent energy price interventions across the EU have resulted in prices that are introducing a bias in cost-optimality calculations. Indeed, such governmental interventions artificially reduce the benefits of energy savings. The updated cost-optimal methodology should be **adjusted to properly reflect unsubsidised energy prices,** especially considering the limited duration of several protection mechanisms. The methodology should remain aligned with realistic long-term energy pricing trends.

BPIE RECOMMENDATION #2:

Identify, quantify, monetise and incorporate social and environmental benefits into the cost-optimality calculations

[107] EPBD Annex VII (2024 additions underlined): *"the comparative methodology framework shall enable Member States to determine the energy and emission performance of buildings and building elements, and the economic aspects of measures [...] and to link them with a view to identifying the cost-optimal level to achieve the 2030 emission reduction and climate neutrality goals, as well as ZEB stock by 2050 at the latest."*

WHAT BENEFITS SHOULD BE BETTER REFLECTED IN THE COST-OPTIMAL METHODOLOGY?

Besides health and environmental benefits which are now included in the cost-optimal methodology (see Annex VII), Member States should consider incorporating in their calculations:

- ***Improved energy security:*** The benefits of import-related energy security have traditionally focused on reducing dependence on fossil fuels – this must continue. However, as renewable energy sources gain greater importance, it is now crucial to also reduce reliance on foreign supplies of key technologies. Incorporating energy security benefits when determining cost-optimal levels would strengthen the role of highly energy-efficient buildings in supporting a smooth transition to locally produced renewables.
- ***Electricity grid benefits:*** Cost-optimality calculations often overlook the benefits that highly energy-efficient buildings provide to energy distribution systems, such as reducing peak demand and minimising energy losses in power lines. By incorporating these grid benefits into cost-optimality calculations, the methodology would more comprehensively reflect the impacts of highly energy-efficient buildings and enhance their contribution to electricity grid decarbonisation efforts.
- ***Productivity gains:*** Highly energy-efficient buildings improve indoor environments, boosting the productivity of building occupants. This leads to better work performance, improved academic outcomes and better health. To fully capture the outcomes of highly energy-efficient buildings, all these benefits should be included in the updated comparative cost-optimal methodology framework.

HOW TO CONCRETELY REFLECT THOSE BENEFITS IN THE COST-OPTIMAL METHODOLOGY?

The first step after identifying the multiple benefits is to consider their **quantification**. As a second step, and to be able to include them in the methodology, **they need to be monetised**. This two-step exercise is possible for several of the benefits outlined but entails some methodological challenges. Precise monetisation approaches need to be further developed, but there is already consensus about the significant value of multiple benefits. The inclusion of multiple benefits in the cost-optimal methodology should therefore go ahead, supporting future calculation and monetisation work and ensuring constant improvement. Systematic collection and analysis of best practices, especially from frontrunner Member States or thematic projects,[108] would help this. Member States are encouraged to take a more forward-looking approach to applying the cost-optimal methodology, based on the two recommendations outlined previously, whether or not they are integrated in the EU-level framework.

[108] Such as COMBI or the multiple benefits monetisation MBx tool from the syn.ikia project

TO GO FURTHER ON COST-OPTIMALITY
ADDITIONAL READING

- **Syn.ikia project (2024),** Multiple benefits of sustainable plus energy neighbourhoods and their potential impact on policy and investment decisions.
- **BPIE (2024),** From cost savings to societal gains: rethinking the cost-optimal methodology.

3.3 FULLY DECARBONISED BUILDINGS

WHAT ARE THE ZEB OBJECTIVES IN TERMS OF EMISSIONS?

Beyond framing how requirements on the ZEB energy performance level should be set at national level, the EPBD also outlines what sources of energy are allowed (or not) to supply a new construction and if so, how.

The objective is to fully decarbonise new buildings, with two cumulative underlying goals:

1. A ZEB shall not cause any on-site carbon emissions from fossil fuels (Article 11§1) – **no direct operational carbon emissions**; and
2. A ZEB should produce zero or a very low amount of operational GHG emissions, with Member States required to establish a maximum threshold, expressed in $kgCO_2eq/(m^2.year)$, reported in their NBRP (Article 11§5) – **limited indirect operational GHG emissions.**

Definition (Article 2§23): operational GHG emissions

Greenhouse gas emissions associated with the energy consumption of the technical building systems during the use and operation of the building.

Definition (Article 2§6): technical building system

Technical equipment of a building or building unit for space heating, space cooling, ventilation, domestic hot water, built-in lighting, building automation and control, on-site renewable energy generation and energy storage, or a combination thereof, including those systems using energy from renewable sources.

The first objective means that **some sources of energy are forbidden to supply a ZEB**. The energy needed to supply a ZEB cannot be generated by systems which fall under these two cumulative conditions:

1. **They combust fossil fuels,** defined as *"solid fuels [i.e., coal and coal products], natural gas, and oil"* (Governance Regulation 2018/1999 Article 2§62); **and**
2. **They are located on-site,** defined as *"in or on a particular building or on the land on which that building is located"* (EPBD Article 2§54).

The EPBD adds an indicative objective for ZEBs to **offer flexibility in their energy grid integration**; a ZEB should *"where economically and technically feasible, offer the capacity to react to external signals and adapt its energy use, generation, or storage"* (Article 11§1). For more information on the flexibility potential of buildings and what it means for electricity grids, see Deep Dive #3.

WHAT SOURCES OF ENERGY ARE ELIGIBLE, BY DEFAULT, TO SUPPLY A ZEB?

The EPBD presents an explicit list of four energy sources which are eligible to supply the total annual primary energy use of a ZEB. The first two are based on renewable energies.

Definition (Article 2§14): energy from renewable sources

Energy from renewable non-fossil sources, namely wind, solar (solar thermal and solar photovoltaic) and geothermal energy, osmotic energy, ambient energy, tide, wave and other ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas, and biogas.

OPTION A ON-SITE OR NEARBY RENEWABLE ENERGY SOURCES

Definition (Article 2§54): on-site

In or on a particular building or on the land on which that building is located.

Definition (Article 2§55): energy from renewable sources produced nearby

Energy from renewable sources, produced within a local or district-level perimeter of a particular building, which fulfils all of the following conditions:

(a) it can be distributed and used only within that local and district-level perimeter through a dedicated distribution network;

(b) it allows for the calculation of a specific primary energy factor valid only for the energy from renewable sources produced within that local or district-level perimeter; and

(c) it can be used on-site through a dedicated connection to the energy production source, where that dedicated connection requires specific equipment for the safe supply and metering of energy for self-use of the building.

Renewable energy sources that fall into this first case are solar energy (thermal and photovoltaic), heat pumps (for their ambient heat component), geothermal energy, hydroelectric power, biomass and renewable fuels.[109] Renewable energy sources under this first case, especially biomass and renewable fuels, must comply with the provisions laid down in RED Articles 7 and 29 on sustainability and GHG emissions saving criteria. Where Member States allow a ZEB to be supplied via biomass and renewable fuels, they must ensure, in accordance with EPBD Article 11§5, that the building produces a very low amount of operational GHG emissions, i.e. less than the nationally determined maximum threshold.

BPIE RECOMMENDATION:

While the EPBD allows a ZEB to be supplied by four different options, Member States should consider giving priority to option A. On-site or nearby renewables, besides being an eligible source to supply a ZEB, can support the delivery of EPBD Article 10 ("solar energy in buildings") as well as enhance the building's capacity to provide flexibility services to the electricity grid.

A SPECIAL PUSH FOR SOLAR ENERGY INSTALLATIONS: EPBD ARTICLE 10 REQUIREMENTS FOR NEW BUILDINGS

The EPBD specifically pushes the deployment of one kind of on-site renewable energy: solar energy. First, **Member States must ensure that all new buildings are *"designed to optimise their solar energy generation potential"***. This means considering certain aspects when construction plans are first drawn up, such as the building aspect (is it overshadowed by a bigger building, which façade faces which direction?), the shape and size of the roof, and the space availability for storage.

Second, Member States are required to ***"ensure the deployment of suitable solar energy installations,*** *if technically suitable, and economically and functionally feasible"* on certain sorts of buildings by certain dates, and more specifically:

- **On new public and non-residential buildings with a useful floor area larger than 250m² - by 31 December 2026**
- **On new residential buildings – by 31 December 2029.**

These requirements are linked with the "renewable acceleration areas" under RED III Article 15c.[110]

During the transposition period, Member States will need to define what "suitable solar energy installations" cover, as well as give more details on the technical, economic and functional feasibility (e.g. depending on the roof orientation, availability of space, roof structure). The EPBD does not provide a quantitative target in terms of output generated or surface covered by the solar energy installations, but Member States should make the best use of the available surface, in synergy with measures that foster adaptation and resilience (e.g. green roofs). Member States must report on "numerical targets for the deployment of solar energy in buildings" within their NBRPs.

[109] Biomass refers to organic materials derived from plants, animals and waste that can be used as a source for producing bioenergy. Bioenergy can take the form of heat, electricity or biofuels (one kind of renewable fuel). Bioenergy can be generated by burning biomass directly (e.g., wood pellets for heating) or through biochemical and thermochemical processes (e.g., fermentation, gasification). Renewable fuels are liquid or gaseous fuels produced from renewable sources, such as biodiesel, bioethanol, renewable natural gas, and synthetic fuels derived from green hydrogen. EPBD Recital 22 clarifies that *"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"*.

[110] For more information, see the Commission Guidance (2024) on designating renewables acceleration areas.

OPTION B RENEWABLE ENERGY FROM A RENEWABLE ENERGY COMMUNITY

The second option explicitly mentioned as eligible to cover the energy demand of a ZEB is renewable energy from a renewable energy community. Defined and promoted through the RED, renewable energy communities may also act as one-stop shops for building renovation and decarbonisation under EPBD Article 18 (for more information on one-stop shops, see section 4.3).

Definition (Renewable Energy Directive, Article 2§16): renewable energy community

A legal entity:

(a) which, in accordance with the applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity

(b) the shareholders or members of which are natural persons, SMEs or local authorities, including municipalities

(c) the primary purpose of which is to provide environmental, economic or social community benefits for its shareholders or members or for the local areas where it operates, rather than financial profits.

OPTION C ENERGY FROM AN EFFICIENT DISTRICT HEATING AND COOLING SYSTEM

The third option is energy from an efficient district heating and cooling system, as described in EED Article 26. If Member States allow a ZEB to be supplied via this option, they must ensure, in accordance with EPBD Article 11§5, that the building produces a very low amount of operational GHG emissions, i.e. less than the nationally determined maximum threshold.

What is meant by an *efficient* district heating and cooling system will evolve, based on a gradual increase of the share of renewable energy, waste heat (and high-efficiency cogeneration) until 2050. Until 2040, a district heating and cooling system can still be labelled as "efficient" even when half the energy is based on fossil fuels.

Definition (Article 2§50): district heating/cooling

The distribution of thermal energy in the form of steam, hot water or chilled liquids, from a central or decentralised source of production through a network to multiple buildings or sites, for the use of space or process heating or cooling.

Periods	Default option (Article 26§1)	Alternative option (Article 26§2): sustainability performance criteria based on the maximum amount of GHG emissions from the district heating and cooling system per unit of heat or cold delivered
From 01/01/2028 until 31/12/2034	At least 50% renewable energy Or at least 50% waste heat Or at least 50% renewable energy and waste heat Or at least 80% of high-efficiency cogenerated heat Or at least a combination of such thermal energy going into the network where the share of renewable energy is at least 5% and the total share of renewable energy, waste heat or high-efficiency cogenerated heat is at least 50%	150 grams/kWh
From 01/01/2035 until 31/12/2039	At least 50% renewable energy Or at least 50% waste heat Or at least 50% renewable energy and waste heat Or a system where the total share of renewable energy, waste heat or high-efficiency cogenerated heat is at least 80% and in addition the total share of renewable energy or waste heat is at least 35%	100 grams/kWh
From 01/01/2040 until 31/12/2044	At least 75% renewable energy Or at least 75% waste heat Or at least 75% renewable energy and waste heat Or a system using at least 95% renewable energy, waste heat and high-efficiency cogenerated heat and in addition the total share of renewable energy or waste heat is at least 35%	100 grams/kWh
From 01/01/2045 to 31/12/2049	At least 75% renewable energy Or at least 75% waste heat Or 75% renewable energy and waste heat	50 grams/kWh
From 01/01/2050	Only renewable energy Or only waste heat Or only a combination of renewable energy and waste heat	0 grams/kWh

OPTION D ENERGY FROM "CARBON-FREE SOURCES"

The last eligible source of energy to supply a ZEB explicitly mentioned in the EPBD is *"energy from carbon-free sources"*. Neither the EPBD nor other EU-level legislation includes an official definition for this concept. However, it can be considered to cover:

- Electricity from nuclear energy[111]
- Electricity from renewable energy sources through the grid
- The share of renewables and waste heat within a district heating and cooling system that is not considered efficient.

The issue of proving the "carbon-free" content of energy used remains to be addressed by Member States during the transition period. They must determine who is responsible for verifying this content and establish the method of verification. Broadly, two approaches could be considered: either through contracts with energy providers linked to guarantees of origin, or by referencing the energy mix (preferably at a local level, such as the area surrounding the building, rather than at the national level). This could be facilitated through data sharing from transmission system operators and distribution system operators.[112]

BPIE RECOMMENDATION:

While options A and B clearly prioritise renewable energy exclusively as of 2028/2030, options C and D as well as the alternative option do not guarantee that a ZEB will source its energy solely from renewables. For instance, a district heating and cooling system can be labelled as "efficient" while still relying on at least 50% fossil fuels until 2040. However, from a systemic point of view, connecting to district heating and cooling is beneficial since it ensures the viability of the district heating and cooling system and enables its transformation.

To ensure a ZEB is fully decarbonised from its construction and throughout its lifetime, Member States should give priority in their national ZEB definition to option A, then to option B. This is because option B relies on a contractual arrangement to be part of a renewable energy community, which can be undone over time. At the least, options A and B should represent a minimum share of the ZEB's very low energy demand. This approach would also align with requirement on solar energy installations and would encourage on-site renewable energy production and consumption (whether used directly, stored or fed back into the grid), which is key to unlock the flexibility potential of buildings. Incentives to prioritise options A and B should also be reflected at the consumer level, such as through advisory services and financial support.

[111] Nuclear energy is considered within the "share of energy from renewable sources in gross electricity consumption" by Eurostat.
[112] SmartEn (2024), Implementing EU laws: a guide to activate demand-side flexibility in the EU 27 Member States.

HOW TO OPTIMISE THE ZEB ELIGIBLE ENERGY SOURCES, WHEN TO USE ALTERNATIVES AND UNDER WHICH CONDITION

Default approach: the total primary energy use of a ZEB must be fully covered on an annual basis, by one or several of the four allowed options.

While having different ZEB definitions between different Member States is obvious from the EPBD architecture, there could also be different options within each Member State's national ZEB definition. Depending on the building type and the climatic zone, the optimal balance between energy demand thresholds and eligible energy sources, or between the different eligible energy sources, can vary. Certain combinations of technologies (e.g. solar energy + heat pump, especially if coupled with storage) contribute to fulfilling the ZEB energy source requirements while simultaneously increasing the capacity of the building to provide flexibility. For more information on the flexibility potential of buildings and what it means for electricity grids, see Deep Dive #3.

Alternative 1: annual compensatory mechanism between off-site fossil fuels and the four eligible options

If a ZEB cannot be supplied, on an annual basis, by a combination of the four eligible energy sources, a compensatory mechanism can be used. This allows a ZEB to be supplied by another source of energy, but only under three cumulative conditions:

- The off-site fossil energy consumed at one moment of the year is compensated at another point of the year by the same volume of energy from renewables, produced in excess on-site and used either on-site (for other uses than those of Annex I) or exported to the grid.
- There are still no on-site carbon emissions from the use of fossil fuels (EPBD Article 11§1).
- There is zero or a very low amount of operational GHG emissions, as determined by the national thresholds (EPBD Article 11§5).

BPIE RECOMMENDATION:

In accordance with RED Article 15a§3, which mandates Member States to *"require the use of minimum levels of renewables in new buildings"*, Member States should strive to use the annual compensatory mechanism as little as possible and for a limited amount of energy.

Alternative 2: use energy from the grid

A final alternative is that *"the total annual primary energy use [of a ZEB] may also be covered by other energy from the grid complying with criteria established at national level"*. This option should only be used as last resort, when it is technically or economically not feasible to use the four eligible options to supply the building on an annual basis (default option) and the annual compensatory mechanism (alternative option 1) also does not work. Member States should use alternative 2 only to fill the gap where the total annual primary energy use of the building cannot be covered by the default option.

To be applied, alternative 2 must satisfy certain conditions:

- National criteria should be established in a transparent and clear manner, considering building types, climatic zones and the local context (e.g. space availability, solar exposure, existing district heating and cooling systems). This means that alternative 2 can only be applied to individual buildings, not as the national ZEB definition.
- The building using alternative 2 has zero or a very low amount of operational GHG emissions, as determined by the national thresholds (EPBD Article 11§5). To achieve this objective, Member States should strive to put in place lower maximum energy demand thresholds, to reduce the energy needs of the building to be covered by other sources than the four eligible ones.

TO GO FURTHER ON ON ZERO-EMISSION BUILDINGS
ADDITIONAL READING

- **Commission Recommendation 2016/1318,** Guidelines for the promotion of nearly zero-energy buildings and best practices to ensure that, by 2020, all new buildings are nearly zero-energy buildings.
- **Commission Delegated Regulation 244/2012,** A comparative methodology framework for calculating cost-optimal levels of minimum energy performance requirements for buildings and building elements.
- **BPIE (2021),** Nearly Zero: a review of EU Member State implementation of new build requirements.
- **BPIE (2022),** Ready for Carbon Neutral by 2050? Assessing ambition levels in new building standards across the EU.
- **BPIE (2024),** From cost savings to societal gains: rethinking the cost-optimal methodology.
- **EPBD.wise project (2024),** National Building Renovation Plans and Zero-Emission Buildings: policy needs and best practices.

DEEP DIVE #3

Empowering buildings to provide non-fossil flexibility to the electricity grid

ELECTRICITY GRIDS, FLEXIBILITY NEEDS AND THE POTENTIAL ROLE OF BUILDINGS

The overall electricity consumption in the EU is expected to increase by around 60% between 2023 and 2030.[113] This tremendous electricity demand growth, combined with the switch from fossil- to renewable-based generation and the need to upgrade the existing grid infrastructure,[114] results in high investment needs.[115] Anything that reduces the demand for the grid build-out is therefore essential – from lowering the overall energy demand from buildings and optimising the use of existing renewable electricity generation, to making consumption more flexible.

"Flexible consumption" or "flexibility" means the ability of an electricity system to adjust to the intermittency of generation and consumption patterns and to grid availability, across relevant market timeframes (e.g. hourly).[116] For the electricity grid to operate efficiently and stably, the amount of electricity consumed must perfectly match the amount of electricity produced at all points of time. Balancing electricity grids becomes challenging because of increased intermittency on both the supply and demand side. Renewable generation, which is intermittent by nature, represents a growing share of the supply,[117] while on the demand side the number of flexible assets, such as electric vehicles and heat pumps, is rising,[118] requiring higher power consumption and increased peak power. Increased intermittency in the electricity system calls for more flexibility.

The need for flexible consumption could largely be provided by buildings (whether at individual or neighbourhood level), one of the biggest energy consumers. Benefits would materialise at different levels:[119]

- Building: reduced energy bills, increased resilience to price fluctuations, potentially a passive income for the building owner from supplying electricity markets.
- Infrastructure: managing supply and demand intermittency, optimising usage of existing grid resources, supporting strategic infrastructure updating, reduced risk of brownouts and blackouts, contributing to energy security and resilience.
- Society: reduced need to upgrade grids, decreased peak electricity demand avoids turning on "peaker plants" which are highly polluting,[120] yielding quicker and more substantial GHG emissions reductions in both the buildings and electricity sectors.

[113] European Commission press release, 2023

[114] 40% of the existing distribution network is more than 40 years old.

[115] According to the European Commission in its Communication "Digitalising the energy system-action plan" (October 2022), the EU will need to allocate €584 billion by 2030 for grid expansion and upgrades.

[116] Regulation 2024/1747 (13 June 2024) as regards improving the Union's electricity market design

[117] In 2023, 24.1% of final energy use came from renewable sources. The EU's target is 42.5% in 2030.

[118] According to the European Environment Agency, the share of electric vehicles in overall sales increased from 2% in 2018 to 22% in 2023. As for heat pumps, sales have increased since 2019, with capacity doubling between 2019 and 2022. The political ambition in the EU (REPowerEU communication) is to deploy 30 million additional heat pumps by 2030.

[119] However, the precondition for providing flexibility services cost-effectively is that the building has a high energy performance, with low energy needs and, depending on the flexible asset combination and capacity, more generation available to be used in the electricity market.

[120] Peak power demand is usually met by gas generation units.

If buildings are to provide flexibility services to the grid, the EPBD and the electricity market design (EMD)[121] need to be in sync.[122] The EMD is a regulatory package adopted in 2024, revising a set of preexisting files, notably the Electricity Regulation ((EU)2019/943) and the Electricity Directive ((EU)2019/944), which address the functioning and management of electricity markets. The EMD objective is threefold: (1) enhance stability and predictability of energy costs; (2) protect consumers from volatile and high prices; and (3) boost new renewable energy investment.[123]

Some EMD provisions are indirectly linked to buildings, such as the requirement for Member States to assess their non-fossil flexibility needs. This is a bottom-up process where transmission system operators and distribution system operators[124] devise a methodology, assess their flexibility needs and submit these to national authorities for evaluation. Member States are then to define an indicative national objective for non-fossil flexibility, evaluate the potential contribution of non-fossil flexibility sources (e.g., demand response and energy storage), identify barriers to deployment of flexibility services and develop solutions to remove them. This process, which is to be reflected in the NECP, will determine the (non-fossil) flexibility market demand size, with corresponding services which can be provided by buildings, among others.

HOW SHOULD EMD AND EPBD IMPLEMENTATION BE STRATEGICALLY PLANNED TO EMPOWER BUILDINGS TO PROVIDE FLEXIBILITY TO ELECTRICITY GRIDS?

The EPBD does not set specific requirements at building stock level to provide flexibility capacity to the electricity grid, but it requires certain building categories to offer the *"capacity to react to external signals"* and adjust energy consumption: ZEBs (Article 11§1), certain non-residential buildings (Article 13§9-10) and residential buildings undergoing major renovations (Article 13§11). However, there are two limitations to these provisions: (1) the number of ZEBs will be negligible in proportion to the overall stock,[125] and (2) the requirement is conditional on economic and technical feasibility – to be defined at national level, and without a requirement for Member States to improve this feasibility.

Furthermore, the EPBD does not require or sufficiently incentivise a high number of buildings to provide flexibility services to the grid, missing opportunities at building, infrastructure and societal levels. For example, EPBD Article 15 refers to the smart readiness indicator (SRI), a tool which can assess the capabilities of the building to adapt its operation to the grid (energy flexibility and storage is one of the seven SRI criteria). However, the EU SRI scheme is currently optional, tested in a few Member States, and will become mandatory (if the testing is deemed positive) only as of June 2027 for certain non-residential buildings. As the SRI will not be widely rolled out by 2030, and in any case only serves as an information tool about flexibility capabilities, other instruments may be needed to boost the role of buildings as flexibility providers. Member States should approach the implementation of various EPBD provisions, although not directly linked to flexibility, in a way that maximises the capacity of buildings to offer these services.

[121] Regulation 2024/1747 as regards improving the Union's electricity market design.
[122] The RED is also interesting in this regard, but out of scope for this deep dive.
[123] Commission press release, March 2023.
[124] A transmission system operator is an entity entrusted with transporting energy in the form of natural gas or electrical power on a national or regional level, using fixed infrastructure. A distribution system operator is an entity that delivers electricity to most end-users, usually on low voltage lines.
[125] Since ZEB is the updated standard for new buildings and existing buildings being deeply renovated. It is estimated that new buildings constructed annually represent 0.1% of the total stock, based on the number of construction permits (269,000 in 2021) and the total number of buildings in the EU (220 million).

The first, high-level opportunity for this resides in aligning strategic planning instruments to coordinate the definition of the flexibility capacity "demand" (from EMD) and the outline of the flexibility capacity "supply" (from EPBD).

	EMD planning	EPBD planning
2025		**By 31/12:** Member States submit draft NBRP #1
2026	**By 17/07:** Member States shall determine their national flexibility needs, consider potential for non-fossil flexibility sources (e.g., demand response and energy storage, aggregation and interconnection) for a period of 5 to 10 years.	**By 30/06:** Commission assesses draft NBRPs #1 and provides recommendations. **By 31/12:** Member States submit final NBRP #1.
2027	**By 17/01:** Member States set indicative national targets for non-fossil flexibility, including the respective contribution of both demand response and energy storage.	
2028	**By 17/07** (and every two years thereafter): Member States reassess their national flexibility needs for a new period of 5 to 10 years.	**By 01/01:** Member States submit draft NBRP #2 within draft NECP.
2029		**By 01/01:** Member States submit final NBRP #2 within final NECP (submitted every 10 years, with a midterm update – draft in 2033, final in 2034).

BPIE RECOMMENDATION:

As these two processes almost run in parallel in the coming years and will both be reflected in the NECP, national entities working on determining indicative non-fossil flexibility needs and those drafting building renovation plans should exchange information and coordinate efforts to synchronise actions. More specifically, transmission system operators and distribution system operators should be involved in the public consultation on the first draft NBRP (during 2025). The first final NBRP (due end 2026) should consider flexibility needs (available in July 2026). The second draft NBRP, included in the draft NECP (due January 2028), should consider the indicative national targets for non-fossil flexibility (due January 2027). On the EMD planning side and considering the NECP-NBRP drafting cycle is 10 years with a midterm review, it is recommended that national flexibility needs reports are submitted every five years (instead of 5 to 10 years), ideally a few months before the draft NBRP is due.[126]

[126] Besides improving strategic planning, if all Member States adopt a five-year cycle for national flexibility needs reports, it has two benefits: 1) a shorter timeframe facilitates more accurate projections; and 2) it helps determine flexibility needs at Union level in a more comprehensive way, increasing incentives for deployment of flexible technologies.

HOW SHOULD EPBD PROVISIONS EXPLICITLY REQUIRING FLEXIBILITY FROM CERTAIN BUILDING CATEGORIES BE IMPLEMENTED?

The EPBD explicitly requires three building categories to offer the *"capacity to react to external signals"* and adjust energy consumption, i.e. offer flexibility services: ZEBs (Article 11§1), certain non-residential buildings (Article 13§9-10) and residential buildings undergoing major renovations (Article 13§11). Although the EPBD assigns a (weak) flexibility objective to specific categories of buildings, it does not specify enabling conditions to maximise their (at least technical) capacity to provide this flexibility. This is why it is interesting to reflect on other aspects of the ZEB definition and consider how it should be implemented to open wider flexibility capacity.

BPIE RECOMMENDATIONS:

In defining the ZEB standard, Member States should consider that:

- A building with high energy performance standards (minimising its own energy needs) will be better positioned to provide flexibility services economically. According to EPBD Article 11, the ZEB energy performance threshold must be set *at least* 10% lower than the national 2024 NZEB threshold for total primary energy use. Member States are encouraged to exceed this 10% difference.
- Certain combinations of technologies (e.g. solar energy + heat pump, especially if coupled with electricity storage and automation) contribute to fulfilling the ZEB requirements in terms of eligible energy sources (and prioritising on-site and nearby renewables), while simultaneously increasing the capacity of the building to provide flexibility.

However, the impact of Article 11§1 and 13§9-10-11 in creating flexibility capacity is limited, since:

- The number of ZEBs will be negligible in proportion to the overall stock
  - New buildings constructed annually represent an estimated 0.1% of the total stock[127]
  - There is no requirement to deeply renovate existing buildings, i.e. to bring them to ZEB level after renovation
- Fulfilling Article 13 requirements is conditional on economic and technical feasibility
  - Feasibility is to be defined at national level
  - Member States are not required to improve this "feasibility condition" over time.

[127] Based on the number of construction permits (269,000 in 2021) and the total number of buildings in the EU (220 million).

BPIE RECOMMENDATIONS:

To increase the existing building stock capacity to provide flexibility, Member States should:

- Increase the number of deep renovations, as this reduces the overall energy demand from the building stock, reducing peak loads and the cost of grid upgrades.
- Increase the technical capacity of existing buildings to provide flexibility by implementing EPBD provisions linked to specific technologies (i.e., solar energy, technical building systems, and infrastructure for sustainable mobility) in a coordinated manner.[128]

HOW SHOULD SELECTED EPBD PROVISIONS BE IMPLEMENTED TO IMPROVE THE TECHNICAL FEASIBILITY CONDITIONS OF EXISTING BUILDINGS TO OFFER FLEXIBLE CAPACITY?

If a building is to provide flexibility services to the market, it (ideally) needs to have on-site renewable generation (e.g. solar energy) and flexible assets (e.g. heat pumps, energy storage options such as thermal energy storage, batteries and EVs) that can shift its energy use, including electricity use. The EPBD prescribes some requirements for these elements but providing flexibility capacity is not an objective. This is a missed opportunity to maximise the capacity of buildings to provide flexibility services. To address this issue, Member States should adopt a coordinated approach to the implementation of EPBD Articles 10, 13, and 14.

EPBD Article 10 (solar energy in buildings) sets a schedule for deploying suitable solar installations, mostly for new buildings. However, one provision requires Member States to deploy solar installations, *"by 31 December 2027, on existing non-residential buildings with useful floor area larger than 500m², where the building undergoes a major renovation or an action that requires an administrative permit for building renovations, works on the roof or the installation of a technical building system"*. Having solar generation in a building is one element, besides an energy management system and a heat pump or energy storage, that enables a building to provide flexibility services, for example by adjusting consumption and reducing electricity demand from the grid. If there is a mismatch between the time of supply and of demand for electricity generated on-site, it can either be fed into the grid or stored for later use; alternatively, the generating unit needs to be shut down, wasting renewable electricity.

BPIE RECOMMENDATIONS:

Member States should extend the requirement of deploying suitable solar installations to existing residential buildings undergoing major renovation (to match flexibility requirements from Article 13§11) and, following an individual cost-benefit assessment based on solar irradiance potential and other local variables, including the existence of a renewable acceleration area (in accordance with REDIII), to existing buildings smaller than 500m².

[128] This analysis focuses exclusively on building elements, and not on interoperability of flexibility assets with energy management systems, although this is a precondition.

EPBD Article 13 (technical building systems) paragraph 7 encourages Member States to replace standalone boilers powered by fossil fuels in existing buildings, *"with a view to a complete phasing out of fossil fuel boilers by 2040"*.[129] At the same time, the EPBD refers to the REDIII *"indicative target of at least 49% [renewables in the EU] final energy consumption in buildings in 2030"*.[130] One way to fulfil these requirements is to roll out a renewable and flexible asset: **heat pumps**. These can be easily switched on and off, or include more complex control systems, to avoid or shift grid load. While the EPBD does not mention heat pumps specifically, the EU has an aspirational goal of deploying 30 million heat pumps by 2030.[131] **EPBD Article 13§6** states that *"Member States shall promote energy storage for renewable energy in buildings"*. This is a positive mention because coupling energy storage with renewable installations, whether solar energy or heat pumps, is an essential component to maximise flexibility services. For example, energy storage enables the prosumer to use electricity for self-consumption when the price is high, or to sell it on the market.

BPIE RECOMMENDATIONS:

Member States should:

- Proactively and meaningfully support energy storage installation by setting mandatory energy storage targets (whether at building or neighbourhood level). This would ensure market demand for storage, reducing the cost of the technologies while also lowering energy prices.
- For all buildings, but especially those undergoing major renovations:
  - If economically feasible, require the deployment of solar energy installations and heat pumps to be directly coupled with energy storage, whether at building or neighbourhood level.
  - If economically unfeasible, require those buildings to be flexibility-market ready, by including a designated space for (future) storage units, appropriate installations, ducting and wiring ("storage-readiness" requirement).
- Incentivise the installation of a heat pump in connection with a solar energy installation, mirroring the EPBD Article 10 requirement to deploy solar energy in buildings where a technical building system (such as a heat pump) is installed.
- Use funds available from the non-fossil flexibility support schemes (stemming from the EMD)[132] to deploy subsidies, lowering the costs of flexible building assets such as heat pumps or storage units.

EPBD Article 14 (infrastructure for sustainable mobility) lays out a schedule for Member States to ensure pre-cabling and ducting of car parking spaces, and installation of electric vehicle (EV) charging stations. While EV batteries can act as electricity storage units, under the current EPBD framework, there is limited potential for EVs to provide flexible capacity in buildings. This is because 1) of the relatively slow deployment of charging stations, 2) EVs are mobile batteries with questionable predictability regarding their location but also their usage (acting as generator or load), and 3) not all EVs and their components are yet designed for two-way electricity flows. EPBD Article 14§6 opens the possibility for Member

[129] Mandatory indicator within Annex II (NBRP template).
[130] Directive 2023/2413 as regards the promotion of energy from renewable sources
[131] Commission Communication (2022), REPowerEU Plan.
[132] Regulation 2019/943 Internal Market for Electricity, Article 19e

States to opt out from ensuring charging points are capable of bi-directional charging. This, however, is a necessary precondition for EVs to provide electricity back to the grid and thus to play a role in the flexibility capacity of buildings. Additionally, Article 14 requirements, in the way they apply to new vs. renovated buildings, and to residential vs. non-residential buildings (based on number of parking spaces), are not well aligned with Article 10 requirements to deploy solar generation (based on building floor area). If EVs are deployed without solar energy installed and used at generation time, EVs will become an additional load to the building energy use (and to the grid), rather than a flexibility capacity provider.

BPIE RECOMMENDATIONS:

Member States should:

- Require that all charging stations are bi-directional (vehicle-to-grid) and incentivise a match between EV charging time and solar PV production periods
- Apply the requirement to install charging stations also to buildings under the scope of EPBD Article 10, and conversely, apply the requirement to deploy solar energy installations to buildings under the scope of EPBD Article 14
- Require public buildings to not only be pre-wired but also to have charging stations and align this with the ZEB deadline for buildings owned by public bodies (i.e. 2028 rather than 2033 as in Article 14).

EPBD IMPLEMENTATION: A STEPPING STONE FOR BUILDINGS TO BECOME FLEXIBILITY PROVIDERS

Buildings, currently one of the biggest energy consumers, could become active participants in the electricity market by providing flexibility services to the grid, contributing to its efficiency and resilience. This, however, can only happen if buildings are fitted to provide flexibility services. Member States need to implement relevant EPBD provisions (Articles 3, 10, 11, 13, 14) in a strong and coordinated way, maximising the flexible capacity buildings could provide. By following the recommendations included in this deep dive, Member States will get closer to this objective.

This comprehensive and strategic approach will be in line with the spirit of the EPBD, as in its Recital 33, which states that *"it should be possible for Member States to encourage, by means of information, appropriate administrative procedures or other measures that are set out in their national building renovation plans, the deployment of suitable solar energy installations in combination with the renovation of the building envelope, with the replacement of technical building systems or with the installation of recharging infrastructure for electric vehicles, of heat pumps or of building automation and control systems."*

3.4 A PROGRESSIVE INTEGRATION OF LIFE-CYCLE THINKING: FROM DISCLOSURE OF LIFE-CYCLE GLOBAL WARMING POTENTIAL TO BENCHMARKS AND LIMIT VALUES

ARTICLES 7§2, 7§3, 7§5, AND ANNEX III

WHAT IS NEW, WHAT HAS CHANGED AND WHY IS IT IMPORTANT?

Ever since it was first adopted in 2002, the scope of the EPBD has gradually expanded from regulating operational energy performance to mitigating climate impacts, improving comfort and indoor air quality, and linking buildings to other sectors like transport and electricity grids. Yet, until the 2024 recast, efforts to reduce carbon emissions from buildings have focused on energy-related emissions during the building use phase, especially from heating and cooling. Now, for the first time, **the EPBD mandates a comprehensive approach that addresses all building-related carbon emissions**, including embodied emissions from product manufacturing, transport, construction, renovation and maintenance processes, alongside operational emissions.[133]

Reducing operational carbon emissions remains an essential component of reaching a climate-neutral building stock, particularly for existing buildings. However, operational carbon only represents a part of the building stock's total carbon footprint. Embodied carbon emissions typically make up 20 to 30% of a building's total carbon emissions, and in low-operational carbon buildings this figure amounts to 50% or even higher.[134] As the energy performance of new and existing buildings progressively improves, and their energy supply is increasingly renewables-based, operational carbon emissions will decrease. As a result, **both the relative and absolute contribution of embodied carbon to the whole-life carbon emissions of buildings will increase.**

Definition (Article 2§24): whole-life-cycle GHG emissions

Greenhouse gas emissions that occur over the whole life cycle of a building, including the production and transport of construction products, construction-site activities, the use of energy in the building and replacement of construction products, as well as demolition, transport and management of waste materials and their reuse, recycling and final disposal.

Definition (Article 2§25): life-cycle global warming potential (GWP)

An indicator which quantifies the global warming potential contribution of a building along its full life cycle.

[133] This section is based on BPIE (2025), Defining a common vision for climate neutral buildings: a comprehensive and harmonised framework for whole-life carbon measurement across Europe.
[134] Ramboll, BPIE, KU Leuven (2023), Supporting a Roadmap for the Reduction of Whole Life Carbon in Buildings.

Adopting a life-cycle view on carbon emissions is necessary to bring the building sector to carbon neutrality by 2050. This is crucial not only because the operational and embodied carbon emissions from the building sector are both significant and offer actionable opportunities for reduction, but also because effective decarbonisation policies must account for the complementarity and potential trade-offs between these two aspects.

For these reasons, **the EPBD takes a full life-cycle view toward construction-sector GHG emission reductions, ensuring that GHG emissions are not being simply shifted between life-cycle phases.** A life-cycle approach, which integrates both operational and embodied climate impacts, offers significant flexibility to Member States and building sector stakeholders. It enables them to implement the most feasible and appropriate carbon reduction measures while identifying synergies between solutions aimed at reducing operational emissions, and those targeting embodied emissions. This approach also allows for a reasonable degree of compensation for carbon hotspots in some building elements or life-cycle stages by achieving lower emissions in others. By pinpointing the sources and scale of embodied carbon in buildings, policymakers and industry can prioritise efforts where carbon mitigation is most needed and effective.

AN INCREMENTAL APPROACH FROM DISCLOSURE TO LIMIT VALUES

The EPBD adopts a gradual approach to regulating life-cycle emissions, and provisions only apply to new construction, not to existing buildings being renovated.

STEP 1 DELEGATED ACT ON A UNION FRAMEWORK FOR THE NATIONAL CALCULATION OF LIFE-CYCLE GWP (ARTICLE 7§3)

"The Commission is empowered to adopt delegated acts in accordance with Article 32 to amend Annex III to set out a Union framework for the national calculation of life cycle GWP with a view to achieving climate neutrality. The first such delegated act shall be adopted by 31 December 2025."

The first step is the development of a common EU framework for calculating and reporting whole-life carbon (WLC) emissions. EPBD Annex III, which outlines the WLC assessment methodology, leaves room for various interpretations. In this sense, the Commission is empowered to adopt a Delegated Act to amend Annex III and establish a "Union framework for the national calculation of life-cycle GWP" by the end of 2025. This is expected to provide more clarity on the scope of the WLC calculation, including life-cycle modules, data sources and scenario definitions.

STEP 2 LIMIT VALUES (ARTICLE 7§5)

"By 1 January 2027, Member States shall publish and notify to the Commission a roadmap detailing the introduction of limit values on the total cumulative life-cycle GWP of all new buildings and set targets for new buildings from 2030, considering a progressive downward trend, as well as maximum limit values, detailed for different climatic zones and building typologies. Those maximum limit values shall be in line with the Union's objective of achieving climate neutrality."

The second step is for Member States to use the building WLC emission data to define benchmarks and baseline values based on common standards and agreed methodologies. The benchmarks represent the starting point for the development of decarbonisation roadmaps and the setting of building-level WLC limit values that will ensure continuous improvement until the net-zero goal is reached. The roadmaps should detail how limit values for new buildings will be introduced from 2030 onwards, while considering a progressive and regular tightening of these limit values over time. The Commission will provide guidance to support Member States in setting these minimum WLC thresholds according to a science-based decarbonisation pathway with a net-zero carbon goal by 2050.

STEP 3 CALCULATION AND DISCLOSURE OF WHOLE-LIFE-CYCLE GHG EMISSIONS (ARTICLE 7§2) AND COMPLIANCE WITH LIMIT VALUES

"Member States shall ensure that the life-cycle GWP is calculated in accordance with Annex III and disclosed in the energy performance certificate of the building:

(a) from 1 January 2028, for all new buildings with a useful floor area larger than 1,000 m²;

(b) from 1 January 2030, for all new buildings."

As of 2028, Member States must ensure the life-cycle GWP for new buildings with a useful floor area above 1,000m², and all new buildings as of 2030, is calculated and disclosed through the EPC. The data selection, scenario definition and calculations must be carried out in accordance with the EN 15978 standard.[135] The building elements and technical equipment included in the assessment must align with the Level(s) indicator 1.2 for life-cycle GWP.[136]

[135] CEN EN15978 (2011), Sustainability of construction works - Assessment of environmental performance of buildings - Calculation method.
[136] European Commission, Level(s) – European Framework for sustainable buildings.

By 31/12/2025

The Commission must adopt a Delegated Act to amend Annex III to set out a Union framework for the national calculation of life-cycle global warming potential.

2027

- Based on the Delegated Act, by 01/01/2027 Member States must publish a roadmap detailing the introduction of limit values on total cumulative life-cycle global warming potential for all new buildings, and set targets and limit values for new buildings from 2030, aiming at a progressive downward trend.
- There will also be Commission guidance to support this exercise.

2028

- From 01/01/2028, Member States must ensure that the life-cycle global warming potential is calculated in accordance with Annex III and disclosed through the energy performance certificate for all new large buildings (useful floor area >1,000m²).
- In calculating and setting cost-optimal levels, to be submitted by 30/06/2028, Member States may take into account life-cycle global warming potential.

From 01/01/2030

All new buildings should comply with the ZEB standard, have their life-cycle global warming potential calculated and disclosed through the EPC, and comply with the limit values on total cumulative life-cycle global warming potential set at national level.

Starting with reporting requirements, with a predictable and planned introduction as well as progressive tightening of limit values in the longer term, allows the construction sector to become familiar with WLC accounting over time, and allows governments to build capacity and collect the data needed to formulate well-calibrated thresholds. The EU framework for the calculation of life-cycle GWP represents an opportunity to enhance transparency and consistency of methodologies among Member States and could be designed to improve the comparability of WLC reporting and benchmarks. **Transparency of WLC methods and assumptions is an essential step towards a more harmonised EU WLC approach**. This is crucial because existing WLC assessment methods diverge in scope and assumptions, complicating comparisons.[137] A proliferation of different WLC approaches in different Member States could lead to confusion and increased costs for the construction industry. At worst, it could lock in the divergence of national methodologies for an extended period.

[137] Steinmann et al. (2022), Whole life carbon models for the EU27 to bring down embodied carbon emissions from new buildings – review of existing national legislative measures.

BPIE RECOMMENDATIONS:

The EU framework for calculating, reporting and regulating WLC emissions, and its subsequent implementation in Member States, needs to consider some design choices and trade-offs. The following guiding principles aim to inform this process and ensure an effective yet flexible and cost-efficient approach to implementing the WLC provisions from the EPBD.

- **Harmonised with room for tailored approaches**
  The EU-level framework as set out in the Delegated Act should support and aim for harmonisation, consistent national methodologies and comparability. It should do so by setting clear guidelines in terms of assessment scope, specifying the life-cycle modules and building elements to be included, data sources, scenario assumptions and metrics. However, the framework must remain flexible in certain aspects. This is to allow Member States to make necessary adaptations according to their unique building stock, climatic conditions, culture, practices and national energy mix, and to set high but feasible ambitions in each national context. The table below lists the recommended level of harmonisation vs. flexibility for the most relevant design features of the EU-level framework.

- **Comprehensive, focused and manageable**
  The WLC framework and its implementation in Member States should include a comprehensive carbon assessment with a view to guiding and incentivising the construction sector to focus its efforts on reducing emissions from the most impactful building types, life-cycle phases and building elements, whichever they may be. Meanwhile, the scope, and the associated effort, of the assessment should be considered and managed. A comprehensive yet manageable assessment scope can be achieved by using default values for a large share of the included building elements. The default values should be based on statistics of commonly used products but include a carbon penalty.[138] This approach incentivises building designers to explore low-carbon options and encourages manufacturers to create and promote specific data through environmental product declarations, improving their availability over time.

- **Pragmatic approach to data**
  Effective and meaningful WLC disclosure requirements and limit values are heavily reliant on data, and the better the data, the better the WLC scheme. An important purpose of the EU WLC framework is therefore to foster the creation and collection of high-quality data. Nonetheless, a functional data foundation can still be established even if the data is not perfect, as long as mechanisms and incentives for continuous improvement of data quality exist. With this pragmatic approach to data, WLC regulations can be launched promptly and improve over time, gaining valuable time in carbon mitigation efforts.

- **Benchmarks to create performance targets**
  Benchmarks and performance thresholds for WLC emissions are essential for ensuring progress towards the long-term goal of climate neutrality. The EU framework in the Delegated Act should set some guiding principles for how these benchmarks and targets should be defined, to ensure a fair and ambitious contribution to climate mitigation from all Member States. However, because of the great heterogeneity of national building stocks, similar ambition levels may translate to different numerical values in different Member States. The absolute value of the thresholds should therefore be set individually by Member States at a level that is ambitious in their unique national context.

[138] Default carbon data facilitates completeness and low-cost assessment of less impactful carbon sources but should come with a "penalty factor". The default value could for example correspond to "worst-in-class" or at least below-average performance, so that actors throughout the value chain are encouraged to provide specific data that yields a more favourable and thus competitive result in the assessment.

The table thereafter describes how to balance flexibility and harmonisation, providing guidelines for the design and implementation of an EU WLC framework.

Topic	Degree of flexibility for Member States	Rationale
Pace of implementation	**Medium**	The EPBD sets out a timeline with clear milestones for implementing a standardised WLC calculation methodology and GWP reduction roadmaps. However, Member States have the flexibility to adopt measures aligned with their own policy timelines and priorities, provided they meet EU-mandated deadlines.
Calculation methodology	**Limited**	Divergent WLC calculation methodologies hinder the comparability of results and the consistent definition of limit values and ambition levels across Member States.
System boundaries and scope: life-cycle modules and building elements	**Limited**	The scope of the assessment should be harmonised based on the one outlined in the Level(s) framework. The EU WLC framework should set out clear boundaries in terms of scope, specifying the life-cycle modules and building elements to be included. While flexibility may introduce concessions concerning data and scenarios, the ultimate objective must remain a consistent and aligned approach to national WLC methods.
Benchmarking methodology	**Medium**	There are established best practices for developing benchmarks that can be employed across Europe with minimal adaptations. These approaches are suitable to accommodate the diversity of the EU building stock. However, the effectiveness of the benchmarking methodologies relies on data availability, construction sector stakeholder participation and public authorities to effectively manage the system. Member States should determine the methods for compiling databases and setting benchmarks, ensuring the data remains accessible and transparent to the market.
Building types included	**High**	The diversity of building stocks across Member States necessitates a flexible framework that can adapt to the national priorities. This flexibility is essential to effectively minimise the WLC of the entire stock.
Generic carbon data, benchmarks and default values	**Medium**	To address persistent data gaps, Member States are advised to develop national reference databases to ensure consistent calculations. The use of default values should incorporate a penalty factor adjusted to the building's development stage to encourage the generation of product-specific data, particularly in the later stages of the construction process. Member States should retain the flexibility to define their own penalties for the use of default values.
Limit values	**Approach and methodology: Limited** **Targets: High** **Target evolution in time: High**	The framework for Member States to establish and communicate limit value targets should be harmonised to ensure comparability across the EU and avoid disparities in ambition levels. However, specific targets and timelines for reduction should remain flexible to accommodate the unique circumstances of each Member State.
Reporting and communication/ training	**Medium**	Harmonised reporting and simplified communication for end-users are essential. The content and focus of the training curricula should be locally directed, tailored to specific circumstances.

GOOD PRACTICE EXAMPLES:

Denmark, Estonia, Finland, France, the Netherlands and Sweden, as well as Iceland and Norway, are among the frontrunning countries adopting a WLC approach to climate mitigation in buildings, ahead of the EPBD recast. Czechia, Ireland and Spain have also begun developing WLC measurement and benchmarking through the INDICATE project, positioning themselves ahead of the curve. While these countries share similarities in how they have designed their WLC policies – following a similar process – they also differ in the scope of their regulations. Frontrunner countries have made an important contribution to the rollout of WLC policies by innovating approaches and providing a proof of concept that can be applied across the EU.

TO GO FURTHER ON WLC REQUIREMENTS
ADDITIONAL READING

- **CEN EN15978 (2011),** Sustainability of construction works - Assessment of environmental performance of buildings - Calculation method.
- **Dodd et al. for JRC (2021),** Level(s) indicator 1.2: Lifecycle Global Warming Potential (GWP).
- **Röck et al. (2022),** Towards embodied carbon benchmarks for buildings in Europe.
- **Steinmann et al. (2022),** Whole life carbon models for the EU27 to bring down embodied carbon emissions from new buildings – review of existing national legislative measures.
- **Boverket – Swedish National Board of Housing, Building, and Planning (2023),** Limit values for climate impact from buildings.
- **Ramboll, BPIE, KU Leuven (2023),** Supporting a Roadmap for the Reduction of Whole Life Carbon in Buildings.
- **Steinmann et al. (2023),** Whole life carbon models for the EU27 to bring down embodied carbon emissions from new buildings - towards a whole life carbon policy for the EU.
- **Balouktsi et al. (2024),** Harmonised Carbon Limit Values for Buildings in Nordic Countries: Analysis of the Different Regulatory Needs.
- **BPIE (2024)**, How to establish Whole Life Carbon benchmarks: Insights and lessons learned from emerging approaches in Ireland, Czechia and Spain.
- **Nordic Sustainable Construction (2024),** Decarbonisation of the building stock

DEEP DIVE #4

Adapting buildings to climate risks, future-proofing investments towards climate resilience

WHY CONSIDER ADAPTATION TO CLIMATE CHANGE TOGETHER WITH MITIGATION MEASURES?

The built environment in Europe is increasingly affected by the accelerating impacts of climate change, such as floods, wildfires and rising temperatures. These effects are jeopardising the essential role that buildings play in supporting human life and prosperity. For example, heat-related deaths have increased by 94% over the past 25 years.[139] In addition to directly threatening livelihoods, failing to adapt buildings to climate change results in substantial economic losses (€26 billion per year on average in the last decade).[140] Importantly, these ongoing impacts of climate change risk undermining existing climate mitigation efforts: for instance, a flood may damage newly renovated buildings, diminishing the benefits of recent investments. For these reasons (protecting lives and livelihoods, reducing damage and costs, and avoiding suboptimal investments in building infrastructure), the EU and its Member States must accelerate efforts to adapt the built environment to the challenges posed by climate change. This needs to happen in parallel and integrated with mitigation interventions and investments.

WHAT IS A CLIMATE-RESILIENT BUILT ENVIRONMENT?

A climate-resilient built environment is the result of a holistic approach that integrates both adaptation and mitigation strategies, and considers the interplay of technical building systems, building occupants and surrounding nature. It is centred around the principle of just resilience, while avoiding maladaptation.[141] Such a built environment is adaptable across its three subsystems (technological, social and natural) and in its entirety. It can anticipate, withstand and recover from diverse climate impacts. It is highly energy efficient and renewables-based, promotes the health and well-being of its inhabitants and contributes to broader societal resilience. Examples of positive synergies between mitigation and adaptation measures on buildings include, for example, the creation of green roofs paired with solar energy installations, with the cooling effect of the green roof improving the solar panels' performance.

HOW CAN EPBD POLICY MEASURES SUPPORT THE TRANSITION TOWARDS CLIMATE-RESILIENT BUILDINGS?

There is growing recognition of the need for a systemic approach to adaptation, but there is currently no specific strategy or policy framework at EU level that coordinates efforts towards a climate-resilient built environment. Cross-referencing between building-related and adaptation-focused policy documents is done at EU level, and intentions for action are set, but the actual implementation is often fragmented. While a more strategic and consistent policy approach is required at EU level to drive meaningful progress, the EPBD includes some provisions and mechanisms that Member States can start using to improve the climate resilience of their building stock.

[139] Copernicus Climate Change Service and the World Meteorological Organization (2023), European State of the Climate 2023.
[140] EU Court of Auditors Special Report (2024), Climate adaptation in the EU – action not keeping up with ambition.
[141] Maladaptation refers to adaptation measures with unintended consequences that shift vulnerability to other sectors, other locations or other communities, resulting in their increased exposure or vulnerability to climate risk and lock-ins.

BPIE RECOMMENDATIONS:

Vision for the built environment and strategic planning tools

- Article 1: Member States should include climate resilience as an objective for their building stock to reach by 2050, besides being zero-emission, based on the BPIE definition suggested previously.
- Article 3 & Annex II: while the increased climate resilience of buildings is a voluntary indicator in EPBD Annex II, Member States should include within their NBRP an overview of implemented and planned policies and measures to increase climate resilience. They should make use of the synergies and align NBRPs with national adaptation strategies and plans, to be drawn up in accordance with the EU Climate Law and the Governance Regulation.[142]

Renovation policies for existing buildings and updated standard for construction

While the EPBD requires Member States to address, amongst others, the issue of adaptation to climate change for buildings undergoing major renovation (Article 8§3) and for new builds (Article 7§6), they should widen the scope to all existing buildings being renovated, but especially deeply renovated (in line with Recital 45), renovated to fulfil Article 9 and renovated thanks to public funds. Member States should go beyond merely *"addressing the issue"* to set requirements providing integrated mitigation and adaptation solutions, building on synergies between these two objectives. This approach is hinted at in Article 10§4, requiring Member States to *"take into account structural integrity, green roofs, and attic and roof insulation, where appropriate"* when deploying solar installations on buildings. For more solutions and measures to increase the climate resilience of buildings, Member States should use the EU Technical Guidance for adapting buildings to climate change, and consider in particular the Best Practice Guide.

Information, advisory and financial supportive framework

- Article 19§10: while the EPBD opens the possibility to provide, within the EPC, *"advice on how to increase the climate resilience of the building"*, Member States should make it an integral and mandatory part of the EPC recommendations, to mirror the mandatory aspect of this item in the renovation passport (Annex VIII, indicator h). This is especially important considering the EPC validity is 10 years (Article 19§13), and the need to future-proof buildings in view of present and future climate risks.
- Article 18: while the EPBD does not include adaptation to climate change and climate resilience of building as topics on which one-stop shops should give advice, Member States should strive to enlarge the scope of one-stop shop support to these topics, based on existing experiences of "adaptation help centres". One-stop shops' advice on adaptation and climate resilience should be given in an integrated way with advice on renovation and decarbonisation, especially solar PV roof installations.

[142] Regulation 2021/1119 and Regulation 2018/1999.

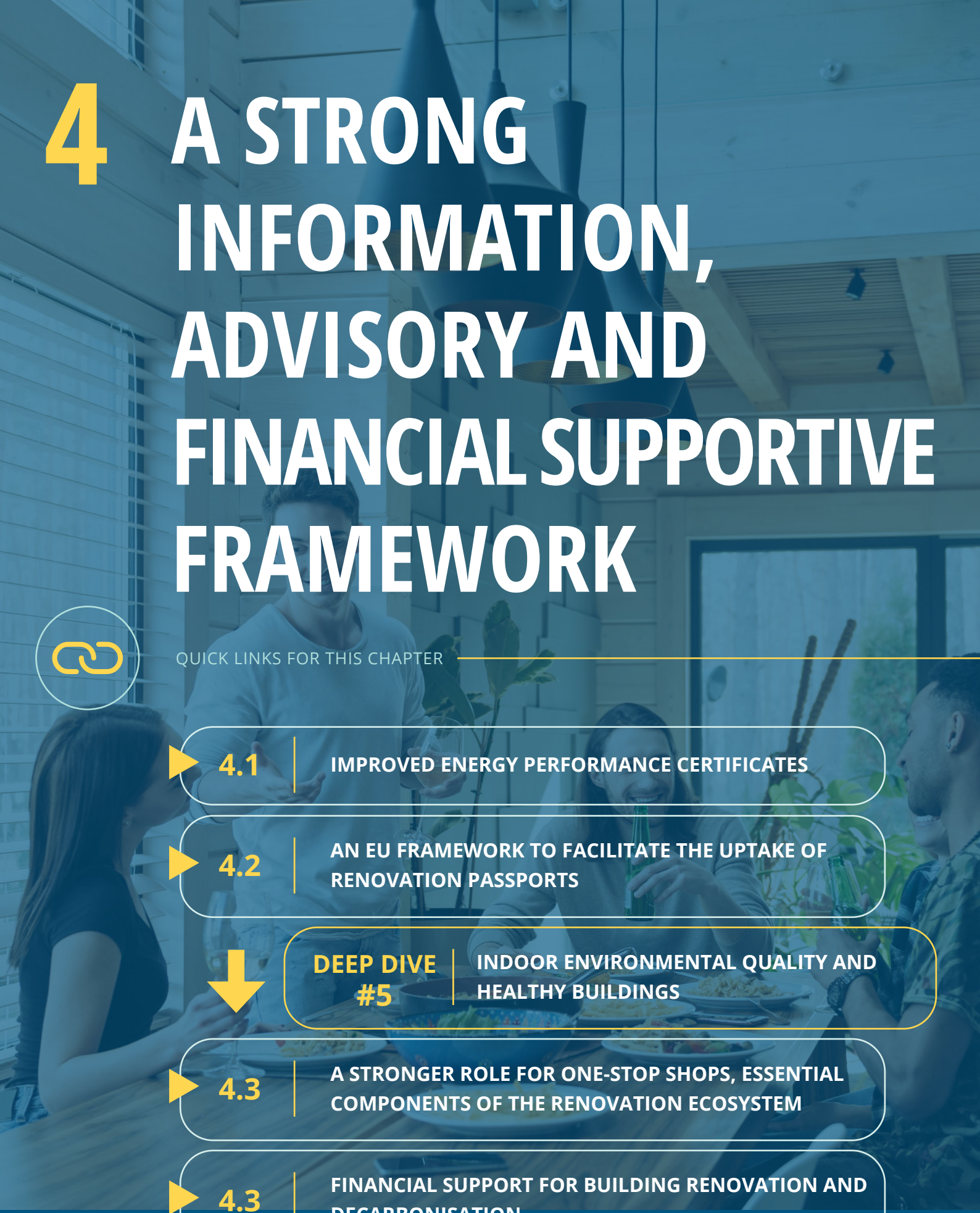
- Article 29§3: while the EPBD requires Member States to ensure the provision of guidance and training to a wide range of actors responsible for implementing the Directive, on topics such as energy performance, renewable sources and district heating and cooling, it leaves Member States with the option of providing training on adaptation to climate change. BPIE recommends widening the mandatory training topics to climate-resilient buildings to prepare the workforce and local authorities for this challenge and equip them with the right knowledge and skills. This is especially important as climate adaptation action is highly context-specific and thus much dependent on local authorities' capacity and resources.
- Article 17: while the EPBD does not include specific requirements on how to use financing for increasing the climate resilience of buildings, it would make sense to use public funds in a cost-optimal way. Greater support should be given to incentivising deep renovations that would both fulfil the EPBD requirements and increase the climate resilience of buildings in line with the national adaptation strategy. This would avoid investing in stranded assets as well as intervening multiple times on the same property.

GOOD PRACTICE EXAMPLES:

Some good examples of adaptation policies and measures can be found at regional and local level, notably through the work of the EU Mission on Adaptation to Climate Change (led by the European Commission) and the Climate-ADAPT Platform (led by the European Environment Agency).

TO GO FURTHER ON CLIMATE RESILIENCE ADDITIONAL READING

- **BPIE (2024),** Towards a Climate-Resilient Built Environment: A discussion paper on opportunities and priorities for adaptation in the EU.



4 A STRONG INFORMATION, ADVISORY AND FINANCIAL SUPPORTIVE FRAMEWORK

QUICK LINKS FOR THIS CHAPTER

BE ON THE LOOKOUT FOR:

Definitions | BPIE recommendations | Good practice examples | Focus

Building renovation and decarbonisation measures have always relied on an enabling framework for their success. With the EPBD revision, this framework has been strengthened and is now more detailed, providing a clearer and more comprehensive approach. It includes several supportive elements:

- *Information:* This encompasses key reforms to the EPC system, ensuring that citizens and professionals alike have access to up-to-date, clearer and more accurate data about building performance.
- *Advisory services: T*his includes the introduction of requirements to roll out one-stop shops, as well as the development of an EU framework for renovation passports, together with the establishment of mandatory national renovation passport schemes. These services provide expert guidance, helping citizens to understand and navigate the complexities of building renovation.
- *Financial support:* Adequate funding options are essential to help finance renovations, and this framework describes what is available and how to optimise the use of public money, notably with social considerations in mind.

The EPBD supportive framework is crucial for the effective implementation of regulatory requirements, but also for building trust with stakeholders and citizens at large. By addressing their needs comprehensively, the framework provides assurance that they will not be left to navigate the changes alone. This helps create a sense of confidence and fosters long-term engagement in renovation and decarbonisation. It is key to address EPBD provisions in a holistic, integrated manner rather than approaching each provision in isolation. A siloed approach, focusing solely on obligations and postponing work on the supportive framework, would risk undermining the entire renovation process. Instead, an integrated strategy ensures that synergies between various provisions are leveraged, creating mutually reinforcing solutions that enhance the overall impact. The EPBD supportive framework is not a "nice-to-have" besides obligations but should be seen as the underlying basis for positive change.

The EPBD supportive framework is not a "nice-to-have" besides obligations but should be seen as the underlying basis for positive change.

4.1 IMPROVED ENERGY PERFORMANCE CERTIFICATES

ARTICLE 19, 20, 21, ANNEXES V AND VI

WHAT IS NEW, WHAT HAS CHANGED AND WHY IS IT IMPORTANT?

Energy performance certificates (EPCs) were introduced at the EU level with the 2002 EPBD. Their main objective was to **provide (prospective) tenants or buyers with essential information about a building's energy performance** and to suggest recommendations for improvements. EPCs were mandatory when selling or renting a building and had to be issued by qualified independent experts. Studies indicate that properties with better EPC ratings tend to have higher market value.[143]

Definition (Article 2§30): energy performance certificate

A certificate, recognised by a Member State or by a legal person designated by it, which indicates the energy performance of a building or building unit, calculated in accordance with a methodology adopted pursuant to Article 4.

However, **the coverage of the EU building stock with EPCs is still quite low** and varies greatly from one Member State to the next. The non-residential segment is notably less covered with EPCs than the residential segment. Criticism has also emerged concerning the quality and reliability of input data in EPCs. The latest EPBD revision thus aimed to improve the content of EPCs and their usability, as well as to increase the number of EPCs issued. The main changes relate to the scale of EPC classes, the information to be included and presented, trigger points for issue and data management, as well as connecting EPCs to other EPBD provisions.

The EPC reform brought by the EPBD is crucial. Beyond being a go-to instrument for consumers (and a multitude of other actors) to get information about the energy performance of a building, **EPCs have gained increased significance** beyond this objective, from influencing property values to being used for monitoring and reporting policy implementation progress, or as compliance tool to receive subsidies. **The EPBD now places the EPC at the intersection of multiple other provisions.**

[143] Based on a literature review of studies in 19 Member States. Concerted Action EPBD (2017), Impact of the EPC on the property value.

EPCs

- ZEB (EPC 'A')
- GWP information to be reported in EPC
- Heating and cooling decarbonisation (through EPC recommendations)
- Non-residential MEPS (EPC to express "tranches" and to check individual compliance)
- Residential renovation trajectory (EPC as source)
- NBRP (reporting on EPC coverage)
- Renovation passport (joint issuing with EPC possible)
- Digital building logbook (link to EPC data)
- Energy performance database (link to EPC data)
- Financing (EPC to check compliance of proportionality)

The EPBD also introduces new requirements for data collection, quality and management (Article 22 – databases for energy performance of buildings). At the same time, the design of measures is becoming increasingly data-driven, as seen for example in Article 9, especially for identifying the worst-performing buildings. This creates a two-way dynamic: **policy both relies on and drives the need for more data.** In this context, effective rules and clear governance of data collection, management and use are essential. Ensuring high-quality, standardised and accessible data does not only support informed policymaking but also enhances the implementation and monitoring of measures.[144]

HOW TO MAKE EPCS MORE READABLE?

TOWARDS A COMMON APPROACH TO EPC SCALES, WITH SOME NATIONAL FLEXIBILITY RETAINED

One of the key steps to making EPCs more readable is to require Member States to **rescale their EPC classes in a more comparable way, without enforcing full harmonisation.** EPBD Recital 65 highlights that this adjustment will allow financial institutions, subject to the Taxonomy Regulation, to work with more standardised EPCs across the EU.

Member States must recalibrate EPC classes on a scale with only seven standard classes, ranging from A to G. This reform will require changes in most Member States, as EPC classification systems currently vary across the EU. At the time of the EPBD revision (end of 2022/early 2023), Malta and Poland had not yet implemented any EPC classes. Four Member States used between 10 and 15 classes (Italy 10, Hungary and the Netherlands 12, Ireland 15). Most Member States had between seven and nine classes. Only a few Member States already complied with the new A to G requirement, whether for single-family houses or multi-family houses.[145]

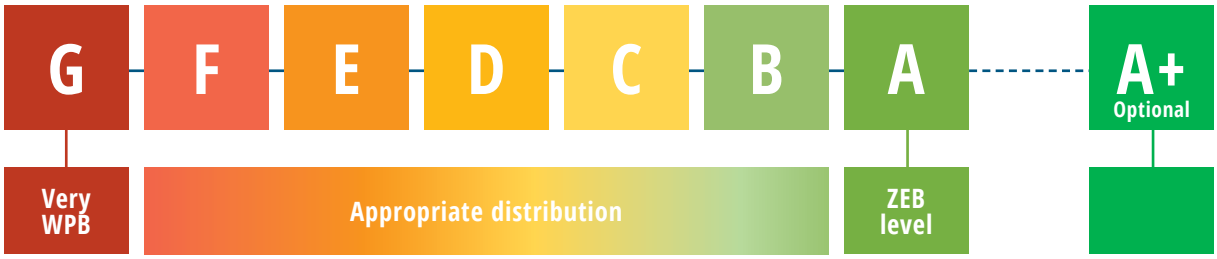
Despite using a standard EU-wide A to G scale, **Member States retain responsibility for defining what A and G mean in their national context,** leading to differences in what actual ambition level stands behind the entire classification. **EPC class A should correspond to ZEB standard, which is defined at national level.** Member States that, as of 29 May 2026, already designate ZEBs as A0 may continue to use that designation instead of A. Ensuring that EPC class A aligns with ZEB standards is crucial for monitoring and reporting progress on their development, whether for new or renovated buildings. **EPC class G should represent the very worst-performing buildings, with definitions set at national level. An additional optional class A+ may be introduced by Member States.** While not explicitly labelled as such, it is conceptually like an "energy-positive" building, as it is being defined as a *"building with a maximum threshold for energy demand, which is at least 20% lower than the maximum threshold for ZEB, and which generates more renewable energy on-site annually than its total annual primary energy demand".*

[144] For more information on data collection and management, see BPIE (2025), Aufbau einer Datenbank über die Gesamtenergieffizienz von Gebäuden in Deutschland (in German only)
[145] Joint Research Center (2023), Progress on the implementation of Energy Performance Certificates in EU.

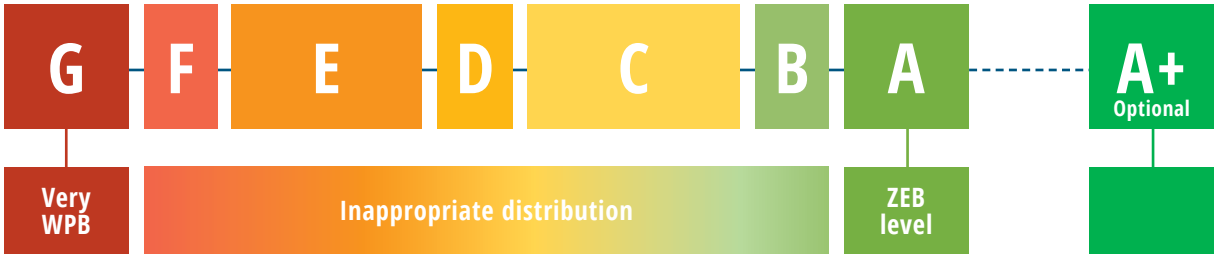
Finally, Member States must ensure an *"appropriate distribution of energy performance indicators"* among classes B to F. This means that class boundaries (expressed in kWh/(m².y)) must be set to avoid excessively large or small class groupings. For example, if A class goes until 30 kWh/(m².y) and class G starts at 185 kWh/(m².y), it means that classes B to F have a collective bandwidth of 155 kWh, with each class from B to F having a bandwidth of 31 kWh. This approach ensures that buildings are distributed fairly across EPC classes, **helping Member States identify priority buildings for renovation and providing consumers with a fair picture of the energy performance of their building.**

BPIE RECOMMENDATION:

Member States should proceed in a stepwise approach. First, they should recall the ZEB thresholds, set in accordance with EPBD Article 11, to determine EPC class A. Member States should also use the EPC class A+, to monitor the evolution of such buildings and their potential to provide flexibility services. Second, they should define *very* worst-performing buildings at national level and derive a threshold to define EPC class G. While there is no official EU-wide definition, EPBD Article 9 can provide some guidance, as the worst-performing non-residential buildings are referred to as the bottom 16% and 10% tranches, making up the worst 26% overall. The residential renovation trajectory focuses on the worst 43% of residential buildings, though the most critical subsegment is of course smaller. Earlier versions of the EPBD during the negotiations proposed defining G as the 15% worst-performing buildings. Finally, Member States should define equal ranges for B to F classes.



Letters express ranges in kWh/(m².y)



Letters express ranges in kWh/(m².y)

The updated scale should apply to new EPCs issued as of 29 May 2026. However, Member States that rescaled their EPCs between 1 January 2019 and 28 May 2024 may postpone the rescaling to 31 December 2029. This delay can only apply to EPBD provisions linked to rescaling – the rest of the EPC reform remains applicable to these Member States in its entirety. Reforming EPCs is not only about rescaling classes: it is also about ensuring that EPCs are seen by relevant actors and easily readable (beyond the EPC class).

GOOD PRACTICE EXAMPLE: FRANCE

In 2021, France undertook a significant redesign of its EPC system, introducing updated visuals, revised EPC class values and new performance indicators. To support this transition, extensive preparatory resources were provided. A key component of this effort was the development of a comprehensive guide for certifiers, produced by Cerema (a public agency) and the Ministry of Ecological Transition, in close collaboration with industry stakeholders. This guide, focused on residential buildings, offered detailed insights into the new EPC framework, including the applicable regulations, technical input data for assessments and practical recommendations for building improvements.

EPCs in France are typically valid for 10 years. However, to ensure a smooth transition to the new system and prevent outdated certificates from remaining in circulation, France introduced a phased expiration policy for EPCs issued before July 2021 – the date when the updated EPCs came into effect. Under this policy, EPCs issued between 2013 and 2017 expired by 31 December 2022 and EPCs issued between 1 January 2018 and July 2021 expired by 31 December 2024.[146]

CLARITY IN LAYOUT AND ACCESSIBILITY IN DISPLAY FOR MORE USER-FRIENDLINESS

The EPBD sets out specific requirements to ensure that EPCs are clear, accessible and standardised at the national level.

- ***Layout:*** EPCs must have a *"common visual identity"* within each Member State (Article 19§3).
- ***Format and accessibility:*** EPCs must be available in a *"machine-readable"* (digital) format (Article 19§4), with a paper version provided upon request (Article 20§1). Access to EPC information must be ensured for people with disabilities (Annex V).
- ***Minimum required information:*** EPC content must align with the template in Annex V, which includes mandatory indicators (Article 19§4) – for more information, see subsection below.

▶ *Displaying EPCs in some situations to specific actors*

EPCs must be displayed in specific circumstances, and the EPBD clarifies when, to whom and under what conditions they should be shown. Ideally, EPCs should be issued *"at the latest once the building has been constructed or renovated"* to reflect its as-built state. The independent control system, set up by Member States, is responsible for verifying both the *availability* of EPCs to prospective buyers and tenants, as well as the *visibility* of EPCs in online and offline advertisements (Annex VI §3).

[146] Official Journal of the French Republic (2020), Décret du 17 décembre 2020 relatif à la durée de validité des diagnostics de performance énergétique.

Situation	EPCs showed to	EPBD provision
Construction	**Prospective buyer or tenant**	Article 20§2
After major renovation	**Tenant**	Article 20§2
Sale	**Prospective buyer**	Article 20§2
	Online and offline advertisements	Article 20§4
Rent	**Prospective tenant**	Article 20§2
	Online and offline advertisements	Article 20§4
Renewal of rental contract	**Tenant**	Article 20§2

Displaying EPCs of some buildings to the wider public

EPCs must be displayed in a prominent and visible location for two specific categories of buildings:

- Buildings both occupied by public bodies and frequently visited by the public (Article 21§1).
- Non-residential buildings for which an EPC has been issued (Article 21§2).

EPBD Recital 69 provides examples of such buildings: *"town halls, schools, shops, shopping centres, supermarkets, restaurants, theatres, banks, and hotels"*.

Beyond improving the EPC readability, the EPBD introduces several positive changes aimed at enhancing the quality and reliability of EPC content and therefore trust in the tool. This is particularly significant given the increasing references to EPCs in other EPBD provisions and their expanded use cases.

HOW TO IMPROVE THE CONTENT OF EPCs?

A WEALTH OF INFORMATION, BASED ON A COMMON EU TEMPLATE

The EPBD makes EPCs more complete, informative and useful. A key change is the introduction of a **common EU template,** which will be mandatory as of 29 May 2026. This template defines the elements that must be included in EPCs, categorised into three groups of indicators:

1. **Mandatory indicators on the front page**
2. **Mandatory indicators throughout the EPC**
3. **Optional indicators**

To support this transition, BPIE has developed the table thereafter, outlining these categories and introducing thematic lines to better structure the information to be provided.[147]

Topics	Mandatory *front-page* indicators	Other mandatory indicators	Optional indicators
Energy demand information	(a) the energy performance class (b) the calculated annual primary energy use in kWh/(m².y) (c) the calculated annual final energy use in kWh/(m².y)	(a) the calculated annual primary and final energy consumption in kWh or MWh (c) the calculated energy needs in kWh/(m².y)	(q) metered energy consumption
Energy supply information	(d) renewable energy produced on-site in % of energy use	(b) renewable energy production in kWh or MWh; main energy carrier and type of renewable energy source	(a) energy use, peak load, size of generator or system, main energy carrier and main type of element for each of the uses: heating, cooling, domestic hot water, ventilation and in-built lighting (m) expected remaining lifespan of the heating or air-conditioning systems and appliances, where applicable (r) whether there is a connection to a district heating and cooling network, and, if available, information about a potential connection to an efficient district heating and cooling system (s) local primary energy factors and related carbon emission factors of the connected local district heating and cooling network

[147] The letters introducing the indicators (a), (b), (c), etc., are copied from the EPBD text.

Topics	Mandatory *front-page* indicators	Other mandatory indicators	Optional indicators
Technical building systems & building elements	(e) the average U-value for the opaque elements of the building envelope (f) the average U-value for the transparent elements of the building envelope (g) type of most common transparent element (e.g. double-glazed window) (h) results of the analysis on overheating risk (if available) (i) the presence of fixed sensors that monitor the indoor environmental quality (j) the presence of fixed controls that respond to the levels of indoor environmental quality (k) number and type of recharging points for electric vehicles (l) presence, type and size of energy storage systems		
Embodied and other emissions	(e) operational greenhouse gas emissions ($kgCO_2/(m^2.y)$), and the value of the life-cycle GWP, if available (b) the greenhouse gas emission class (if applicable) (c) information on carbon removals associated to the temporary storage of carbon in or on buildings (t) operational fine particulate matter (PM2.5) emissions		
Building potential/ feasibility	(d) a yes/no indication whether the building has a capacity to react to external signals and adjust the energy consumption (e) a yes/no indication whether the heat distribution system inside the building is capable to work at low or more efficient temperature levels, where applicable (n) feasibility of adapting the heating system to operate at more efficient temperature settings (o) feasibility of adapting the domestic hot-water system to operate at more efficient temperature settings (p) feasibility of adapting the air-conditioning system to operate at more efficient temperature settings		
Links with other tools and instruments	(f) the contact information of the relevant one-stop shop for renovation advice (d) a yes/no indication whether a renovation passport is available for the building (a) a yes/no indication whether a smart readiness assessment has been carried out for the building (b) where available, the value of the smart readiness assessment (c) a yes/no indication whether a digital building logbook is available for the building		

EPCs will communicate energy performance in a more standardised format throughout the EU, displaying some key numeric indicators with the same metric. This is notably the case for calculated primary and final energy use in kWh/(m^2.y) and operational GHG emissions in $kgCO_2$/(m^2.y). For comparison purposes, EPBD Article 19§1 also requires Member States to provide in EPCs **reference values** for minimum energy performance requirements, MEPS, NZEB and ZEB requirements. By expanding the scope and clarity of EPCs, building owners, tenants and other stakeholders will be provided with more comprehensive and transparent information, enabling better decision-making.

BPIE RECOMMENDATIONS:

- Member States should comply with Annex I and cover all end-uses included there whenever they calculate the energy performance of buildings, whether for complying with requirements or for certification. This will increase consistency, comprehensiveness and comparability.
- Member States should consider an update of their EPC calculation software in coordination with the introduction of the national scheme for renovation passports, especially for cases where a passport is issued jointly with an EPC (for more information, see below). They should also consider the link with digital building logbooks.

IMPROVED RECOMMENDATIONS, WITH A LINK TO THE RENOVATION PASSPORT

The EPBD also widens the scope and depth of information to be included in EPC recommendations, which should increase the positive impact of the tool. Beyond outlining cost-effective energy performance improvements and steps to achieve them, EPC recommendations must/can now also provide more detailed information on the topics thereafter.

Mandatory recommendations	Optional recommendations
Estimated energy savings (EPBD Article 19§7), and operational GHG emissions reduction (EPBD Article 19§5)	
Improvement of indoor environmental quality (EPBD Article 19§5)	
Assessment whether heating systems, ventilation systems, air-conditioning systems and domestic hot-water systems can be adapted to operate at more efficient temperature settings (EPBD Article 19§8), and remaining lifespan of heating or air-conditioning systems (EPBD Article 19§9)	Possible alternatives for replacing heating or air-conditioning systems in line with 2030 and 2050 targets (EPBD Article 19§9)

Mandatory recommendations	Optional recommendations
An indication as to where the owner or tenant of the building or building unit can receive more detailed information (EPBD Article 19§10), information on the steps to be taken to implement the recommendations, and the contact information of relevant one-stop shops (EPBD Article 19§10)	Estimated payback periods or costs and benefits over economic life cycle (EPBD Article 19§7), available financial incentives and benefits, administrative and technical support options (EPBD Article 19§7), and advice on how to increase the climate resilience of the building (EPBD Article 19§10)

Whether mandatory or optional, **EPC recommendations should be tailored to the building** for which the EPC has been issued (Article 19§7). When a building has been issued an EPC with a class below C, owners must be invited to a one-stop shop to receive renovation advice (EPBD Article 19§13). Finally, if a renovation passport is issued jointly with the EPC, it replaces the standard EPC recommendations (Article 19§6).[148]

BPIE RECOMMENDATIONS:

- Member States should strive to provide more/wider recommendations for buildings for which an EPC below class C has been issued, as those are the buildings most in need of advice.
- Member States should consider, when issuing recommendations, the climatic zone in which the building is located, as well as their impact over the course of a year (especially potential differentiated impact between winter and summer).
- For all buildings, Member States should make the recommendation on "climate resilience" mandatory, to mirror the mandatory aspect of this item in the renovation passports (Annex VIII, indicator h). This is especially important, considering the EPC validity is 10 years (Article 19§13), and the need to future-proof buildings in view of present and future climate risks.
- More broadly, Member States should consider synergies with the renovation passport mandatory elements when drawing the list of mandatory EPC recommendations, especially if the EPC is to be made more useful towards triggering (staged-) deep renovations. This should be particularly the case for Member States that choose to leave the renovation passport optional for all building owners in all cases. In such cases, EPC recommendations will probably be the only written advice that building owner will get, so Member States should consider designing EPCs that outline recommendations on how to achieve a deep renovation, beyond the *"cost-effective energy performance improvements"*.

[148] For more information about renovation passports, see section 4.2.

HOW TO INCREASE THE NUMBER OF (QUALITY) EPCs?

The EPC reform also increases the circumstances in which an EPC should be issued, to maximise coverage of the building stock, and enhances EPC quality through some key principles.

A GRADUAL AND RESTRICTED INCREASE OF THE NUMBER OF REFORMED EPCS

Expanding the coverage of EPCs is crucial for improving building stock data and enabling more effective design of building renovation and decarbonisation measures. However, EPC issuance, although varying greatly between Member States, remains limited across the EU. The table thereafter shows the number of EPCs issued for residential and non-residential segments respectively (data mostly for 2020-2021), per 1000 units, broken down for 21 Member States.[149] Out of 21 Member States analysed, more than half have a coverage of less than 100 EPCs per 1000 units.

Member State	Residential	Non-residential
Belgium	519,8	NA
Bulgaria	1,0	9,9
Croatia	42,4	16,4
Cyprus	67,3	6,3
Czechia	35,3	34,1
Denmark	296,6	79,9
Estonia	43,4	8,5
Finland	63,3	29,3
France	94,4	317,7
Germany	65,6	10,2
Greece	296,4	220,1
Hungary	115,2	71,8
Ireland	624,1	155,7
Italy	61,8	76,5
Lithuania	140,4	NA
Netherlands	608,0	130,8
Poland	32,0	4,6
Portugal	474,6	231,8
Slovakia	63,4	13
Slovenia	60,5	10,4
Spain	250,3	136,6

Legend (per 1000 units)
0-100
100-200
200-300
300-400
400-500
>500

[149] Adapted from tables 15 and 18 in Joint Research Centre (2023), Progress on the implementation of Energy Performance Certificates in EU.

Although the EPBD recast expands the circumstances requiring an EPC to be issued, improvements brought by the reform remain restricted to a small subset of the building stock. **Beside the trigger points of construction, sale or leasing to a new tenant, the EPBD requires an EPC to be issued in the case of a major renovation and renewal of rental contracts** (EPBD Article 20§1). In addition, it widens the requirement to issue an EPC from *"buildings over 250 m² occupied by public authorities and frequently visited by the public"* to ***"existing buildings owned or occupied by public bodies"***. Despite these additional trigger points, EPC coverage will remain insufficient, particularly for owner-occupied buildings.

BPIE RECOMMENDATIONS:

- Member States should require EPCs to be issued in additional instances, such as when the building is subject to MEPS or the owner benefits from public subsidies to improve the building. Member States could also align the EPC trigger points to the ones mentioned in the definition of MEPS (EPBD Article 2§4), i.e. *"donation or change of purpose within the cadastre or land registry"*. Member States should recognise that increasing the coverage of the stock with EPCs will help not only stakeholders but also their own mapping of the stock, and therefore the fine-tuning of policies and measures.
- Member States could also require certain subsegments/categories of the building stock to get an EPC by a certain date. More specifically, this can be done with different deadline dates for different subsets of the building stock, for example based on the year of construction (e.g., if not required by a mandatory trigger before that, older buildings would need to get an EPC by 2030 and newer buildings by 2035). This progressive rollout of EPCs could also be done in coordination with the national strategy to develop the use of renovation passports. This should also be coupled with EPBD provisions requiring Member States to make EPCs affordable to all households and to provide specific financial support to vulnerable households in getting an EPC.
- Member States should shorten the validity period to below 10 years (as set in EPBD Article 19§13), which would trigger a faster renewal of EPCs and enable the EPC reform to apply faster to a larger number of EPCs. Indeed, EPCs lawfully issued under the current scheme until 28 May 2026 will remain valid until May 2036, coexisting with EPCs issued under the new scheme as of 29 May 2026.

GOOD PRACTICE EXAMPLE:

Some Member States, such as Bulgaria, Greece, Poland, Portugal and Spain, require the presentation of an EPC for financial support for renovation measures.[150]

[150] BPIE (2024), Wärmewende in Europa: Gute Praxis aus ausgewählten Ländern & Empfehlungen für Deutschland.

HOW TO ENSURE QUALITY, RELIABILITY AND AFFORDABILITY FOR ALL EPCS?

First, EPC quality is ensured through some *exante* conditions. The most important criterion is that EPCs shall be issued, by default, by an independent expert based on an on-site visit (EPBD Article 19§4). The EPBD however allows for the visit to *"be carried out, where appropriate, by virtual means with visual checks"*, as an alternative.

BPIE RECOMMENDATION:

While improved methods may enhance their reliability in the future, virtual visits alone are not yet a suitable method for issuing EPCs. Member States should favour the issuing of EPCs through on-site visits carried out by independent experts, and limit the virtual alternative to very specific buildings, restrict the use of such EPCs to limited cases, and require an on-site visit to confirm the "virtual" results within a certain timeframe.

The EPBD also includes provisions to ensure that **professionals issuing EPCs are independent, trained and certified.** EPBD Article 25 requires Member States to make publicly available *"regularly updated lists of qualified or certified experts or companies which offer the services"*. This ensure quality services are provided to building owners, increasing trust. In this context, education and training is key to provide building certifiers and assessors with the necessary and updated skills to issue quality EPCs.

GOOD PRACTICE EXAMPLE: PORTUGAL

EPC quality assurance is ensured through two phases: prevention (before issuance) and correction (after issuance). First, to issue an EPC, a qualified expert must conduct an on-site building inspection. These experts must be certified by ADENE, the national energy agency. Second, any technical errors or mistakes identified during the EPC issuance process must be recorded in the central database, which serves as a repository for all EPCs, supporting information sharing and expert training.[151] The correction phase also includes a building owner survey and two types of quality assessments – simple and detailed – which may require a second on-site visit.[152] If severe errors are detected, the expert must reissue the EPC.[153]

GOOD PRACTICE EXAMPLE: FRANCE

To become accredited to issue an EPC, experts must demonstrate theoretical knowledge, complete training, and pass an exam administered by a relevant certification body. Accreditation is valid for seven years, after which experts must undergo recertification. Their work is also continuously monitored through measures such as on-site supervision by a representative of the certification body during an EPC assessment or post-issuance checks via separate on-site visits.[154] If serious errors or deficiencies are detected, the certifying body may impose sanctions, including suspension or withdrawal of accreditation.[155] Households have access to a directory of certified experts.

[151] QualDeEPC project (2020), Report on local EPC situation and cross-country comparison matrix.
[152] XTENDO project (2020), Energy Performance Certificates: Assessing their status and potential.
[153] CA-EPBD (2020), Implementation of the EPBD in Portugal.
[154] French Ministry website, Real estate diagnostician: a regulated profession.
[155] CA-EPBD (2020), Implementation of the EPBD in France.

Second, EPC quality is verified after they have been issued via independent control systems. Member States are required to establish independent control systems for EPCs (EPBD Article 27 and Annex VI), which ensure that at least 90% of EPCs are valid. The scope of these systems has been further clarified in the recast EPBD, including through:

- A clearer definition of what constitutes a valid EPC (Annex VI §1): valid input data, valid calculations, maximum deviation, and a minimum number of elements different from default or standard values
- Enhanced quality control measures (including more targeted sampling, obligation to resubmit the EPC, graded and proportional penalties for assessors, on-site verification visit, and temporary or permanent bans for dishonest assessors).

BPIE RECOMMENDATION:

Member States should adopt a holistic approach to EPC quality control, improving all stages of the certification process, including boosting training and upskilling of auditors, enhancing quality checks for methodologies and software, automatic validation of data when uploading EPCs to the national database for the energy performance of buildings, increasing the frequency of expost quality controls, and implementing more stringent penalties for non-compliance.

Finally, EPBD Article 19§4 requires Member States to ensure affordability of EPCs to all households, but also to consider providing specific financial support to vulnerable households. The cost of getting an EPC remains a concern for many building owners across the EU.[156]

BPIE RECOMMENDATION:

Member States have different options to reduce the costs of issuing EPCs without compromising on their quality, such as increasing the number of default/ standardised values to reduce issuing time or relying on pre-existing data if available in digital building logbooks, for example. On the other hand, even if the EPC cost may remain the same in absolute terms, Member States should improve their affordability, at least for vulnerable households, by providing subsidies to this target audience.

[156] At an EPBD.wise project event in Bulgaria in 2024, it was stated that an EPC costs on average €1,000 in the country.

TO GO FURTHER ON EPCS
ADDITIONAL READING

- **QualDeEPC project (2020),** Report on local EPC situation and cross-country comparison matrix.
- **XTENDO project (2020),** EPCs: assessing their status and potential.
- **XTENDO project (2021)**, Introductory reports: comfort indicator.
- **XTENDO project (2021),** Introductory reports: EPC databases.
- **XTENDO project (2021),** Introductory reports: enhanced recommendations.
- **XTENDO project (2021),** Introductory reports: financing options.
- **XTENDO project (2022),** Advancing EPCs to next generation: recommendations to integrate new features into EPC schemes.
- **XTENDO project (2022),** Implementation guidelines and replicability potential of the innovative features for the next generation EPCs.
- **BPIE for BEUC (2023),** Introducing the Heat Pump Readiness Indicator: how to make EPCs fit for heat pumps.
- **Joint Research Centre (2023),** Progress on the implementation of Energy Performance Certificates in EU.
- **Amorocho J., Zuhaib, S. and Fernandez Alvarez, X. – BPIE (2024), eceee Summer Study proceedings,** Energy performance certifications: current status, challenges, and opportunities.
- **EPBD.wise project (2024),** EPCs: policy needs and best practices.
- **BPIE (2025),** Aufbau einer Datenbank über die Gesamtenergieffizienz von Gebäuden in Deutschland (in German).

4.2 AN EU FRAMEWORK TO FACILITATE THE UPTAKE OF RENOVATION PASSPORTS

ARTICLE 2§19, 12, 19§6, ANNEX VIII

WHAT IS NEW, WHAT HAS CHANGED AND WHY IS IT IMPORTANT?

Renovation passports were first introduced in the 2018 revision of the EPBD as an optional scheme. Member States can introduce under their long-term renovation strategy to stimulate cost-effective deep renovation of buildings (Article 2a). Additionally, Article 19a required the Commission to conduct a feasibility study to assess the possibilities and timeline for introducing an optional renovation passport to complement EPCs. This study, published in May 2020,[157] led to subsequent revisions in the latest EPBD. The 2024 EPBD introduces significant changes to the renovation passport framework, along with more stringent provisions. According to Article 12, based on an EU framework, Member States are required to establish national renovation passport schemes by 29 May 2026, making renovation passports available to building owners on an individual basis.

Reovation passports can play a crucial role in the renovation ecosystem by fostering deep renovations through a people-centric approach. Their primary benefit is impact. While EPBD Recital 42 acknowledges that *"one-step deep renovation can be more cost-effective and result in fewer emissions linked to the renovation than staged renovation,"* it also recognises that staged deep renovation can be an effective solution to address high upfront costs. Renovation passports support the careful planning of a staged deep renovation journey, providing a clear roadmap with actionable steps to improve the building. They serve as a building-level equivalent of the NBRP at the stock level. Another key benefit of renovation passports is their ability to engage owners more actively in their renovation journey and better cater to their needs. Renovation passports provide personalised and high-quality information about both the current state of the building and its improvement potential, as well as about the benefits of renovation. As a result, they serve as a vital advisory tool, motivating building owners in their renovation and decarbonisation actions, while being personalised to their circumstances.

[157] European Commission, (2020) Technical study on the possible introduction of optional building renovation passports : final report.

WHAT IS A RENOVATION PASSPORT?

KEY ELEMENTS FROM THE LEGAL DEFINITION

Definition (Article 2§19): renovation passport

A tailored roadmap for the deep renovation of a specific building in a maximum number of steps that will significantly improve its energy performance.

Unpacking the definition and key elements from EPBD Article 18, a renovation passport can be further described as:

- ***Personalised:*** A renovation passport should be tailored to both the owner and the specific building it pertains to.
- ***Goal-oriented:*** The main objective of a renovation passport is to guide the building towards achieving NZEB (until 2030) and ZEB (as of 2030) level, in accordance with the definition of "deep renovation" (Article 2§20). While the EPBD contains no specific deadline mandating existing buildings to be renovated to ZEB level, Article 12§5 states that a renovation passport should *"explain the best steps by which to transform the building into a ZEB well before 2050."*
- ***Following quality principles:*** A renovation passport is developed in line with the energy efficiency first principle and focuses on *"essential building elements,"* as defined in Article 2§20 regarding deep renovation.
- ***Outlining a progressive pathway:*** Beyond providing a snapshot of the building's energy performance at a specific point in time, a renovation passport outlines a forward-looking pathway towards 2050. While progressive, this pathway is limited to a few steps, with each step delivering a *"significant improvement"* in energy performance. Although the EPBD does not specify what would be an acceptable number of steps for a deep renovation through a renovation passport, experiences in national schemes suggest limiting the steps to a maximum of three to five.[158] Consequently, the renovation passport frames some aspects about how a staged deep renovation should take place.

Definition (Article 2§21): staged deep renovation

A deep renovation carried out in a maximum number of steps, as set out in a renovation passport

[158] BPIE (2021), Deep Renovation: Shifting from exception to standard practice in EU Policy.

WHAT INFORMATION AND ADVICE SHOULD A RENOVATION PASSPORT INCLUDE?

A renovation passport must contain several mandatory elements and can add certain optional components. The table thereafter, based on Annex VIII, distinguishes the required elements (in normal font) from the optional ones (in italic font). To enhance clarity, these elements are grouped thematically, offering a more structured view of a renovation passport's ideal composition. It provides a clearer, more organised reference than Annex VIII, which lists mandatory and optional elements separately and in a different order without thematic titles.[159]

THE STATUS OF THE BUILDING WHEN THE RENOVATION PASSPORT IS ISSUED
(a) information on the current energy performance of the building
(e) any major renovations made to the building or building unit, as referred to in Article 8§1, and any retrofitting or replacement of a building element that forms part of the building envelope and which has a significant impact on the energy performance of the building envelope, as referred to in Article 8§2, where such information is made available to the expert carrying out the renovation passport
THE STEPWISE ROADMAP TOWARDS ZEB LEVEL
(b) a graphical representation or graphical representations of the roadmap and its steps for a staged deep renovation
(d) a succinct explanation on the optimal sequencing of steps
(a) an indicative timing of the steps
(e) information about each step, including: (i) the name and description of the renovation measures for the step, including relevant options for the technologies, techniques and materials to be used *(b) (i) a detailed description of the technologies, techniques and materials to be used, their advantages, disadvantages and costs* *(b) (vi) where available, the reference values on the life-cycle greenhouse gas emissions for the materials and equipment and links to the relevant web pages where they can be found* *(b) (v) the estimated time needed to carry out the step* *(b) (vii) the estimated lifetime of measures and the estimated maintenance costs* (ii) the estimated energy savings in primary and final energy consumption, in kWh and in percentage improvement compared to the energy consumption prior to the step (iii) the estimated reduction of operational greenhouse gas emissions *(b) (iii) the estimated costs for carrying out the step* (iv) the estimated savings on the energy bill, clearly indicating the assumptions on energy costs used for the calculation *(b) (iv) the estimated payback period for the step, with and without any available financial support* (v) the estimated energy performance class of the EPC to be achieved following completion of the step Each metric used for estimating the impact of steps shall be based on a set of standard conditions (Annex VIII §4)
(c) (vi) independent module on the underlying assumptions behind the calculations provided or links to the relevant web page where they can be found

[159] The letters introducing the indicators (a), (b), (c), etc., are copied from the EPBD text and have not been changed, only the ordering.

Information about the regulatory and technical environment of the building
(c) information on relevant national requirements such as minimum energy performance requirements for buildings, minimum energy performance standards and rules in the Member State on the phasing out of fossil-fuel used in buildings for heating and cooling, including application dates
(b) (ii) for each step, how the energy performance of the building would compare to minimum energy performance requirements for buildings undergoing major renovation, NZEB and ZEB requirements after completion of the step and how the energy performance of the building elements replaced would compare to minimum energy performance requirements for single building elements, where these exist
(f) information about a potential connection to an efficient district heating and cooling system
(g) the share of individual or collective generation and self-consumption of renewable energy estimated to be achieved after the renovation
(c) (iii) independent module on the technical conditions needed for an optimal rollout of low temperature heating
(g) upon request of and on the basis of information made available by the current building owner, an attachment containing additional information, such as the adaptability of spaces to evolving needs and any planned renovations
Renovation benefits beyond energy performance and decarbonisation
(h) general information on available options for improving construction products' circularity and for reducing their whole-life-cycle GHG emissions, as well as wider benefits related to health and comfort, indoor environmental quality and the improved adaptive capacity of the building to climate change
(f) information related to seismic safety, where such information relevant to the building is made available to the expert
(c) (iv) independent module on how the renovation steps and additional measures could improve the smart readiness of a building
Information about the renovation ecosystem and practical steps to move ahead with the renovation
(i) information on available funding and links to the relevant web pages indicating the sources of such funding
(j) information on technical advice and advisory services, including contact details and links to the web pages of one-stop shops
(d) information on how to access a digital version of the renovation passport
(c) independent modules on: *(i) the typical trades necessary or recommended for carrying out energy renovations (architects, advisors, contractors, suppliers, installers, etc.) or links to the relevant web pages* *(ii) a list of relevant architects, advisors, contractors, suppliers or installers in the area, which may include only those fulfilling certain conditions such as matching higher qualification or certification labels or conditions, or links to the relevant web pages* *(c) (v) technical and safety requirements for materials and works*

BPIE RECOMMENDATIONS:

- The renovation passport concept, as defined in the EPBD, is both comprehensive and appropriately ambitious. It provides a strong foundation upon which Member States can rapidly and effectively develop their own national schemes. Member States are encouraged to develop renovation passports that incorporate optional indicators from the template provided in Annex VIII. At a minimum, some optional indicators should be included, such as those addressing the timing and estimated costs of renovation steps, adaptability of spaces to evolving needs, seismic safety information, and contact details for qualified professionals responsible for the renovation works.
- The mandatory indicator (c) and optional indicator (b-ii) are also particularly crucial. In addition to *informing* about or *comparing* the building with the regulatory environment relevant to the building (e.g., MEPS, ZEB), renovation passports should ensure renovation steps meet these regulatory requirements and even provide guidance on how to exceed them or comply ahead of deadlines. This proactive approach is essential for future-proofing buildings, especially considering that the EPBD may not specify requirements beyond 2033 or 2035, while the renovation passport should outline a pathway for the building to achieving ZEB standard well before 2050.
- Although not explicitly mentioned, it would be beneficial for a renovation passport to include an outline of a one-step deep renovation scenario as a reference, along with a comparison of the proposed pathways against this scenario, particularly in terms of costs.
- Member States should propose a mandatory indicator (h) which not only *informs* about wider benefits, notably related to the improved capacity of the building to adapt to climate change, but also to propose renovation steps that include measures boosting both the mitigation and adaptation potential of the building, in order to foster its long-term resilience.

HOW IS A RENOVATION PASSPORT ISSUED AND WHAT DOES IT LOOK LIKE?

The EPBD outlines key conditions for issuing a renovation passport to ensure its quality:

- *Expertise and human interaction:* A renovation passport must be issued by a qualified or certified expert, following an on-site visit. Additionally, a discussion with the expert *"shall be suggested to the building owner to allow the expert to explain the best steps"*.
- *Digital format:* The renovation passport must be issued in a *"digital format suitable for printing"*.

While the Annex VIII mandatory indicator (b) **requires a *"graphical representation*** *or graphical representations of the roadmap and its steps for a staged deep renovation"*, the EPBD does not specify a standard design format for how the renovation passport should be presented.

BPIE RECOMMENDATIONS:

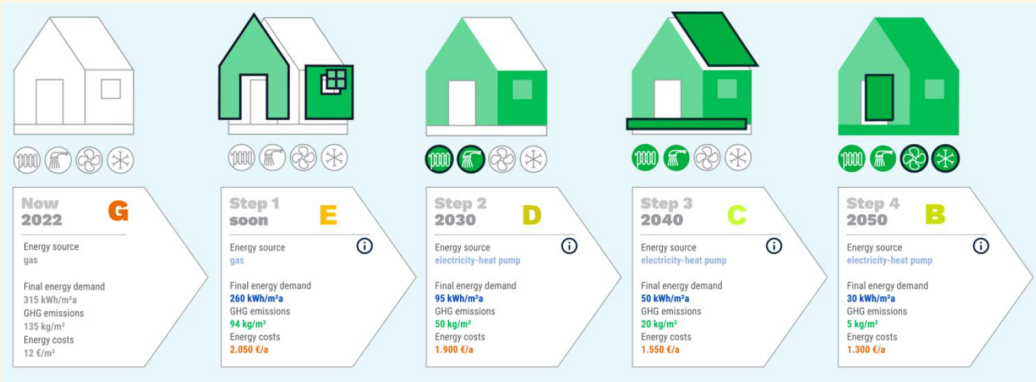
- **Recognise the on-site visit (on one side) by an expert (on the other) are two essential cumulative conditions for the renovation passport issuance process.** The on-site visit allows the expert to fully assess the building's condition and identify the most appropriate renovation steps. Considering the information to be included in a renovation passport and the level of detail, a renovation passport should not be issued remotely or in the absence of an expert. While the EPBD allows Member States to develop *"a complementary tool allowing building owners and building managers to simulate a draft simplified renovation passport"*, the result of this tool should not be considered a final and valid renovation passport.
- **Make the *discussion* with the expert mandatory** as part of the renovation passport issuing process. This discussion is key to ensuring the building owner understands the proposed renovation steps and their benefits, and that the roadmap proposed fits with his/her needs. It could be suggested, for example, that the discussion takes place during the on-site visit, as part of a follow-up session, or at the nearest one-stop shop.
- **Strive for a balance between readability and information sharing.** While the digital format can include clickable elements for further exploration, it is crucial to provide an initial graphic representation that clearly and simply communicates the key ideas of the renovation process. This ensures that the renovation passport is both accessible and informative from the outset.

GOOD PRACTICE EXAMPLE: SANIERUNGSFAHRPLAN (GERMANY)[160]

The *Sanierungsfahrplan* (SFP), applicable to both residential and non-residential buildings, was initially developed and tested in Baden-Württemberg between 2011 and 2013 and officially launched in 2015 with funding from the state bank. In 2017, a national version – the *Individueller Sanierungsfahrplan* (iSFP) – was introduced as part of Germany's National Energy Efficiency Programme and the Federal Efficiency Strategy for Buildings. The iSFP was designed to address a key challenge: although Germany has a strong tradition of on-site energy audits, the resulting highly detailed reports – often extending up to 150 pages – were frequently left unread and failed to effectively promote staged renovations. To overcome this, the iSFP was developed as a user-friendly tool, featuring clear and engaging graphical visualisations to better communicate renovation pathways.

GOOD PRACTICE EXAMPLE: IBROAD2EPC PROJECT

The EU-funded iBRoad2EPC project, which ran from 2021 to 2024, adapted the renovation passport model developed by the iBRoad project (2017-2020) with the objective to incorporate it into EPCs, and tested it in six EU Member States (Bulgaria, Greece, Poland, Portugal, Romania and Spain). The project provides another example of graphic visualisation outlining information on the benefits of renovation, such as reductions in energy demand, greenhouse gas emissions and energy costs, as well as improvements in EPC classifications.[161]



[160] iBRoad project (2018), The concept of the Individual Building Renovation Roadmap: An in-depth case study of four frontrunner projects.
[161] iBRoad2EPC project (2024), Accelerating deep renovation in the EU with Renovation Passports: EU roadmap proposing concrete measures to maximise the uptake of iBRoad2EPC schemes.

HOW TO ROLL OUT RENOVATION PASSPORTS?

A DEVELOPMENT LED BY MEMBER STATES WITH A DEGREE OF FLEXIBILITY

The EPBD introduces an EU-wide framework for renovation passports through Article 12 and Annex VIII, defining the content and key features of renovation passports, which are divided into mandatory and optional elements. Based on this framework, **each Member State is required, by 29 May 2026, to put in place its own national renovation passport scheme.** While national schemes are mandatory, the use of renovation passports by individual building owners is, by default, voluntary. However, Member States may choose to make the use of renovation passports mandatory for building owners.

BPIE RECOMMENDATIONS:

To develop their national renovation passport schemes in a comprehensive and tailored manner, Member States should adopt a roadmap approach, based on the one developed within the iBRoad2EPC project.[162] The following steps are suggested:

- **Form a renovation passport task force:** led by national authorities, this task force should engage stakeholders throughout the process to gain insights on what is desirable and possible.
- **Assess needs and existing tools:** Member States should evaluate the situation at the time transposition starts, whether at the national or regional level, including the status and reform of EPCs, the existence or absence of tools like the renovation passport, and the mandatory and optional elements of the EU framework. Additionally, Member States should identify other EPBD requirements (e.g., stemming from Article 9) that may influence the implementation of the renovation passport scheme.
- **Consult stakeholders to identify national priorities:** Member States should engage with stakeholders to decide which optional elements should be included and determine the best options for renovation passport rollout, based on national needs and capacities. This step should be aligned with the NBRP consultation and drafting process.
- **Draft and implement an action plan** which should cover aspects such as access to funding, capacity building and training, communication, and monitoring and evaluation (further details are provided in the section below).

[162] iBRoad2EPC project (2024), Accelerating deep renovation in the EU with Renovation Passports: EU roadmap proposing concrete measures to maximise the uptake of iBRoad2EPC schemes.

A ROLLOUT OF MANDATORY RENOVATION PASSPORTS MAINLY BASED ON BUILDING STOCK SEGMENTATION

One option for Member States could be to adopt a modular approach and make certain elements of the renovation passport mandatory while others remain voluntary, based on the indicators template of Annex VIII. However, this may lead to a variety of different renovation passports circulating within the national market, which is not recommended. Member States should ensure a single, standardised renovation passport format and design within their territory. Then, they essentially have three options for rolling out the renovation passport: (1) make the renovation passport entirely voluntary, (2) make the renovation passport entirely mandatory, or (3) make the renovation passport mandatory in some cases but voluntary in others.

However, there is one case in which **Member States should make the renovation passport mandatory,** even though the EPBD does not require it: **when the building owner benefits from public financial support for the renovation.** Considering EPBD Article 17§6 requires Member States to *"incentivise deep renovation and staged deep renovation with higher financial, fiscal, administrative, and technical support"* while EPBD Article 17§14 mandates them to *"link financial measures for energy performance improvements and reduced greenhouse gas emissions to energy savings and improvements,"* requiring a mandatory renovation passport when benefiting from public financial support would contribute to an optimal use of public resources.

Member States might also want to **make the renovation passport mandatory if they choose the alternative approach to fulfil EED Article 6 requirements.** This provision requires that *"at least 3% of the total floor area of buildings owned by public bodies be renovated each year to meet NZEB or ZEB standards."* But if Member States decide to use the alternative approach to achieve the same amount of energy savings in that segment of the building stock, then they must ensure that, each year, a renovation passport is introduced for at least 3% of the total floor area of buildings owned by public bodies. The provision states that *"for those buildings, the renovation to NZEB shall be achieved at the latest by 2040."*

Consequently, **BPIE recommends Member States pursue option three as outlined previously** (making the renovation passport mandatory in certain cases while encouraging voluntary adoption in others), **based on a segmentation of the building stock**. More precisely, and based on an earlier BPIE analysis,[163] Member States should make the renovation passport mandatory for:

- Single-family homes
- Multi-family buildings with mixed ownership
- Small non-residential buildings (less than 1,000 m²)

[163] BPIE (2023), Minimum standards, maximum impact: how to design fair and effective minimum energy performance standards for buildings in Europe.

For other subsegments, such as larger non-residential buildings (over 1,000 m²) or multi-family buildings with a single owner, the renovation passport could remain voluntary. When deciding which subsegments should be required to use the renovation passport, Member States should also coordinate with their transposition of Article 9 requirements.

A further consideration is *when* to make renovation passport issuance mandatory. Member States should define specific trigger points (amongst those used for EPC issuance), such as property sales or major renovations, at which the renovation passport becomes mandatory (within the subsegments of the building stock selected for mandatory renovation passports). Mandatory issuance could be progressive – for example, it could enter into force earlier for the worst-performing buildings.

Member States should also consider, when deciding whether to make the renovation passport mandatory, **the ownership profile and financial capacity of building owners.** Member States could offer individual exemptions for cases where economic feasibility is a concern, mirroring how exemptions are applied under Article 9§1 requirements (i.e., MEPS for non-residential buildings).

HOW TO INCENTIVISE THE UPTAKE OF VOLUNTARY RENOVATION PASSPORTS?

Whether the renovation passport is entirely voluntary for all building owners or only for certain building subsegments, as decided by the Member State, **there are several actions Member States can take to encourage building owners to adopt renovation passports, even in the absence of legal obligations.** By combining these approaches – enhancing accessibility, ensuring affordability and expanding availability – Member States can effectively drive renovation passport uptake and maximise their positive impact on building renovation activity.

▶ *Enhance accessibility*

To promote renovation passport adoption, Member States should leverage regional energy agencies, one-stop shops,[164] EPC assessors, homeowner associations and municipalities to launch targeted communication campaigns towards building owners. These efforts should focus on raising awareness about the benefits, importance, and available support systems for renovation passports. Campaigns should showcase locally relevant and transferable best practices and success stories to inspire confidence. Private sector actors, such as installers, utility companies and banks, could serve as key influencers and channels for spreading awareness and encouraging renovation passport uptake.

▶ *Ensure affordability*

Whether renovation passports are mandatory or voluntary, affordability is crucial to their widespread adoption. The EPBD requires Member States to implement measures to ensure that renovation passports are financially accessible, particularly for vulnerable households. Potential strategies to enhance affordability include:

- *Redirecting public subsidies:* Member States could allocate a portion of renovation subsidies to cover renovation passport issuance costs, or redirect funds previously allocated to fossil fuel-based boiler installations towards renovation passport issuance.[165]

[164] While renovation passports should mention one-stop shop contact details as a mandatory indicator, one-stop shops could actively promote renovation passports in return.

[165] According to EPBD Article 17§15, as of 1 January 2025, Member States are banned from providing financial incentives for the installation of standalone boilers powered by fossil fuels.

- *Tax incentives:* Member States could offer temporary tax reductions, such as a one-year property tax exemption, to owners who decide to get a renovation passport and act upon the first step at least.
- *Involvement of financial institutions:* Member States could encourage banks to cover renovation passport costs through mechanisms linked to the increase of their lending capacity to renovation (EPBD Article 17§10).

GOOD PRACTICE EXAMPLE: INDIVIDUELLER SANIERUNGSFAHRPLAN (GERMANY)[166]

The support framework for the individueller Sanierungsfahrplan (iSFP) has changed over time. As of August 2024, the issuance of an iSFP as a result of energy advice for residential buildings is subsidised at a rate of 50% of the eligible costs. The subsidy covers up to €650 for single-family buildings and up to €850 for multi-family buildings (depending on the number of residential units). If (some of the) recommended renovation measures are carried out within 15 years after the issuance of the iSFP, the general support scheme for residential building renovation can be enhanced: the eligible costs increase from €30,000 to €60,000 per residential unit, and the subsidy rate increases from 15% to 20% due to the iSFP bonus (an additional 5%).

Expand availability through capacity building

Member States should ensure the widespread availability of qualified professionals capable of issuing high-quality renovation passports. National and regional energy agencies, along with third-party organisations such as EPC assessor associations and training institutions, should offer comprehensive training programmes to upskill key stakeholders, including energy auditors, construction professionals and public authorities.

In parallel, Member States should strengthen independent control and quality assurance systems for renovation passports, in line with EPBD Articles 25-27 and Annex VI. These mechanisms should verify the capacity, expertise and independence of renovation passport issuers, with the resulting information made publicly available to enhance confidence in this instrument.

GOOD PRACTICE EXAMPLES:

- The **Renocally project** (2023–2025) supports municipalities in Bulgaria, Romania and Slovakia in adopting and using renovation passports for public buildings (e.g., medical centre, town halls and kindergartens).
- The **iBRoad2EPC project** (2021-2024) has developed a range of training toolkits and support packages tailored for various audiences, including energy experts, construction professionals and public authorities.

[166] iBRoad project (2018), The concept of the Individual Building Renovation Roadmap: An in-depth case study of four frontrunner projects.

A ROLLOUT LINKED TO EPCS

According to the EPBD, by default, the renovation passport is issued as a standalone document, separately from the EPC. However, regardless of whether the renovation passport is mandatory or voluntary, **both tools are inherently linked and complement each other.** On one side, the renovation passport should build on the data provided in the EPC, notably information about the building's current energy performance. On the other side, the renovation passport outlines an improvement pathway that estimates the EPC class achievable upon completion of the proposed renovation measures. **Another synergy between EPCs and renovation passports lies in the software used to produce them.** EPBD Article 12§6 requires Member States to *"provide a dedicated digital tool by means of which to prepare and, where appropriate, update the renovation passport."* To ensure interoperability and cost efficiency, it is recommended that this tool be integrated with existing EPC software systems, whether the renovation passport is made mandatory or remains voluntary. This will allow seamless data exchange, reduce the costs of renovation passport rollout, and facilitate the potential future introduction of mandatory renovation passports.

Beyond the EPC/renovation passport links outlined previously, EPBD Article 12§3 gives the **option to Member States to allow renovation passports to be drawn up and issued jointly with EPCs.** This approach is explicitly encouraged by EPBD Recital 43, which highlights the potential to reduce costs and avoid duplication of efforts by issuing both documents together. A first instance in which **it would make great sense to implement this option is buildings owned by public bodies.** EPBD Article 20§1 requires that existing buildings owned or occupied by public bodies get an EPC. To optimise administrative efforts, it would make sense to issue a renovation passport simultaneously for these buildings, particularly considering the implementation of EED Article 6 alternative approach.[167] Additionally, the identical requirements for issuing both the EPC and the renovation passport (i.e. by an expert following an on-site visit) facilitate the joint issuing of both documents. **In cases where the renovation passport is issued jointly with the EPC, it will replace the recommendations section of the EPC** (Article 19§6). However, if the renovation passport is issued separately, the EPC recommendations will remain unchanged.

GOOD PRACTICE EXAMPLE: IBROAD2EPC PROJECT

The project offers a flexible and modular renovation passport model that Member States can either use as a standalone tool or integrate within their national EPC framework. The model aligns well with EPBD requirements, fulfilling 11 out of 14 mandatory criteria and 7 out of 15 optional elements set out in Annex VIII. Portugal, one of the focus countries of the project, is already working on the integration of some renovation passport functionalities into its EPC framework.[168]

[167] According to this provision, Member States should ensure that, each year, a renovation passport is introduced for at least 3% of the total floor area of buildings owned by public bodies, with the objective to renovate to NZEB level by 2040 latest.

[168] iBRoad2EPC project (2024), Accelerating deep renovation in the EU with Renovation Passports: EU roadmap proposing concrete measures to maximise the uptake of iBRoad2EPC schemes and Public authorities' views on the integration potential.

RENOVATION PASSPORTS AND DATA MANAGEMENT

The renovation passport gathers extensive building-related data, making it essential to ensure alignment and consistency (and even prepare for its integration) with other existing digital tools and data instruments mentioned in the EPBD. This will enhance efficiency, avoid duplication and facilitate data accessibility.

Digital building logbook

The EPBD adopts a forward-looking approach by requiring the renovation passport to be issued in a digital format (although also suitable for printing) and prepared through a dedicated digital tool, which should allow for updates over time. It also requires Member States to ensure that the renovation passport is stored in or can be accessed via the digital building logbook, where the latter is available. This ensures centralised data storage, allowing easy access and monitoring as well as a continuous update process, facilitating long-term planning.

Definition (Article 2§41): digital building logbook

A common repository for all relevant building data, including data related to energy performance such as EPCs, renovation passports and smart readiness indicators, as well as data related to the life-cycle GWP, which facilitates informed decision-making and information-sharing within the construction sector, and among building owners and occupants, financial institutions and public bodies.

National database for energy performance of buildings

While the renovation passport relies on data inputs from various sources, including EPCs, the EPBD requires Member States to make it technically feasible to upload the renovation passport into the national energy performance database set up in accordance with EPBD Article 22.

BPIE RECOMMENDATION:

Although it is not a mandatory requirement that any issued renovation passport is uploaded onto the database, BPIE recommends that Member States, beyond making it technically possible, also require an automatic upload of renovation passports to the national database. That will ensure that renovation activities are accurately recorded and tracked over time and can be connected and cross-checked with other sources of information going into the national database. This inclusion of renovation passports into the database would be made easier and quicker if renovation passports and EPCs were issued jointly or using the same software platform.

GOOD PRACTICE EXAMPLE: IBROAD2EPC PROJECT

The project offers valuable insights and best practices for integrating renovation passports with existing data systems. It features the capability to connect to external databases, such as the national EPC registry or other energy performance databases, using APIs (application programming interfaces) to enable seamless data exchange.

TO GO FURTHER ON RENOVATION PASSPORTS ADDITIONAL READING

- **BPIE (2016),** Building Renovation Passports: customised roadmaps towards deep renovation and better homes.
- **iBRoad project (2018),** The concept of the Individual Building Renovation Roadmap: An in-depth case study of four frontrunner projects.
- **iBRoad project (2019),** How can Member States implement iBRoad? Barriers and drivers for countries willing to explore the feasibility and replicability of iBRoad.
- **European Commission (2020),** Technical study on the possible introduction of optional building renovation passports : final report.
- **X-tendo project (2021),** Introductory reports: building logbook.
- **iBRoad2EPC project (2023),** Conceptualising iBRoad2EPC: how EPCs can be upgraded with Building Renovation Passport elements.
- **EPBD.wise project (2024),** Implementing Renovation Passports: policy needs, status quo and best practices.
- **iBRoad2EPC project (2024),** Accelerating deep renovation in the EU with Renovation Passports: EU roadmap proposing concrete measures to maximise the uptake of iBRoad2EPC schemes.
- **DemoBlog project (2024),** Unlocking the potential of digital building logbooks for a climate-neutral building stock.
- **Renocally project (2024),** Enabling local authorities to lead the decarbonisation of existing buildings: challenges and opportunities for developing building renovation passports in support of public authorities in Central and Eastern Europe.

DEEP DIVE #5
indoor environmental quality and healthy buildings

The definition of indoor environmental quality (IEQ) has evolved from the broader concept of *"indoor climate conditions"* to a more structured assessment of factors influencing occupant health and well-being. This shift reflects a growing recognition of the complex interplay between various environmental elements and their impact on individuals within indoor spaces. Consequently, modern IEQ assessments now systematically evaluate elements such as thermal comfort, indoor air quality, lighting and acoustics to ensure indoor environments that promote both comfort and health.

Definition (Article 2§66): indoor environmental quality

The result of an assessment of the conditions inside a building that influence the health and well-being of its occupants, based upon parameters such as those relating to the temperature, humidity, ventilation rate and presence of contaminants.

The EPBD gives more prominence and visibility to IEQ. First, it includes it in the **objectives** of the Directive (Article 1), beside the improvement of the energy performance of buildings, the reduction of GHG emissions and considerations for local conditions and cost-effectiveness. Second, it fosters data collection since NBRPs include an evidence-based IEQ assessment, as part of a broader **analysis of wider benefits** – though the NBRP template (Annex II) only includes a description of policies addressing IEQ as optional indicator. Third, IEQ is **reflected in several information tools** about building performance, such as EPCs, the smart readiness indicator (Article 15 and Annex IV) and renovation passports. More specifically, Article 19 requires EPC

recommendations to tackle IEQ improvements as well as energy performance and operational GHG emissions. The EPC template (Annex V) includes as optional indicator an analysis of the risk of overheating, as well as reporting on the presence of fixed sensors and controls for IEQ monitoring. Finally, the renovation passport template (Annex VIII) includes *"general information about [...] wider benefits related to health and comfort, IEQ [...]"* as a mandatory indicator.

The EPBD also sets IEQ-related requirements at the technical building system level. First, Member States must set adequate IEQ standards to maintain a healthy indoor climate (Article 13§4). They must also address the issues of optimal IEQ in new buildings (Article 7) and existing buildings undergoing major renovation (Article 8). Non-residential ZEBs must be equipped with monitoring and control devices to regulate indoor air quality (Article 13). Further provisions mandate the consideration of IEQ at building level. The methodology for the calculation of the energy performance of buildings (Annex I) requires Member States to consider aspects of indoor climatic conditions when setting standards. They must also consider optimal IEQ when setting minimum energy performance requirements to prevent negative effects on occupants (Article 5).

OTHER KEY IEQ ASPECTS DIRECTLY OR INDIRECTLY MENTIONED ARE:

- *Ventilation and indoor air quality:* EPBD Article 13§4 mandates Member States to set requirements for the implementation of adequate IEQ standards in buildings to maintain a healthy indoor climate. Specifically, for non-residential ZEBs, Article 13§5 requires the installation of monitoring and control devices to regulate indoor air quality. This includes the use of mechanical ventilation systems with heat recovery and smart ventilation technologies to provide adequate fresh air while minimising energy losses. The directive also emphasises the importance of air filtration and CO monitoring to prevent pollutant accumulation.
- *Thermal comfort:* EPBD Annex I requires that the methodology for calculating the energy performance of buildings must consider aspects of indoor climatic conditions, including thermal comfort. Recommendations include proper insulation, adaptive heating, ventilation and air-conditioning solutions, and passive design strategies like thermal mass and shading to maintain comfortable indoor temperatures efficiently.
- *Lighting and daylight access:* The EPBD does not explicitly mandate daylighting, but Annex I encourages the consideration of daylight utilisation in the calculation of energy performance. Annex I outlines that the energy performance of a building should reflect typical energy use, including built-in lighting. While it does not specifically mention daylight utilisation, the inclusion of lighting energy use in the calculation methodology implies that natural daylight, which can reduce the need for artificial lighting, is a relevant factor.
- *Acoustics and noise control:* Although not explicitly detailed, the EPBD encourages the use of standards like EN 16798-1 in Annex I, which includes parameters for indoor environmental quality, encompassing aspects such as acoustics.

BPIE RECOMMENDATIONS:

- Member States should include information about IEQ and the benefits of optimal (rather than "adequate") indoor climate conditions in all EPBD-related provisions, from high-level planning instruments (NBRP) to information tools (EPCs, renovation passports, SRI), with mandatory indicators where possible. More specifically on EPCs, IEQ indicators should be based on standards like ISO EN 16798-1. This integration provides transparency to occupants and potential investors regarding the indoor environmental conditions of a building.
- Member States should also consider the interactions between technical building system-level IEQ requirements and broader considerations of IEQ at building level. In this context, Member States should set requirements for the regular inspection of technical building systems, including ventilation and air conditioning systems, to ensure they are functioning optimally and maintaining adequate IEQ levels.
- Member States should encourage the use of smart technologies that monitor and adjust IEQ parameters in real-time, enhancing occupant comfort and energy efficiency. This includes improving the smart readiness indicator to reflect a building's capability to maintain optimal IEQ.
- Member States should promote IEQ-focused education and certification for professionals, by providing incentives for training and certification schemes for building professionals, such as designers, installers and facility managers, to equip them with the knowledge to implement and maintain high IEQ standards.
- Finally, they should consider the broader dimensions of healthy buildings, going beyond simple IEQ indicators, as defined in the Healthy Buildings Barometer: (1) improving mental and physical health, (2) designed for human needs, (3) sustainably built and managed, (4) resilient and adaptive, and (5) empowering people.

GOOD PRACTICE EXAMPLE: SINGLE-FAMILY HOUSE RENOVATION IN SALA (SLOVAKIA)

A renovation of a single-family home in Slovakia showcases best practices in sustainable living by reducing material and carbon footprints while lowering energy costs and improving comfort for occupants. Key strategies include improving ventilation and natural light (chimney-style air tunnel enhancing air circulation and daylight access), thermal comfort and energy performance (solar window shading maintaining indoor temperatures in summer, while enhanced wall and roof insulation significantly reduce energy consumption) and affordability and space optimisation. This example demonstrates how thoughtful design can enhance indoor quality, reduce costs and address housing challenges in an energy-efficient manner. For more information, see the website.

TO GO FURTHER ON IEQ AND HEALTHY BUILDINGS
ADDITIONAL READING

- **BPIE (2018),** The inner value of a building: linking indoor environmental quality and energy performance in building regulation.
- **BPIE (2024),** Healthy Buildings Barometer 2024: how to deliver healthy, sustainable, and resilient buildings for people.

4.3 A STRONGER ROLE FOR ONE-STOP SHOPS, ESSENTIAL COMPONENTS OF THE RENOVATION ECOSYSTEM

ARTICLE 18

WHAT IS NEW, WHAT HAS CHANGED AND WHY IS IT IMPORTANT?

By introducing a dedicated provision for one-stop shops, the EPBD recognises the crucial role of advisory and technical assistance facilities, positioning them as a key component of the renovation ecosystem. **While the EPBD does not provide a legal definition of a one-stop shop, it lays down requirements for their establishment, rollout, target audiences and service offerings.** It also outlines how one-stop shops should be integrated with other EPBD elements, such as EPCs. Beyond meeting the mandatory EPBD requirements, Member States should consider the provisions of EED Article 22 ("Information and Awareness Raising") and follow the Commission's associated recommendations to maximise the effectiveness and impact of one-stop shops.[169]

Member States should recognise that one-stop shops are a vital tool for achieving mandatory EPBD provisions, such as MEPS, in a faster and more efficient manner. One-stop shops are a useful instrument which can provide many services to a wide range of stakeholders within the renovation ecosystem, including public authorities and industry actors. They serve as data hubs, promote the benefits of renovation, manage funds, and act as intermediaries for progressively increasing and improving available (human) resources. If developed well and sustained over time, one-stop shops can boost the building renovation and decarbonisation market.[170]

Equally important, one-stop shops play a crucial role for citizens. Establishing and sustaining effective one-stop shops in the long term is essential to raising awareness of renovation benefits, guiding and empowering citizens to make informed decisions and take meaningful action to improve their homes. One-stop shops make the energy transition more tangible for citizens by offering a dedicated platform where they can express their needs and

[169] Commission Recommendation EU 2024/2481 (2024), Guidelines for the interpretation of Articles 21, 22 and 24 of Directive (EU) 2023/1791.

[170] For example, the one-stop shop in Ghent (Belgium) showed that for every €1 invested in the one-stop shop functioning, €16 was brought back to the local economy – information from EU PEERS Summit, Brussels, June 2024.

concerns. But beyond embodying a bottom-up, more democratic approach to renovation, one-stop shops are also very effective in driving action. Experience has shown that advisory services have a greater impact than financial support alone, as clear guidance and expert advice instil confidence in the renovation process. Evidence suggests that steady, moderate financial support combined with comprehensive and sustained advisory services delivers better long-term results compared to short-term subsidies lacking technical assistance.[171]

WHAT IS A ONE-STOP SHOP?

Although the EPBD does not provide a legal definition of one-stop shops, they are a well-established concept within the renovation ecosystem. One-stop shops are advisory services for building renovation and decarbonisation, typically operating as physical hubs that facilitate or offer energy renovation solutions. Their primary role is to present available renovation options aligned with the policy framework, helping homeowners to identify the most suitable measures and their optimal sequencing for their specific building. They also provide information on the available financial support and details about local providers of renovation works. One-stop shops simplify the renovation process and provide valuable guidance for informed decision-making.

Examples of one-stop shops can vary significantly, as they encompass a wide range of models and approaches. Key differences include:

- The target audience(s) and their level of engagement with the one-stop shop
- The scope and depth of services offered[172]
- The distribution of responsibilities between public authorities and private entities in delivering services
- The funding mechanisms and underlying business models.

BPIE RECOMMENDATION:

It is essential to implement the requirements of EPBD Article 18 in a well-structured, sequential manner, as each decision can shape or even limit subsequent choices. The recommended sequence of steps, outlined below and in the following sections, provides a clear roadmap for effective implementation.

[171] ComActivate project (2024), Inventory of resource centre models and typologies: unlocking the potential of community-driven models to drive residential renovation: Insights from six case studies.
[172] INNOVATE project (2020), How to set up a one-stop shop for integrated home energy renovation.

WHO ARE THE TARGET AUDIENCES?

The EPBD mandates that one-stop shops cater to three key audience categories:

1. ***Administrative actors and public bodies:*** This would for example include entities that own or occupy buildings such as schools, hospitals and other public facilities.
2. ***Homeowners and households at large, including tenants:*** Representatives such as homeowners' associations and citizen energy communities should also benefit from one-stop shop services, though the EPBD does not explicitly mention them. The EPBD does, however, explicitly require a focus on dedicated services for vulnerable households, people affected by energy poverty and low-income households.
3. ***Financial and economic actors, including SMEs and microenterprises:*** This category covers a broad range of stakeholders, such as construction and renovation companies, installers, energy efficiency service providers, energy suppliers and banks.

Definition (Article 2§5): public bodies

As defined in Article 2§12 of the 2023 Energy Efficiency Directive (2023/1791): national, regional or local authorities and entities directly financed and administered by those authorities but not having an industrial or commercial character.

Definition (Article 2§28): vulnerable households

Households in energy poverty or households, including lower middle-income households, that are particularly exposed to high energy costs and that lack the means to renovate the building that they occupy.

Definition (Article 2§27): energy poverty

As defined in Article 2§52 of the 2023 Energy Efficiency Directive (2023/1791): a household's lack of access to essential energy services, where such services provide basic levels and decent standards of living and health, including adequate heating, hot water, cooling, lighting, and energy to power appliances, in the relevant national context, existing national social policy and other relevant national policies, caused by a combination of factors, including at least non-affordability, insufficient disposable income, high energy expenditure and poor energy efficiency of homes.

It is a positive step that the EPBD explicitly identifies a broad range of actors eligible to benefit from one-stop shop services while also mandating a specific focus on those most in need. This requirement is crucial, as one-stop shop rollout across the EU has faced significant inclusivity challenges in the past. Despite being nominally open to all citizens, services aimed at vulnerable and energy-poor households have often been inadequately designed, resulting in one-stop shops failing to effectively reach these parts of society. This will however be even more needed in the future, as the inclusion of buildings in the new emissions trading system will affect energy bills, with a greater impact on those living in energy poverty. For such households, one-stop shops must first address pressing legal issues – such as energy bill disputes or conflicts between tenants and landlords – before offering renovation support. The management and governance of the one-stop shops play a critical role in ensuring these services are accessible and will reach the target audience (for more information on one-stop shop services or management structure, see sections below).

BPIE RECOMMENDATIONS:

- While the legal scope of one-stop shop audiences is broad, it is recommended to prioritise residential homeowners and households, who might need more awareness and guidance in their renovation journey. Non-residential buildings tend to be owned by private actors or entities with more knowledge on both the technical and financial aspects of building renovation, and some are even professionally managed.
- Member States should dedicate time and resources to identifying and mapping the most vulnerable, energy-poor and low-income households to proactively reach them with one-stop shop services. This effort should be integrated into the preparation of the NBRP, notably by comparing existing societal needs and services available, by leveraging insights from regional and local authorities, and by cross-referencing data from social authorities (providing income support) and energy agencies (providing renovation advice and/or subsidies). Special attention should be paid to ensure that one-stop shop services are available to people with disabilities.

GOOD PRACTICE EXAMPLE: PONTO DE TRANSIÇÃO – TRANSITION POINT (PORTUGAL)

Launched by the private Calouste Gulbenkian Foundation in 2022, Transition Point is a one-stop shop operating from a repurposed shipping container and bringing face-to-face connection with vulnerable households. Its services include advice, information on financing and support in preparing funding applications, and free energy audits. The container can be easily transported between municipalities. Its important successes include bringing localised solutions to combating energy poverty, as well as direct engagement with local stakeholders and the community (e.g. by training local "Transition Agents"). Read more on its website.

WHAT SERVICES SHOULD ONE-STOP SHOPS PROVIDE AND HOW?

MANDATORY SERVICE OFFERINGS

The EPBD mandates one-stop shops to offer three key levels of service, ranging from basic to comprehensive support:

1. Streamlined information – this encompasses general awareness-raising activities on building renovation and decarbonisation, highlighting their benefits.
2. Independent advice – offering impartial guidance tailored to the specific needs of customers.
3. Holistic support – a comprehensive service covering the entire customer journey, as outlined below.

These services address the energy performance of buildings throughout all stages of renovation projects, encompassing both technical and financial solutions. Special attention should be given to worst-performing buildings, while also adapting services to diverse housing typologies and geographical contexts. This means one-stop shops should consider differentiating between single-family houses and multi-apartment buildings and consider climatic conditions when proposing solutions.

Although **the one-stop shop customer journey** may vary depending on building segment, building category (e.g., single-family home or multi-apartment building) and audience profile, it typically involves the following stages, particularly at the holistic support level:[173]

- Customer identification: engaging with potential clients, establishing relationships and understanding their specific needs.
- Building diagnosis: conducting detailed energy audits, ideally resulting in an EPC and a renovation passport.
- Work programme design: developing a comprehensive renovation plan, outlining costs, benefits, and financing options. This phase includes collaboration with residents/owners, addressing their concerns, and securing contracts with professionals as well as helping secure funding.
- Execution of renovation works: overseeing the project from start to finish.
- Maintenance and follow-up: evaluating the outcomes through technical assessments, measuring customer satisfaction, and offering ongoing inspection and maintenance services.

[173] Turnkey Retrofit project (2021), Underpinning the role of One-Stop Shops in the EU Renovation Wave: First Lessons Learned from the Turnkey Retrofit Replication.

BPIE RECOMMENDATIONS:

- **Tailored services:** One-stop shops should adapt their offerings to the specific needs of the territory they serve. Different service levels should be designed to meet the diverse requirements of target groups within the same area, also depending on the most prevalent building category (as informed by the NBRP overview).[174] Priority should be given to vulnerable households in the worst-performing buildings, where the highest level of guidance is required. This approach helps optimise one-stop shop resource allocation.
- **Fostering deep renovation:** One-stop shops should inspire and guide customers toward deep renovations, providing insights on exceeding minimum standards in a technology-neutral manner.
- **Expanding the scope:** While the EPBD does not currently mandate one-stop shops to provide advice on climate adaptation and resilience, health benefits or sufficiency practices, Member States should consider integrating these aspects into their one-stop shop services and measures suggested to owners, so that buildings can be future-proofed more effectively. This awareness-raising role is crucial, especially considering the large climate insurance protection gap of residential buildings in the EU.[175]

GOOD PRACTICE EXAMPLE: HAUSKUNFT ONE-STOP SHOP, VIENNA (AUSTRIA)

Since its establishment in 2021, Hauskunft, operated by the Municipality of Vienna and located near the City Administration Office, has been offering a broad range of services tailored to condominiums, apartment owners and tenants. The initiative focuses on addressing the unique needs of various target audiences, ensuring higher take-up, more effective guidance and support. Its services are tailored and can be categorised in two broad categories – information and outreach, and advice and recommendations. Hauskunft provides information through different channels (phone, website, on-site) and organises "information evenings" for homeowners once a month. This personalisation of services relies on an extensive mapping of stakeholder profiles and needs at the start of the project, including through dialogues. More information can be found on its website.

[174] For more information on this topic, see part "Use quality data as the basis: where are we now?" in subsection "Get to work: elaborate the NBRP content", in section 1.2.

[175] The climate insurance protection gap refers to the fact that a portion of the economic losses caused by climate-related natural disasters is not insured. A 2023 analysis by the EU Central Bank and EIOPA (EU Insurance and Occupational Pensions Authority) found that *"only about a quarter of the losses caused by extreme weather and climate-related events in the EU are currently insured, and in several countries this share is below 5%."*

OPTIONAL SERVICE OFFERINGS

The EPBD also opens the possibility for one-stop shops to provide additional services besides the mandatory ones. **The first optional service offering mentioned is the accompaniment of *"integrated district renovation programmes"*.** The EPBD does not provide a legal definition of "integrated districts", but Annex II includes a mandatory indicator within the requirement for Member States to provide an overview of policies in their NBRPs regarding *"the promotion of district and neighbourhood approaches and integrated renovation programmes at district level, which may address issues such as energy, mobility, green infrastructure, waste and water treatment and other aspects of urban planning and may take into account local and regional resources, circularity and sufficiency."* In its position on the EPBD during negotiations, the European Parliament had defined in Article 2§44 "integrated district" as *"a district selected on the basis of an analysis of building stock, taking into account the area-specific potentials for energy efficiency measures by means of clear and measurable objectives and that develops renovation roadmap templates for similar building types, following an adequate analysis of local conditions, with the aim of a rapid, resource-efficient and mutually coordinated transformation of buildings, as well as other aspects, such as the social structure, the economic and environmental conditions and the energy supply infrastructure of buildings."*

GOOD PRACTICE EXAMPLE: OPENGELA IN BASQUE COUNTRY (SPAIN)

The Horizon 2020 HIROSS4all project (2019-2023) supported the establishment of Opengelas, or "open living rooms". This initiative piloted two projects in the Otxarkoaga (Bilbao) and Txonta (Eibar) neighbourhoods, paving the way for the model's replication and scaling to 25 communities across the Basque Country. Opengela operates as a neighbourhood one-stop shop, providing homeowners (with a focus on vulnerable households) with comprehensive support throughout the renovation process, in a neighbourhood and community approach. It exemplifies a successful public-private partnership: the public sector facilitates the establishment of one-stop shop offices, while the private sector executes renovation works and investments. The project achieved average energy savings of approximately 60% and mobilised over €15 million in cumulative investment from both households and public bodies, including €5.2 million in private investment. Additionally, the project engaged a wide range of stakeholders, raised awareness about building renovations, organised training courses to enhance professional skills, and contributed to local job creation. More information can be found on its website.

A second optional service offering involves providing measures and financing to promote education and training, particularly targeting SMEs, to ensure *"there is a sufficient workforce with an appropriate level of skills"* (EPBD Article 17§12). Beneficiaries of these services include renovation companies, professionals and market actors directly involved in building renovations.

Administrative actors and public bodies, identified as one of the key target audiences, would also significantly benefit from the education and training provided by one-stop shops. Strengthening their capacity offers two key advantages. Firstly, it helps public authorities renovate buildings they own or occupy, aligning with EED Article 6 requirements, ensuring that 3% of the total floor area owned by public bodies is renovated to NZEB or ZEB levels (see Deep Dive #1). Secondly, it empowers public authorities to become leaders and drivers of EPBD implementation within their territories.

GOOD PRACTICE EXAMPLE: RENOWATT (BELGIUM)

RenoWatt is a one-stop shop in Wallonia that assists smaller municipalities in securing financing for the renovation of public buildings, such as administrative offices, schools and healthcare facilities. Launched in 2014 and extended until 2026, RenoWatt provides municipalities with support in implementing energy performance contracts, aggregating demand by pooling multiple individual building projects, advising on optimal financing instruments, and helping select and negotiate with technical service providers. During its initial phase, RenoWatt contributed to the renovation of over 130 buildings, created more than 300 direct jobs, and achieved an average of 30% energy savings. More information on its website.

BPIE RECOMMENDATION:

Member States should acknowledge one-stop shops as essential facilitators of the renovation value chain and should, although optional, incorporate education and training services into their service portfolios. Providing training for both renovation professionals and public authorities will enhance the quality of renovation and decarbonisation efforts, ultimately improving customer trust and satisfaction. It is crucial that one-stop shops include such offerings in their service portfolios to maximise their impact.

METHODS OF SERVICE OFFERINGS: HOW TO REACH, COMMUNICATE TO AND ATTRACT THE TARGET AUDIENCE(S)?

The first step in promoting one-stop shops is to raise awareness of their existence. In accordance with EPBD, both EPCs and renovation passports must include contact details for relevant one-stop shops (Article 19§10, Annex V, and Annex VIII). Going further, owners of a building for which an EPC below class C is issued should be invited to receive renovation advice in a one-stop shop (Article 19§13). However, a broader promotion strategy is essential to maximise outreach across the territory. This can be achieved through general information campaigns, direct mail distribution, social media engagement, traditional media appearances, advertisements or a dedicated website. The website should offer comprehensive information about renovation, provide FAQs and offer general advice, encouraging citizens to contact the one-stop shop. Nevertheless, these efforts should be considered only as the initial step in one-stop shop promotion – a website alone does not constitute a fully operational one-stop shop.

To establish meaningful connections with customers and attract them effectively, o**ne-stop shops should tailor their communication strategies to different target audiences, emphasising the specific benefits** of building renovation that resonate with each group. For instance, residential homeowners may be primarily interested in reduced energy bills and improved thermal comfort, whereas managers of non-residential buildings and financial stakeholders might be more motivated by the potential to enhance property value through renovations.[176]

[176] Joint Research Centre (2021), One-stop shops for residential building energy renovation in the EU.

Regarding communication methods, **one-stop shops should employ a combination of digital and physical outreach strategies to maximise impact.** Digital tools such as websites, email marketing and social media campaigns can effectively engage younger, tech-savvy audiences. Meanwhile, in-person approaches, including door-to-door outreach, one-on-one meetings and community events, remain crucial for reaching older or more vulnerable households. A balanced mix of both digital and physical communication ensures broader reach and greater engagement across diverse demographic groups.

GOOD PRACTICE EXAMPLE: RENOVATION CARAVAN (BELGIUM)

A good example of effective one-stop shop outreach comes from the Klimaatpunt energy community in Belgium, which supports vulnerable households by visiting their neighbourhoods with the Klimaatmobiel, a mobile one-stop shop in the form of a caravan. This initiative brings renovation advice and support directly to citizens, fostering trust and accessibility. Since 2019, the Kimaatmobiel has assisted 1,766 households, out of which 43% undertook a renovation measure. For households that are still undecided, Klimaatpunt contacts the households every six months for a follow-up. Read more on the website.

Beyond initial outreach and engagement, **one-stop shops could foster a strong sense of citizen involvement and community ownership of renovation projects.** Encouraging citizen-led initiatives has proven to be a key factor in achieving long-term success and positive outcomes. This can be achieved through close collaboration with, or partial to full ownership of, citizen energy communities, ensuring a more participatory and inclusive approach to building renovation.

WHO IS RESPONSIBLE FOR ESTABLISHING AND ROLLING OUT ONE-STOP SHOPS?

ESTABLISHING ONE-STOP SHOPS: A MEMBER STATE'S DUTY

The EPBD clearly states that it is the responsibility of Member States to establish and operate one-stop shops. Member States are required to report, within their NBRPs, on the policies implemented to create one-stop shops and may also include information on their number. In accordance with EED Article 22§6, the Commission has provided guidelines to facilitate cooperation between public bodies, energy agencies and community-led initiatives when establishing one-stop shops. Where appropriate, Member States may also engage private stakeholders in the process.

Establishing a one-stop shop involves selecting an implementing body (manager) that aligns with local capacities and needs. Four distinct models of implementing bodies can be identified:[177]

1. *Fully public:* a national, regional or local public authority owns and operates the one-stop shop.
2. *Fully private:* a private entity, such as an industry actor (construction or renovation company, manufacturer, installer), energy service company or consultancy, owns and operates the one-stop shop.
3. *Public-private partnership:* a public authority and a private entity share ownership and responsibility for the one-stop shop.
4. *Cooperative:* a group of households and/or stakeholders collectively own and operate the one-stop shop, for example through an energy community.

BPIE RECOMMENDATION:

Each model presents its own set of risks and opportunities. For example, a fully private one-stop shop may favour specific technologies and materials, potentially compromising technological neutrality. Conversely, a fully public one-stop shop may face resource constraints. When establishing one-stop shop, Member States should define minimum quality standards that each one-stop shop must adhere to, such as ensuring technological neutrality and prioritising support for vulnerable households. While the management of a one-stop shop can be delegated to other actors, Member States should maintain oversight to ensure that key quality criteria are consistently met. More details about the profile of the one-stop shop manager are available in the next subsection, "How to manage and sustain a network of one-stop shops."

[177] Commission Recommendation EU 2024/2481 (2024), Guidelines for the interpretation of Articles 21, 22 and 24 of Directive (EU) 2023/1791.

GOOD PRACTICE EXAMPLE: ECOVISION (IRELAND)

EcoVision is a community-led not-for-profit cooperative functioning as a one-stop shop, supporting households in the uptake of renovation works from initial consultation to post-work evaluation. It started as a local initiative in Ireland's rural community benefiting from grants from the Sustainable Energy Authority Ireland and the Better Energy Communities scheme, before evolving into a community cooperative with 15 members. EcoVision cooperates with organisations from other Member States on specific projects, like the Renpower project focusing on energy poverty alleviation. EcoVision has so far supported the renovation of over 950 buildings, generating €18 million investment. More information can be found on its website.

ROLLING OUT ONE-STOP SHOPS: ENSURING A TIGHT MESH OF INTERCONNECTED PLACES

While the number of one-stop shops is increasing across the EU, there is a risk of exacerbating existing inequalities due to their higher concentration in Western and Northern Europe and their tendency to be clustered in urban areas rather than rural ones. The EPBD addresses these challenges by requiring Member States to **ensure comprehensive geographical coverage of advisory services, ensuring they are widely available and easily accessible.** More specifically, the EPBD requires that at least one one-stop shop is established:

"(a) per 80,000 inhabitants;

(b) per region;

(c) in areas where the average age of the building stock is above the national average;

(d) in areas where Member States intend to implement integrated district renovation programmes; or

(e) in a location that can be reached within less than 90 minutes of average travel time, on the basis of the means of transport that is locally available."

BPIE RECOMMENDATION:

The EPBD does not explicitly clarify whether these criteria are cumulative or alternative, leaving room for interpretation regarding the minimum number of one-stop shops required. Given that some criteria overlap, BPIE recommends that Member States:

- Begin by establishing at least one one-stop shop per region, regardless of population size. The EPBD does not define "region", but it may be interpreted as NUTS 2 according to the Eurostat classification.[178]
- If a region has more than 80,000 inhabitants, additional one-stop shops should be established accordingly.

Criteria (c), (d) and (e) should primarily guide the optimal placement of the one-stop shop within a region. Member States should locate the one-stop shop based on local contexts and needs, while prioritising areas with the worst-performing buildings and a higher share of vulnerable households.

[178] The Nomenclature of Territorial Units for Statistics (NUTS) divides each Member State into three levels, where NUTS 2 are basic regions for regional policies, which are eligible for cohesion policy support. As of 1 January 2024, the EU listed 244 NUTS 2 regions.

Beyond defining the criteria for establishing one-stop shops (i.e., selecting appropriate one-stop shop models), **Member States should adopt a roadmap approach** to effectively fulfil the EPBD requirements for their rollout.

1. ***Leverage existing resources:*** Rather than creating one-stop shops from scratch, start by building on existing structures in the Member States, existing experiences elsewhere or off-the-shelf toolkits (e.g. template contracts or documents). Also, one-stop shops established under EED Article 22 can legally be designated to meet EPBD Article 18 requirements, ensuring better use of public resources and enhancing operational efficiency.

2. ***Think about implementation pathways:*** Choose between (1) rolling out basic services across all regions initially, then expanding the service offerings over time, or (2) launching a few comprehensive one-stop shops initially, testing their effectiveness, and then scaling up while balancing replicability with customisation to address regional and audience-specific needs.

3. ***Integrate with other EPBD initiatives:*** If appropriate, align one-stop shop deployment with related programmes, such as national renovation passport schemes or Article 9 requirements, to maximise synergies and resource efficiency. A key success factor for one-stop shop rollout will be the regulatory clarity, visibility and long-term stability of the entire EPBD implementation ecosystem of measures.

Member States must address potential barriers to the establishment of one-stop shops, such as the availability of qualified experts and professionals to operate them.[179] The resource requirements for establishing and scaling one-stop shops should be thoroughly assessed, with corrective actions implemented if necessary to ensure adequate resource allocation. This is particularly important if, in addition to serving their target audiences, one-stop shops are also expected to fulfil broader roles, such as collecting building data, sharing best practices and contributing to NBRPs.[180] Beyond resource availability, Member States should ensure that one-stop shop professionals possess the necessary knowledge and skills to meet the diverse, in-depth and tailored service demands of their users. One-stop shop teams should showcase technical, organisational and social competences. Capacity-building initiatives, such as dedicated training programmes and workshops, can play a crucial role in enhancing their competencies.

GOOD PRACTICE EXAMPLES:

- The ComActivate project has developed targeted training programmes for one-stop shop employees and stakeholders in Bulgaria, Hungary and Lithuania. Through demonstration sites and various initiatives, the project enhances knowledge in areas such as energy efficiency, financing, and soft skills development. More details are available in ComActivate project (2024), Increasing capacity in local authorities for successful deep renovation programs of multi-family apartment buildings.

- The EU PEERS project fosters a collaborative approach between one-stop shops and the development of long-term networks beyond occasional best practice exchanges.

[179] As an example, according to a survey run by EU PEERS in 2024, the average number of full-time equivalent staff within one one-stop shop in 2023 was estimated at 7.3 (compared to 2.8 when the one-stop shop was founded).
[180] Commission Recommendation (EU) 2024/2481 (2024), Guidelines for the interpretation of Articles 21, 22 and 24 of Directive (EU) 2023/1791.

HOW TO MANAGE AND SUSTAIN A NETWORK OF ONE-STOP SHOPS?

MANAGING ONE-STOP SHOPS: BALANCING PUBLIC RESOURCES AND PRIVATE INVOLVEMENT

The EPBD gives the responsibility to Member States to establish one-stop shops and encourages them to operate these facilities. However, private stakeholders may also be involved in the process. A careful balance between optimising public resources and involving the private sector should therefore be thought through.

Physical (local) presence and community engagement: One-stop shops should be established as physical locations connected to existing local meeting places, fostering a sense of community and inclusivity. The first recommendation from the Citizens' Panel on Energy Efficiency[181] calls on Member States to create a network of physical one-stop shops at the municipal level (e.g., located in city halls or libraries). Local actors, such as social workers, neighbourhood associations, charities and consumer organisations, could play a crucial role in spreading awareness of these services, or even be involved in providing them together with local authorities. Local actors are trusted actors, strengthening not only accessibility but also credibility of the services.

GOOD PRACTICE EXAMPLE: ASENOVGRAD ONE-STOP SHOP (BULGARIA)

The Asenovgrad one-stop shop in Bulgaria is operated by the local municipality, providing effective support to multi-family apartment buildings in accessing the national subsidy programme (covering 80 to 100% of renovation costs) and carrying out renovations. It was initially launched and financed under the Horizon 2020 Up-Stairs project and later sustained by the municipality for two additional years. However, to ensure its long-term operation, new funding sources will need to be secured in the future. The Asenovgrad one-stop shop is well aligned with Bulgaria's policy landscape, where municipalities play a key role in the energy efficiency support framework. Its establishment included comprehensive staff training and preparation to ensure effective service delivery. The one-stop shop services are easily accessible both online and in person, with a dedicated awareness campaign conducted to reach residents. Beyond financial and administrative support, the one-stop shop empowers residents, assists housing associations and property managers, and helps mitigate risks associated with building renovations. For more information, see ComActivate (2024), Unlocking the potential of community-driven models to drive residential renovation – insights from six case studies.

Independence and impartiality: One-stop shops should provide independent advice, free from the influence of specific providers or actors, ensuring equitable access and the dissemination of technology-neutral information. EPBD Article 18 explicitly emphasises the importance of independent advice, which is also a wish expressed by citizens in the Citizens' Panel on Energy Efficiency.

[181] European Citizens' Panel on Energy Efficiency (2024), final recommendations.

GOOD PRACTICE EXAMPLE: FRANCE RÉNOV' NETWORK (FRANCE)

In France, advising households on home energy renovation was officially recognised as a public service in 2013. The France Rénov' label provides nationwide visibility, legitimacy and recognition, offering unbiased information to homeowners.[182]

▶ ***Service differentiation and accessibility:*** A well-structured one-stop shop model should differentiate between core services provided by public authorities for free or at a minimal fee and additional, more specialised services that can be offered by private actors under specific conditions and quality assurance frameworks.

GOOD PRACTICE EXAMPLE: FRANCE

Since 2022, French law distinguishes between two levels of service: (1) general "first-level advice", provided free of charge by a network of France Rénov centres, co-financed by local authorities, and (2) tailor-made "support services", offered for a fee through a certified network of one-stop shops called "Mon Accompagnateur Rénov", which homeowners are required to use in order to benefit from renovation subsidies.[183]

SUSTAINING ONE-STOP SHOPS: THE CRUCIAL ROLE OF FINANCING AND BUSINESS MODELS

A significant challenge that one-stop shops face is the lack of adequate funding and sustainable business models to ensure their long-term viability, as well as their ability to offer services at low or no cost to vulnerable households. Whether one-stop shops are fully or partially operated by public bodies, or when private entities run them with governmental support and incentives, Member States must carefully consider their financing strategies. **Striking the right balance between public and private funding is crucial and depends on the stage of one-stop shop deployment, the services offered and the target audience.**

▶ ***Initial phase funding:*** In the early stages, securing substantial public funding is essential to kick-start one-stop shops, with key possible sources being EU funds (LIFE programme, Regional and Development Fund, Cohesion Fund,[184] Social Climate Fund[185]), revenues from the emissions trading system (ETS), energy efficiency obligation schemes, and subsidies reallocated away from fossil fuel-powered equipment.[186] Financing options through institutions like the European Investment Bank should also be explored. Bundling one-stop shop services with other national services related to energy or the housing market

[182] ORFEE project (2024), More one-stop shops to boost home energy renovation: how to set up a supportive national framework for local one-stop shops? Policy recommendations for EU Member States.
[183] ORFEE project (2024), More one-stop shops to boost home energy renovation: how to set up a supportive national framework for local one-stop shops? Policy recommendations for EU Member States.
[184] Especially considering that the EPBD requires Member States to establish at least one one-stop shop per region, which are beneficiaries of those funds.
[185] One-stop shops are included under eligible measures of the Social Climate Fund, under the condition they target vulnerable households (SCF Regulation, Article 8§1d), formulated as *"targeted, accessible and affordable information, education, awareness and advice on cost-effective measures and investments, available support for building renovations and energy efficiency".*
[186] According to EPBD Article 17§15, as of 1 January 2025, Member States are banned from providing financial incentives for the installation of standalone boilers powered by fossil fuels.

can enhance financial sustainability.[187] It is quite striking that one-stop shops today still heavily rely on (EU) public funding to operate. According to a survey[188] conducted by the EU PEERS network across 38 one-stop shops in 2023, the primary funding sources were EU funds (for 58% of one-stop shops), local subsidies (23%) and regional subsidies (16%).

GOOD PRACTICE EXAMPLE: RENOVAID PROJECT (SLOVENIA)

An example of successful initial-phase funding is the RenovAid project in Slovenia. It started in late 2024, using LIFE funding to further build on the existing and trusted EnSvet advisory network operated by EkoSklad, the Slovenian public eco-fund, to roll out a network of one-stop shops in the country. This initiative benefits from stable subsidies and a constant pipeline of support, ensuring credibility and sustainability.

Transition to private sector involvement: Once one-stop shops are established, it is essential to develop sustainable business models that incorporate private funding to ensure their long-term viability. Public funds should then be reallocated to support vulnerable households and those experiencing energy poverty. Strategies for incorporating private funding include:

- ***Revenue generation from service fees:*** One-stop shops can charge clients who can afford services, ensuring a steady income stream.
- ***Industry collaboration:*** Partnering with private sector actors such as material or technology providers or installers, which benefit from expanded market opportunities, can lead to co-financing arrangements.
- ***Banking sector involvement:*** Banks can provide financing for one-stop shop services and potentially use one-stop shop platforms to verify mortgage and loan applications.
- ***Innovative business models:*** Exploring third-party financing solutions or involving energy service companies.

To give an idea of the amount of funding needed to sustain the functioning of a one-stop shop, it can be estimated at around €250,000 per year.[189]

GOOD PRACTICE EXAMPLE: OKTAVE ONE-STOP SHOP (FRANCE)

The Oktave one-stop shop makes use of third-party financing to expand its services to new markets, safeguarding public funding for segments of its business which are not viable on their own.

[187] Commission Recommendation EU 2024/2481 (2024), Guidelines for the interpretation of Articles 21, 22 and 24 of Directive (EU) 2023/1791.
[188] EU PEERS project (2024), Key figures about OSS you want to know.
[189] According to a survey by EU PEERS in 2024, the average operational costs of a one-stop shop were estimated at around €223,000 per year (with a lot of variation between the surveyed one-stop shops).

TO GO FURTHER ON ONE-STOP SHOPS
ADDITIONAL READING

- **Turnkey Retrofit project (2019),** Benchmarking of promising experiences of integrated renovation services in Europe.
- **Joint Research Centre (2021),** One-stop shops for residential building energy renovation in the EU.
- **Turnkey Retrofit project (2021),** Underpinning the role of One-Stop Shops in the EU Renovation Wave: First Lessons Learned from the Turnkey Retrofit Replication.
- **X-tendo project (2021),** Introductory reports: one-stop-shops.
- **IBF, CLIMACT, BPIE, VITO (2023),** Soutien à la vague de rénovation : un guichet unique en Wallonie : recommandations pour la conception et l'implémentation de services intégrés d'accompagnement à la rénovation énergétique en Wallonie **(in French).**
- **ComActivate project (2024),** Inventory of resource centre models and typologies: unlocking the potential of community-driven models to drive residential renovation: insights from six case studies.
- **ComActivate project (2024),** Increasing capacity in local authorities for successful deep renovation programs of multi-family apartment buildings.
- **Commission Recommendation EU 2024/2481 (2024),** Guidelines for the interpretation of Articles 21, 22 and 24 of Directive (EU) 2023/1791.
- **BPIE for Green European Foundation & Heinrich Böll Foundation (2024), section "Renovation and renewable heating and cooling" in** Boosting participation in the energy transition: five actions areas for the new EU policy cycle.

4.4 FINANCIAL SUPPORT FOR BUILDING RENOVATION AND DECARBONISATION

ARTICLE 17

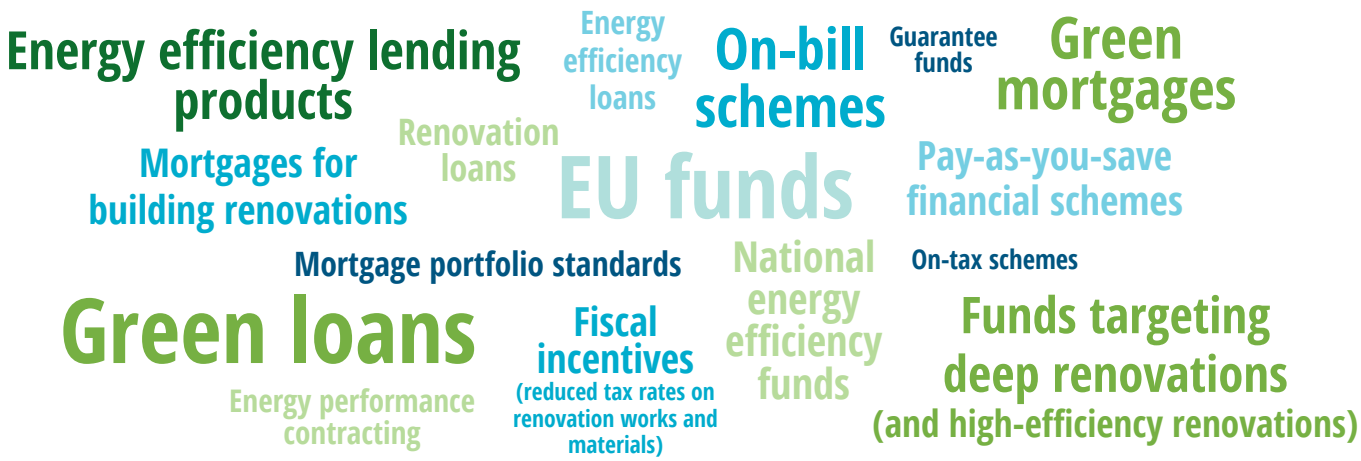
WHAT IS NEW, WHAT HAS CHANGED AND WHY IS IT IMPORTANT?

The EPBD introduces more detailed and stricter requirements for Member States regarding financial support. It establishes new rules to streamline financing for building renovation and decarbonisation, and to improve market conditions overall. The Directive emphasises the importance of funding to simultaneously enhance energy performance and reduce GHG emissions, with a clear link to the 2050 building stock objective, while considering social aspects and protecting vulnerable households. Additionally, it describes specific financial instruments and provides guidance on their implementation by Member States. Article 17 outlines various financing approaches for the EPBD's policy measures and establishes **key quality principles to optimise funding utilisation**. It also emphasises **strong social components**, ensuring financial mechanisms support equitable and inclusive implementation.

DIVERSE FINANCING INSTRUMENTS, UNITED BY A MORE STRATEGIC ROLE

A LANDSCAPE OF FINANCING TOOLS

EPBD Article 17 outlines a wide range of financing tools that Member States can use to support building renovation and decarbonisation.



Definition (Article 2§39): mortgage portfolio standards[190]

Mechanisms incentivising mortgage lenders to establish a path to increase the median energy performance of the portfolio of buildings covered by their mortgages towards 2030 and 2050, and to encourage potential clients to improve the energy performance of their property in line with the Union's decarbonisation ambition and relevant energy targets in the area of energy consumption in buildings, relying on the criteria for determining environmentally sustainable economic activities set out in Article 3 of Regulation (EU) 2020/852 – Taxonomy Regulation.

Definition (Article 2§40): pay-as-you-save financial scheme

A loan scheme dedicated exclusively to energy performance improvements where a correlation is established in the designing of the scheme between the repayments on the loan and the achieved energy savings, also taking into account other economic factors such as the indexation of the energy cost, interest rates, increased asset value and loan re-financing.

While the EPBD outlines a list of potential funding streams for building renovation and decarbonisation, **Member States have some responsibilities.** They:

- Are required to *"promote [their] effective deployment and use"* (Article 17§7)
- *"May promote and simply the use of public-private partnerships"* (Article 17§7)
- Should facilitate project aggregation to create a favourable environment for investors and clients (Article 17§11).

BPIE RECOMMENDATIONS:

- **Member States should make the best use of funds available under the Recovery and Resilience Facility** (ending in 2026, with €46 billion allocated to building renovation) **and the current multiannual financial framework** (ending in 2027 with disbursements possible until 2030, with €29 billion allocated to building renovation, including national co-funding).[191] The remaining parts of these funds should foster the implementation of the EPBD.
- While the EPBD presents various financial schemes as optional examples, **Member States should fully explore their potential and integrate them appropriately into their financing landscape** for building renovation and decarbonisation. To accelerate action, a diverse range of financial instruments is essential to accommodate different building types, ownership structures and investment capacities.
- When setting up public financing schemes, Member States should aim to achieve a **high leverage effect**, effectively mobilising private investment. According to past BPIE calculations, public money amounting to €90 billion per year could unlock the needed private capital.[192]

[190] The European Commission is required to adopt by 29 May 2025 a Delegated Act "establishing a comprehensive portfolio framework for voluntary use by financial institutions that supports lenders in targeting and increasing lending volumes provided [...] for energy performance renovations" (Article 17§10). Besides, *"Member States shall ensure that banks and other financial institutions and investors receive information on opportunities to participate in the financing of the improvement of the energy performance of buildings"* (Article 17§11).

[191] All data from Renovate Europe and E3G (2023), 2021-2027 Cohesion policy support for energy efficiency and building renovation.

[192] BPIE (2020), Covid-19 recovery: investment opportunities in deep renovation in Europe.

- The legal and procedural framework for each scheme should be clearly defined, which may require **regulatory reforms** – such as adjustments to property taxes for example, to enable mechanisms like on-tax financing.[193] Ensuring the effective uptake of financial schemes also requires a **well-structured market environment**, developed in collaboration with key stakeholders such as utility companies. This might lead to other related reforms such as for example making energy bill history accessible (with household consent) to renovation market actors, so that they can assess credit capacity. Another reform might be to promote individual metering in multi-unit buildings to address split incentives in rental properties.[194]

GOOD PRACTICE EXAMPLE: MUNICIPAL GREEN BONDS (SWEDEN)

Green bonds enable local authorities to collect capital to invest in projects such as building renovations, respecting certain ambition levels. For instance, the Gothenburg Green Bond Framework requires new buildings to achieve energy performance equivalent to EPC classes A or B, while major renovations must lead to at least 30% energy consumption reduction.

The Commission provides advice and support to Member States on how to effectively deploy the chosen financing streams. First, it will assist (upon their request) Member States in creating national and subnational financial support programmes to increase the energy performance of buildings, for example through the exchange of best practices (Article 17§13). Second, the Commission should have, by 31 March 2025, published an analysis on the effectiveness and appropriateness of financing instruments at both national and EU level (and the coordination between them) for the purpose of improving the energy performance of buildings, with a particular focus on the worst-performing ones (EPBD Article 9§8).[195]

GOOD PRACTICE EXAMPLE: EUROPEAN ENERGY EFFICIENCY FINANCING COALITION (EEEFC)

The Coalition is a Commission initiative created at the end of 2023, gathering Member States, financial institutions and other stakeholders to concretely improve private financing for energy efficiency, notably by facilitating implementation and sharing best practices. The Coalition includes an expert platform as well as national hubs.

[193] European Commission (2023), Commission Recommendation on transposing Article 30 on national energy efficiency funds, financing and technical support of the Energy Efficiency Directive.
[194] RenOnBill project (2022), European on-bill building renovation roadmap.
[195] Publication is estimated for the second quarter of 2025.

A MORE STRATEGIC ROLE GIVEN TO FINANCING

Since 2010, the EPBD has included a dedicated provision on financing. However, the 2024 recast strengthens its role by **recognising the strategic importance of financial support for building renovation and decarbonisation in achieving a zero-emission building stock by 2050.** It also integrates financing even more **into the strategic planning framework through the NBRP**. Member States must use their NBRPs not only to identify market barriers but also to map investment needs and outline the financial and administrative resources required for implementation.

BPIE RECOMMENDATIONS:

- Where Member States outline the investment needs and the corresponding financial measures and schemes within their NBRP, all should be in line with the energy efficiency first principle to support the achievement of a zero-emission building stock by 2050.
- The Commission's analysis of the effectiveness and appropriateness of financing instruments will support identifying gaps in financing at both national and EU levels. This assessment should inform the drafting of NBRPs as well as contribute to the preparation of the next EU budget, the multiannual financial framework for 2028–2034.

The EPBD establishes stronger links between financing and other provisions throughout the Directive, rather than confining the financing topic to a single article. It acknowledges the need for financial institutions to access better and more comprehensive data.[196] Additionally, it highlights that financial support is one of the three key pillars for achieving renovation goals alongside policies such as MEPS and advisory services (Article 9§2). It also underlines the role of financial support in ensuring compliance, whether with MEPS (Article 9§4) or the deployment of solar installations (Article 10§5). Furthermore, the recast emphasises the importance of tailoring financial mechanisms to the target audience, especially addressing energy-poor and vulnerable households. Financial information is also now more integrated into EPCs (Article 19§7) and may also be included as an optional indicator in renovation passports (Annex VIII).

GOOD PRACTICE EXAMPLE: FRANCE RÉNOV'

Launched in 2022, France Rénov' provides homeowners with access to renovation guidance through both online platforms and physical contact points, available in every municipality – often within local municipal climate and energy agencies. The programme helps households assess the renovation potential of their homes, *understand their eligibility for national aid schemes, and access other relevant support*. By offering tailored advice, France Rénov' aims to simplify the renovation process and improve access to financial and technical assistance.

[196] In the digital building logbook definition, in Article 16§3 on data exchange, in Article 18§1 on one-stop shops and in Article 22 on the energy performance database.

KEY QUALITY PRINCIPLES TO OPTIMISE THE USE OF FUNDING

The European Commission estimated in 2020 that Member States needed an additional €275 billion per year (both public and private) dedicated to building renovation to secure alignment with the 2030 target.[197] Given the limited availability of public resources, **Member States must ensure the most cost-effective use of national and EU financing.** Also, EU funds should not crowd out national sources of financing (EPBD Recital 59), but should rather be used to catalyse further investments, and to develop national and subnational funds, instruments and mechanisms.

PUSH-AND-PULL APPROACH

For an optimal use of public funds, the Directive adopts a push-and-pull approach – **actively supporting certain measures while restricting or prohibiting others.**

- ***Bans:*** A key EPBD measure is the prohibition of financial incentives for installing standalone fossil fuel-powered boilers, effective from 1 January 2025 (Article 17§15).[198]
- ***Promotions:*** The EPBD calls on Member States to financially support the decarbonisation of heating and cooling, aligning with the goal of phasing out fossil fuel boilers by 2040. More specifically, the Directive requires Member States to provide financial support for the deployment of solar energy in buildings (Article 10§5) and encourages Member States to provide *"new incentives and funding to encourage the switch from fossil-fuel-based heating and cooling systems to non-fossil-fuel-based heating and cooling systems"* (Article 13§6).

BPIE RECOMMENDATION:

Member States should redirect the funding streams made available from the end of subsidies for the installation of standalone fossil fuel-powered boilers towards renewable alternatives, especially in existing buildings being renovated and occupied by vulnerable households, in line with the energy efficiency first principle. This measure can have a big impact, considering the gas boiler replacement rate in the EU is above 5%.[199]

[197] European Commission (2020), Communication A Renovation Wave for Europe: greening our buildings, creating jobs, improving lives.
[198] European Commission (2024), Notice on phasing out financial incentives for stand-alone boilers powered by fossil fuels under the recast EPBD.
[199] European Environmental Bureau for Coolproducts (2024), Retrofitting homes with heat pumps: 12 stories across the EU.

"HIGHER IMPACT, HIGHER SUPPORT"

The second quality principle for an optimal use of funds is **alignment between financial measures and energy savings (targeted or achieved)**. Building upon a requirement introduced in the 2018 revision of the EPBD, the Directive now includes a proportional approach on the provision of financing.

The EPBD mandates Member States to provide **higher fiscal, financial, administrative and technical support for (staged) deep renovations,** ensuring stronger incentives for more ambitious energy efficiency improvements. A renovation achieving at least a 60% reduction in primary energy use also qualifies for higher support. This provision will help **direct greater funding toward deeply renovating the worst-performing buildings,** a positive development that aligns with Article 9 requirements.

At the same time, Member States must also provide enhanced support for **large-scale programmes that cover a high number of buildings and achieve an overall primary energy use reduction of at least 30%.** This approach could undermine the "higher impact, higher support" principle, as the 30% energy savings threshold does not align with the deep renovation logic. To address this, the recast EPBD includes a safeguard, ensuring that **Member States prioritise the worst-performing buildings in those large-scale renovation programmes.**

Definition (Article 2§20): deep renovation

A renovation which is in line with the "energy efficiency first" principle, which focuses on essential building elements, and which transforms a building or building unit:

(a) before 1 January 2030, into a nearly zero-energy building

(b) from 1 January 2030, into a zero-emission building.

Definition (Article 2§21): staged deep renovation

A deep renovation carried out in a maximum number of steps, as set out in a renovation passport.

BPIE RECOMMENDATIONS:

- Member States should focus their financial support on whole-of-building renovation projects, rather than designing schemes that focus only on certain building elements.
- When creating subsidy programmes, Member States should aim for continuity, ensuring these programmes are stable, uninterrupted and governed by clear, consistent rules, with a comprehensive framework that includes sufficient advisory support. Maintaining continuity and completeness will help avoid stop-and-go scenarios, improve financial absorption, and build the necessary market confidence for renovation efforts.

- To effectively incentivise (staged) deep renovations with higher support, sufficient information on buildings performance is needed. High-quality EPCs or renovation passports should be required in this process. Some Member States, such as Spain and Romania, have already adopted these requirements. This will both increase the availability of data on buildings and ensure the effectiveness of funding.[200]
- While the EPBD does not include specific requirements on how to use financing for increasing the climate resilience of buildings, it would make sense to use public funds in a cost-effective way, avoiding stranded assets. Member States should use higher support to incentivise deep renovations that simultaneously fulfil EPBD requirements and increase the climate resilience of buildings, in line with the national adaptation strategy.

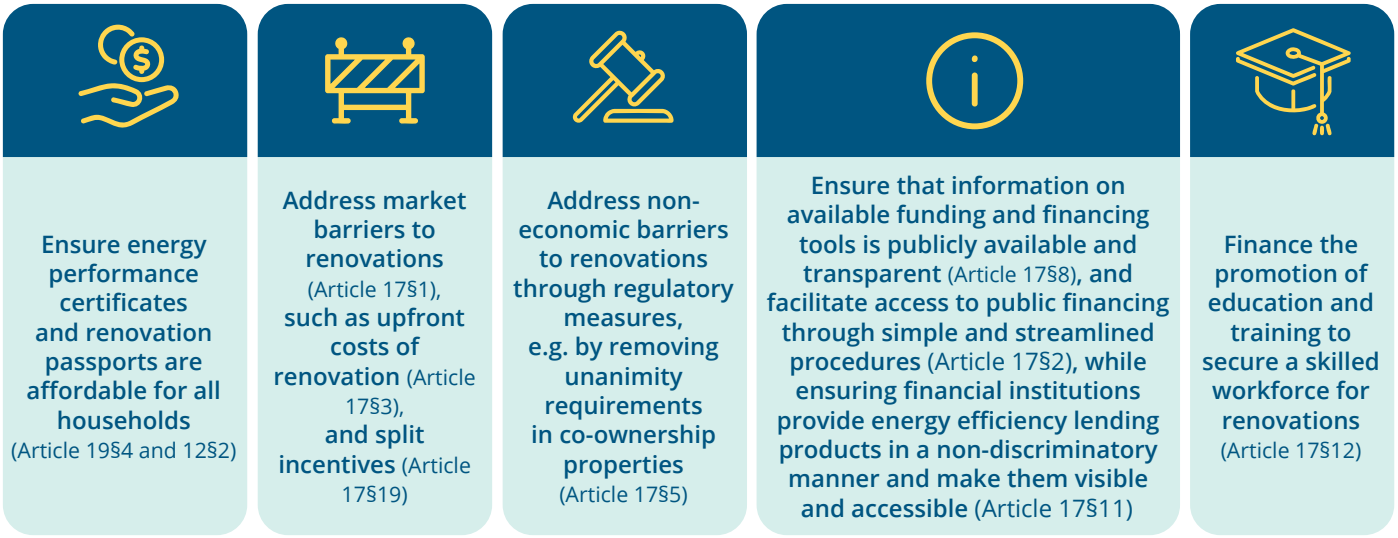
GOOD PRACTICE EXAMPLES:

- Latvian Baltic Energy Efficiency Facility **(Latvia):** LABEEF is a market-funded facility (private fund) designed to support energy service companies in delivering large-scale deep energy efficiency upgrades for multi-apartment buildings, achieving energy savings of over 50% through long-term energy performance contracts. Projects receive up to 40% of their financing from the EU Regional Development Fund, with the remaining costs covered through on-bill financing based on generated energy savings. Energy services companies secure financing agreements with commercial banks to carry out the renovations, with these agreements backed by LABEEF's support measures. In this structure, the energy service companies assume the "execution risk", while LABEEF carries the "financing risk".
- Home Energy Scotland Grant and Loan Scheme **(Scotland):** This scheme offers homeowners grants, interest-free loans or a combination of both to support energy efficiency upgrades and the installation of clean heating systems. Applications must be accompanied by an EPC. Loan repayment terms can extend up to 12 years, depending on the loan amount. In addition to financial support, Home Energy Scotland provides strong advisory services, effective communication and community engagement through dedicated advisors and events, ensuring homeowners receive guidance throughout the process.

[200] iBRoad project (2024), Enhancing incentives through iBRoad2EPC - how to best use financial and non-financial incentives for renovation in implementing markets.

FINANCING TO SUPPORT THE RENOVATION ECOSYSTEM

The third quality principle for an optimal use of funds is to **direct financing to set up and sustain the renovation ecosystem** (rather than using it to only subsidise actual renovation projects), which will help unlock private capital for renovations. In accordance with the EPBD, Member States are required to:



BPIE RECOMMENDATIONS:

- Member States should allocate public funds to develop and support the long-term functioning of advisory tools, such as one-stop shops and renovation passports. The use of public money must be accompanied by strict monitoring and verification rules to ensure the achievement of targeted results, also following the "higher impact, higher support" principle.
- However, Member States should avoid creating dependency on public funding for the renovation ecosystem in the long term. Instead, they should work towards enabling private actors to become self-sufficient by announcing and undertaking a gradual reduction of public subsidies, collaborating with financial institutions to establish pathways ensuring continued support to building renovation and decarbonisation through increased private investment.
- Member States should consistently communicate the benefits of renovations – such as energy bill reductions, positive health impacts, improved well-being and enhanced productivity – to further spur market demand and encourage private investment.
- Financial support for innovation in renovations – such as industrial processes, prefabrication approaches, and digital tools like building information modelling (BIM) – should be integrated into Member States' financing strategies. These technologies have significant potential to enhance energy efficiency, reduce costs, increase economies of scale and accelerate the implementation of renovation projects.[201]

[201] BPIE (2022), Industrial prefabrication solutions for building renovation: innovations and key drivers to accelerate serial renovation solutions in Europe.

FINANCING WITH SOCIAL CONSIDERATIONS

The EPBD places significant emphasis on ensuring equitable access to financing, as well as on putting in place social safeguards:

- *Proactive approach:* Financial incentives should prioritise vulnerable households, individuals affected by energy poverty and those living in social housing – particularly (but not exclusively) when supporting the implementation of renovation requirements outlined in Article 9. Member States should consider providing special financial support for vulnerable households to enable them to access both EPCs and renovation passports (Article 19§4 and Article 12§2). Additionally, national financial support programmes should be accessible to organisations with limited financial, administrative and organisational capacities (Article 17§13).[202]
- *Defensive approach:* Following renovations, Member States must implement safeguards to protect vulnerable households and tenants, including measures to prevent evictions, cap excessive rent increases or provide rent support.

Definition (Article 2§27): energy poverty

As defined in Article 2§52 of the 2023 Energy Efficiency Directive (2023/1791): a household's lack of access to essential energy services, where such services provide basic levels and decent standards of living and health, including adequate heating, hot water, cooling, lighting, and energy to power appliances, in the relevant national context, existing national social policy and other relevant national policies, caused by a combination of factors, including at least non-affordability, insufficient disposable income, high energy expenditure and poor energy efficiency of homes.

Definition (Article 2§28): vulnerable households

Households in energy poverty or households, including lower middle-income households, that are particularly exposed to high energy costs and that lack the means to renovate the building that they occupy.

[202] EPBD Recital 64 acknowledges microenterprises represent an overwhelming 94% of companies active in the building sector, while recognising their difficulties in complying with rules and accessing financial support. It suggests Member States support them with dedicated financial, technical and legal assistance.

BPIE RECOMMENDATIONS:

- Member States should clearly identify who the target audiences are. This can be done either by adopting a clear national definition of energy poverty, in line with the guidance within the EED, or by basing the subsidy level on the income bracket of the recipients as well as the EPC class of the building they occupy.
- Member States should allocate public support giving priority to vulnerable households living in the worst-performing buildings. This can be done either by creating specific funding schemes directed to those target audiences, or by ringfencing parts of existing subsidy programmes or national energy efficiency funds to that effect – avoiding unwanted stigmatisation of this part of the population. Designing a vulnerable group-specific renovation programme can be an effective way to target this audience, but requires clear objectives, more resources and time to manage, and target-group-specific communication approaches.[203]
- Beyond the volume, Member States should design their financial support for vulnerable households to meet their specific needs. For example, even more than for other target groups, the subsidy should be disbursed ahead of the works, or in instalments as renovation work progresses, to compensate for high upfront costs and lack of investment capacity.[204]

GOOD PRACTICE EXAMPLES:

- Clean Air Programme **(Poland):** The programme supports the renovation of single-family houses by improving the building envelope, replacing heating systems and installing solar power.[205] It offers higher financial support for comprehensive thermal modernisation projects that achieve at least 40% energy savings or reach very high energy performance standards. The programme features a tiered support structure with three levels of assistance based on the household income and collaborates with banks to provide loan repayment options. Designed for long-term continuity, it runs from 2018 to 2029 and draws funding from multiple sources, including the Recovery and Resilience Facility, EU Cohesion Funds, the World Bank and other financial instruments.
- MaPrimeRénov' **(France):** MaPrimeRénov' supports households in financing energy renovation projects. Launched in 2020, it consolidated different existing schemes into a single streamlined instrument. The scheme offers different options tailored to household circumstances, considering factors such as ownership type. The level of financial aid is determined by two key criteria: household income (based on family size and income bracket) and the energy savings achieved through renovation (evaluated by improvements to individual building elements or EPC levels before and after renovation). Under MaPrimeRénov', "very-low-income" households can receive up to 90% of the total renovation cost, ensuring that financial support is accessible to those most in need. Unfortunately, recent changes in the national budget have seen a decrease in the financial envelope allocated to MaPrimeRénov'.

[203] BPIE (2024), Wärmewende in Europa: Gute Praxis aus ausgewählten Ländern & Empfehlungen für Deutschland (in German).
[204] European Citizens' Panel on Energy Efficiency (2024), Final Recommendations.
[205] However, it still provides support for fossil and biomass boilers.

GOOD PRACTICE EXAMPLE:

- Better Energy Warmer Homes Scheme **(Ireland):** Established in 2001 and significantly expanded in 2018, the Better Energy Warmer Homes Scheme provides free energy renovations for eligible homeowners. Since 2022, the program has specifically targeted homes with low energy efficiency ratings (E to G) and older buildings constructed before 1993. In 2023, 20% of the homes renovated under the scheme belonged to vulnerable households and benefited from fully funded energy upgrades. The program also incorporates regular monitoring and evaluation to assess impact and improve effectiveness.

FOCUS ON...ETS2 AND THE SOCIAL CLIMATE FUND

The Emissions Trading System 2 (ETS 2) will apply a carbon price to fuels used in buildings and road transport. The first trading of allowances will start in 2027, and it is expected that fossil fuel suppliers will transfer the incurred costs to final energy users. The Social Climate Fund was created in this context as an attempt to partially alleviate the burden on final users and support vulnerable households over the period 2026-2032. Studies show that without ambitious long-term measures, ETS 2 prices could rise to €261 per tonne of CO_2 by 2030, compared to €71 per tonne, if strong renovation policies are implemented.[206] Such a price surge would place immense financial pressure on vulnerable households, increasing reliance on energy subsidies and straining national budgets. An ambitious EPBD implementation and a swift rollout of financial support measures towards the renovation of worst-performing buildings occupied by vulnerable households are essential to mitigate these risks and ensure a just transition. This can be done in two ways.

First, a portion of the Social Climate Fund (SCF), which amounts to €65 billion (€86.7 billion with national contributions), can support improvements in buildings occupied by vulnerable households. This SCF support will be provided through direct income assistance (capped at 37.5% of the fund) and energy efficiency improvements. It is crucial that SCF disbursement for buildings aligns with EPBD objectives, prioritising long-term solutions such as deep renovations of worst-performing buildings occupied by vulnerable households. This coherence can be ensured through the alignment of social climate plans with NBRPs, and by coordination between Commission services (DG EMPL, CLIMA and REFORM manage the SCF, while DG ENER oversees EPBD and NRBPs).[207]

Second, and beyond what Member States allocate in social climate plans, other revenues from ETS 2 – amounting to approximately €173.3 billion,[208] managed directly at national level and which should be dedicated entirely to climate action — should also be directed toward long-term solutions. Prioritising building renovations in the early years of ETS 2 is particularly critical.

[206] Günther et al. (2024), Carbon prices on the rise? Shedding light on the emerging EU ETS2.
[207] See also the Commission Guidance on Social Climate Plans (2025).
[208] Eden et al. (2023), Putting the ETS2 and Social Climate Fund to Work: Impacts, Considerations, and Opportunities for European Member States.

TO GO FURTHER ON FINANCIAL SUPPORT
ADDITIONAL READING

- **BPIE (2020),** Covid-19 recovery: investment opportunities in deep renovation in Europe.
- **BPIE (2022),** Designing Building Decarbonisation Policies for a Socially Just Energy Transition.
- **RenOn Bill project (2022),** European on-bill building renovation roadmap.
- **BPIE (2022),** Industrial prefabrication solutions for building renovation: innovations and key drivers to accelerate serial renovation solutions in Europe.
- **Council of the EU (2022),** Council Recommendation on ensuring a fair transition towards climate neutrality.
- **European Commission (2022),** Staff Working Document: Analysis of the national long-term renovation strategies.
- **Renovate Europe and E3G (2023),** 2021-2027 Cohesion policy support for energy efficiency and building renovation.
- **European Commission (2023),** Recommendation on transposing Article 30 on national energy efficiency funds, financing and technical support of the Energy Efficiency Directive.
- **European Environmental Bureau for Coolproducts (2024),** Retrofitting homes with heat pumps: 12 stories across the EU.
- **iBRoad2EPC project (2024),** Enhancing incentives through iBRoad2EPC - how to best use financial and non-financial incentives for renovation in implementing markets.
- **European Commission (2024),** Notice on phasing out financial incentives for stand-alone boilers powered by fossil fuels under the recast EPBD.
- **BPIE (2024),** Wärmewende in Europa: Gute Praxis aus ausgewählten Ländern & Empfehlungen für Deutschland **(in German).**

BUILDINGS
PERFORMANCE
INSTITUTE EUROPE

Rue de la Science 23
B-1040 Brussels Belgium

Sebastianstraße 21
D-10179 Berlin Germany

www.bpie.eu