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REAL ESTATE ASSOCIATION

A large, modern glass skyscraper with a grid-like facade is the central background image. The building's windows reflect the sky and surrounding environment. The image is framed by a white geometric shape that resembles a stylized 'A' or a large arrow pointing upwards and to the right. The top right corner of the slide is a solid blue color, and the bottom left corner is white.

Early observations on ZEB & EPC implementation under the EPBD 2024 Recast in the EU Member States

7th of July 2025

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LIST OF ABBREVIATIONS

CO₂	Carbon Dioxide
e.g.	For example
EPBD	Energy Performance of Buildings Directive
EPC	Energy Performance Certificate
EPRA	European Public Real Estate Association
EU	European Union
GHG	Greenhouse Gas
HVAC	Heating, Ventilation and Air Conditioning
KPMG	KPMG AG Wirtschaftsprüfungsgesellschaft
kWh	Kilowatt-hour
LRE	Europe's listed real estate
m²	Square meter
MEPS	Minimum Energy Performance Standards
MS	Member States
NBRPs	National Building Renovation Plans
NZEB	nearly zero-energy buildings
PV	Photovoltaic
RES	Renewable Energy Sources
SRI	Smart Readiness Indicator
ZEB	Zero-Emission Building



FOREWORDS

We are pleased to share this early analysis aimed at guiding the market on the current state of implementation of the EU's Energy Performance Certificate (EPC) and Zero Emissions Building (ZEB) requirements under the revised Energy Performance of Buildings Directive, helping stakeholders position themselves accordingly.

This report is the result of a close collaboration between EPRA and KPMG, bringing together insights from across the sector to identify both the practical challenges and opportunities involved in aligning with the new regulatory expectations.

Our aim is to support EPRA members in navigating this transition with greater clarity and consistency. We hope this initial report will serve as a helpful reference point as implementation practices continue to evolve.

Sincere thanks to KPMG and the EPRA Sustainability team for their valuable work in developing this report.

Hassan Sabir
Director of Finance & ESG
EPRA

We are delighted to present this joint white paper on how the 27 EU Member States are transposing the recast Energy Performance of Buildings Directive (EPBD 2024) into national law. The EPBD 2024 touches every stage of the real estate life cycle: from setting the standard for zero emissions in new construction, through the gradual renovation of the existing building stock, to the requirements for data transparency and digitalisation.

This paper helps gauge the progress on two core pillars of the directive: Zero Emissions Building (ZEB) definitions and thresholds, and the Energy Performance Certificate (EPC) reform. Because each country has a degree of discretion in its implementation, pan European property owners are likely to face a varied landscape of timelines and requirements. Our paper therefore suggests how EPRA members can best prepare themselves to futureproof and protect the value of their real estate investments by engaging early on in this pivotal legislation.

Our thanks go to the EPRA team for their open, constructive collaboration and to the many industry experts who shared their insights. We will continue to monitor national debates and technical guidelines to keep our sector ahead of this key policy evolution.

Francesca Galeazzi
Partner, Real Estate Climate & Sustainability
KPMG

1. INTRODUCTION AND OBJECTIVES ►

1.1 Purpose and scope of the white paper

The *Energy Performance of Buildings Directive* (EPBD) has been a cornerstone of the EU's climate and energy policy since its adoption in 2002. Initially aimed at improving building energy efficiency, it has evolved through successive revisions in 2010 and 2018 to align with the EU's long-term ambition of achieving a climate-neutral building stock by 2050.

The 2024 recast accelerates this ambition with more stringent requirements for improving energy performance and phasing out fossil fuel use, with full transposition into national law required by May 2026 (though certain provisions allow for phased adoption by Member States (MS)). While the recast introduces a broad package of measures, including renovation planning, minimum performance standards, and the gradual elimination of fossil fuel heating systems, this white paper focuses exclusively on two elements of highest strategic importance for listed real estate companies:

1. Zero-Emission Buildings (ZEBs): Mandatory for public buildings from 2028 and for all new buildings from 2030. ZEBs must achieve very high energy performance and have no on-site carbon emissions from fossil fuels, marking a critical step toward a decarbonised building stock.

2. The redesigned Energy Performance Certificate (EPC) framework: Requiring MS to adopt a harmonized A-G rating scale by 2026, include new performance indicators (primary energy use and operational GHG emissions), and establish national digital EPC registries to enhance transparency and comparability across the EU.

These two elements are expected to significantly influence EPRA members, Europe's listed real estate (LRE) companies, by shaping:

- Development pipelines and new construction standards,
- Asset valuations and capital allocation,
- Renovation strategies for existing buildings,
- Cross-border investment decisions and portfolio benchmarking, and
- Sustainability and financial disclosures in line with investor expectations.

Other EPBD recast components, while relevant, fall outside the scope of this study and may be addressed in future EPRA research.

Recognising the need for a clear, evidence-based overview, EPRA commissioned KPMG to assess how EU MS are progressing in transposing ZEB and EPC requirements and to provide an independent, fact-based overview of the implementation process. This white paper, which was initiated in January 2025, provides a status update as of 30 June 2025 and offers EPRA members actionable insights to anticipate regulatory changes and adapt their strategies accordingly. Please note that the analysis does not incorporate the latest guidelines published by the European Commission in June 2025.¹ However, a brief section at the end highlights key nuances from these recent publications related to the two topics.

¹ European Commission (2025) Commission sets the EU's building sector on a pathway towards greater energy efficiency and decarbonisation. Brussels: Directorate-General for Energy, European Commission. Published 30 June 2025. Available at: https://energy.ec.europa.eu/news/commission-sets-eus-building-sector-pathway-towards-greater-energy-efficiency-and-decarbonisation-2025-06-30_en

1.2 Methodology

This study combines qualitative and quantitative research to assess MS readiness for implementing ZEB and EPC requirements under the EPBD 2024 recast.



Research approach:

- Reviewed national legislation, regulatory proposals, and EU studies to analyse alignment with the new ZEB and EPC requirements.
- Compared existing Nearly Zero-Energy Building (NZEB) standards and EPC frameworks to the EPBD 2024 recast.
- Applied a point-based scoring system to classify MS into three groups: Front Runners, Transition Movers, and Emerging Implementers.



Stakeholder engagement:

The research was complemented by interviews with key stakeholders, including national Green Building Councils, trade associations, and selected property companies:

- EU level: World Green Building Council
- National level: e.g., DGNB (Germany), FEI (France), Polish Green Building Council, Castellum AB (Sweden), DENEFF (Germany) and other experts (some opting to remain anonymous).
- KPMG's national real estate specialists reviewed the findings to ensure accuracy and consistency.



Data limitations:

- Limited availability of official national documents means NZEB and current EPC standards serve as proxies for readiness.
- Closed-door consultations and unpublished draft legislation were not considered.

Scope clarification:

Focus is strictly on ZEB and EPC; other EPBD measures such as MEPS or renovation passports are excluded.

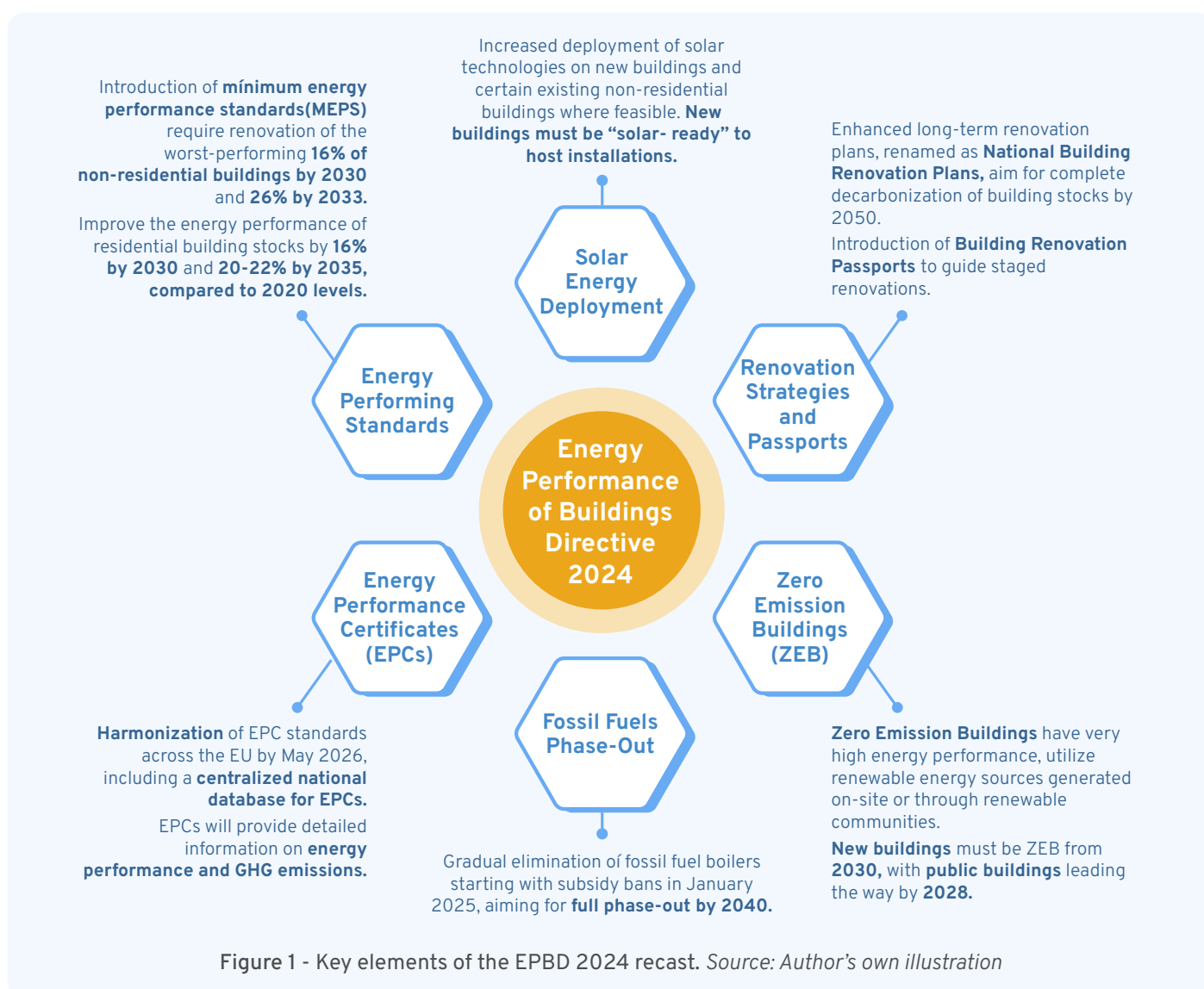
2. KEY CHANGES IN EPBD 2024 RECAST ►

2.1 Overview

The EPBD 2024 recast is a central instrument in the EU's strategy to decarbonise the building stock and harmonise energy performance assessment across EU MS. It introduces a set of interlinked measures to improve energy efficiency, phase out fossil fuel use, and increase renewable energy integration (Figure 1).

Figure 1 summarises the key elements of the recast, including:

- Minimum Energy Performance Standards (MEPS) to accelerate the renovation of the worst-performing buildings,
- Renovation passports and National Building Renovation Plans (NBRPs) to guide deep renovations over time,
- The progressive phase-out of fossil fuel-based heating systems, and
- Updated methodologies for calculating energy performance.



While these measures collectively aim to accelerate the decarbonisation of Europe's building stock, this white paper focuses exclusively on two reforms of highest strategic relevance for listed real estate companies:

1. The Zero-Emission Building (ZEB) standard: raising energy efficiency and emissions requirements for all new buildings (public buildings from 2028; all others from 2030).

2. The redesigned Energy Performance Certificate (EPC) framework: introducing a harmonised rating scale, stricter performance indicators, and national digital registries by 2026.

These changes are expected to have immediate and far-reaching implications for EPRA members, influencing development pipelines, long-term renovation planning, asset valuations, and portfolio benchmarking.

2.2 Focus on ZEB

The EPBD 2024 recast establishes ZEBs as the new construction standard:

- Public buildings must comply from 1 January 2028, and
- All new buildings from 1 January 2030.



Definition and requirements:

- Very high energy performance,
- No on-site carbon emissions from fossil fuels, and
- Residual energy demand covered by on-site or nearby renewable sources, renewable energy communities, or efficient district systems (aligned with the 2023 Energy Efficiency Directive).

ZEBs are also expected to support grid flexibility, contributing to energy system stability through decentralised renewable generation, energy storage, demand response, and smart charging.

Long-term renovation pathway:

The recast outlines a phased decarbonisation pathway for existing buildings. Deep renovations undertaken after 2030 should aim to achieve ZEB-level performance, although MS have flexibility to define intermediate milestones in their National Building Renovation Plans (NBRPs), with indicative targets for 2030, 2040, and 2050.

Performance thresholds:

ZEBs must achieve EPC Class A and comply with primary energy use thresholds at least 10% stricter than current national NZEB standards. Unlike NZEBs, ZEBs also include near-zero operational GHG emissions as a binding requirement.

Implications for Listed Real Estate:

For listed real estate companies, ZEB compliance will directly impact development pipelines, design standards, and construction costs. Over time, alignment with ZEB criteria will also affect asset valuations and investor confidence, making early adaptation critical for maintaining market competitiveness.

2.3 Focus on EPC

The EPBD 2024 recast significantly strengthens the EPC framework to improve comparability, transparency, and reliability across the EU, addressing longstanding inconsistencies in national approaches. Key changes include:

- **Harmonised A-G rating scale:** To be adopted by 29 May 2026.
 - Class A = ZEB-compliant buildings.
 - Class G = the bottom 15% of the national building stock.
 - MS may add an A+ category for buildings significantly outperforming ZEB criteria ($\geq 20\%$ lower energy demand, higher renewable share).
- **Expanded content:** EPCs must include primary energy use ($\text{kWh/m}^2/\text{year}$), operational GHG emissions indicators, and NZEB/ZEB benchmarks.
- **Renovation guidance:** EPCs must list recommended efficiency measures, estimated CO_2 reductions, and cost-effectiveness. Measured operational energy data must be provided where available.
- **Digital EPC registries:** EU MS must create publicly accessible national databases, improving policy monitoring, investor transparency, and progress tracking.

For EPRA members, harmonised EPCs will become a critical tool for portfolio benchmarking, cross-border investment decisions, and ESG reporting. Comparable performance data will increasingly influence asset valuations and capital allocation, while higher EPC ratings are expected to be associated with better access to green financing.



3. STATUS QUO ANALYSIS OF ZEB IMPLEMENTATION ►

3.1 Overview of progress and challenges

The EPBD 2024 recast sets a clear trajectory toward ZEBs across the EU. Each MS is required to transpose the new ZEB definition and associated requirements into national legislation by 29 May 2026. However, as of now, none of the EU-27 countries have fully implemented the ZEB definition into their legal frameworks. MS remain at various stages of preparatory work, such as working groups, stakeholder consultations, and regulatory planning in response to the directive. No formal legislative drafts have been publicly adopted in any MS, although preparatory materials and informal proposals may exist in some jurisdictions. (Status quo of research June 2025).

The absence of national implementation or draft legislation can likely be attributed to several factors. Firstly, MS still have some time until the transposition deadline, and many tend to initiate formal legislative procedures closer to that date. Secondly, the technical and administrative complexity of the ZEB requirements poses a significant challenge. Adapting national frameworks to reflect the ambitious goals of the directive requires careful coordination across multiple sectors, substantial data, and financial planning particularly given the variation in building stock and renovation readiness across the EU. The fixed timeline places significant pressure on national legislative planning, particularly in countries with complex regulatory procedures. In addition, it is possible that MS already have concrete internal plans or strategies for implementing the ZEB

requirements but have chosen not to disclose these publicly at this stage.

Interviews were conducted with a range of EU and national stakeholders (such as green building councils, energy efficiency associations, and property companies) who closely follow and are actively engaged in the national response to the EPBD 2024 recast, and they suggest that creating an appropriate political narrative around the planned changes is crucial. Due to the fact that improvements in building efficiency are associated with significant expenditure and affect the general public, which may involve large-scale criticism of environmental policies in some countries. In certain cases, MS have adopted a measured approach to external communication, focusing on compliance-related disclosures while internal planning processes continue.

Moreover, MS are known to exchange information on the status of implementation and technical challenges both with each other and with the European Commission through closed-door processes. Based on these exchanges, the Commission has published a detailed technical guidance on the 30th of June 2025 to support the implementation of the EPBD 2024 recast. It is therefore likely that MS are awaiting these guidelines before making any public announcements or sharing national-level implementation details for the EPBD 2024 recast.

⁸ EFRAG: ESRS Revision: Progress Report as of 20 June 2025

3.2 Assessment of ZEB criteria

Given the limited accessibility of publicly available and official documentation on national implementation plans on the EPBD 2024 recast for ZEB criteria, it is difficult to evaluate the readiness of MS to implement the ZEB standards. Since detailed national ZEB plans are not yet available, the analysis uses each MS current NZEB standards as a reference point to assess proximity to the new ZEB definition. For this purpose, a point-based evaluation system has been developed. This evaluation is based on criteria drawn from the EPBD 2024 recast ZEB definition and existing NZEB frameworks.

Criteria were weighted based on their significance for aligning NZEB standards with the EPBD 2024 recast ZEB definition, as well as the variability in policy maturity across MS. The following table shows the criteria analysed, which will be explained in detail in the text below.

Ranking – ZEB	
Criterion	Point Distribution
1. ZEB Legal Definition adopted	0 – 1
2. Ban on Fossil Fuels for Space/Water Heating	0 – 2
3. GHG Performance Cap Included in NZEB Requirements	0 – 2
4. Mandatory use of renewable energy in NZEB	0 – 2
5.1 Primary Energy Threshold in NZEB	0 – 1
5.2 NZEB thresholds vs. EU recommended benchmark	0 – 2

Figure 2 - Summary of the categories and scoring system for the ZEB implementation analysis in the EU MS

1. ZEB Legal Definition Adopted

A formal and binding national-level definition of ZEB, aligned with the EPBD 2024 recast framework, has been enacted in legislation or regulation. Points were awarded based on the presence of a formally adopted and binding national-level ZEB definition, in line with the EPBD 2024 recast framework.

Point-Distribution: (0-1)

- 1 Point – ZEB Legal Definition Adopted
- 0 Points – No ZEB Legal Definition Adopted/ No Information available

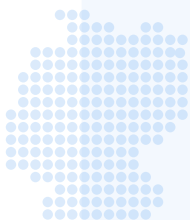
2. Ban on Fossil Fuels for Space/Water Heating

A regulatory ban or phase-out has been introduced on the installation or use of fossil-fuel-based systems such as gas boilers or oil heaters for space heating and/or domestic hot water heating in new or renovated buildings. Points were assigned based on the scope and enforceability of fossil fuel restrictions, with full national bans scoring highest and partial or sector-specific measures receiving intermediate scores.

Point-Distribution: (0-2)

- 2 Points – Full Ban on Fossil Fuels for Space/Water Heating
- 1 Point - Partial Ban (e.g. only restriction for gas boilers) on Fossil Fuels for Space/Water Heating
- 0 Points – No Ban on Fossil Fuels for Space/Water Heating/ No Information available

Examples:



In Germany, from 2024, new heating systems must use at least 65% renewable energy. Since 2020, the installation of mono-use oil boilers has been banned in both new and existing buildings.² (1 point)



In France, oil boilers have been banned in new buildings since 2022. Additionally, gas boilers are no longer allowed in new single-family homes since 2022 and will also be banned in new multi-family houses starting in 2025.³ (1 point)

3. GHG Performance Cap Included in NZEB Requirements

While the EPBD 2024 recast does not yet impose a direct GHG cap for ZEB compliance, this criterion reflects growing national efforts to integrate operational emissions limits in building regulation. National NZEB standards include a cap on the allowable level of operative GHG emissions, typically expressed in CO₂-equivalents, as a mandatory compliance criterion. Scoring was determined by whether operational GHG caps were formally required, optionally applied, or entirely absent from NZEB regulations.

Point-Distribution: (0-2)

- 2 Points – GHG Performance Cap Included in NZEB Requirements
- 1 Point – Optional Inclusion of GHG Performance Cap in NZEB Requirements
- 0 Points – No GHG Performance Cap Included in NZEB Requirements/ No Information available

Examples:



Ireland has introduced NZEB requirements for both residential and non-residential buildings. Residential buildings must achieve 7–8 kg CO₂/m²/year associated with the operational energy use of the building. For non-residential buildings, compliance is met if actual emissions are equal to or less than 1.15 times those of a reference model building.⁴ (2 points)



Denmark has set life-cycle emissions limits for new buildings a few years ago. Nevertheless, from July 2025, all new buildings must meet new CO₂e limits, which are now lowered to an average of 7.1 kg CO₂e/m²/year. These requirements include varied limits for different building types and a focus on the specific emissions from construction phases.⁵ (2 points)

² European Heat Pump Association (2024) Update: Which countries are scrapping fossil fuel heaters?. EHPA. Available at: <https://www.ehpa.org/news-and-resources/news/update-which-countries-are-scrapping-fossil-fuel-heaters/>

³ European Heat Pump Association (2024) Update: Which countries are scrapping fossil fuel heaters?. EHPA. Available at: <https://www.ehpa.org/news-and-resources/news/update-which-countries-are-scrapping-fossil-fuel-heaters/>

⁴ Ruiz, N., D'Agostino, D., Bertoldi, P., Economidou, M. and Zangheri, P. (2024) Impact assessment of minimum energy performance standards for buildings in the EU. EUR 31821 EN. Luxembourg: Publications Office of the European Union. Available at: <https://publications.jrc.ec.europa.eu/repository/handle/JRC138771>, page 74-75.

⁵ Ruiz, N., D'Agostino, D., Bertoldi, P., Economidou, M. and Zangheri, P. (2024) Impact assessment of minimum energy performance standards for buildings in the EU. EUR 31821 EN. Luxembourg: Publications Office of the European Union. Available at: <https://publications.jrc.ec.europa.eu/repository/handle/JRC138771>, page 74-75.

4. Mandatory Use of Renewable Energy in NZEB

NZEB regulations mandate a minimum share of renewable energy generated on-site or nearby, such as solar, geothermal or biomass to supply part of the building's energy needs. While Article 11 and Annex III of the EPBD 2024 recast (defining ZEB) encourage the use of renewable sources to cover the residual energy demand, they do not prescribe a uniform minimum percentage at EU level, leaving this determination to the MS. Nevertheless, the extent to which current NZEB requirements already mandate the use of renewables remains an important indicator for assessing MS progress towards the long-term decarbonisation goals.

Scores reflect whether renewable energy use is a binding legal requirement within NZEB frameworks; MS mandating a specific minimum share received full points. The full 2 points were assigned to this criterion, as the mandatory integration of renewable energy is considered a key element on the pathway towards achieving the ZEB standard for new buildings.

Point-Distribution: (0-2)

- 2 Points – Mandatory Use of Renewable Energy in NZEB
- 0 Points – No Mandatory Use of Renewable Energy in NZEB/ No Information available

Examples:



The Netherlands continues to apply NZEB standards that impose strict limits on energy demand ($\leq 25/50$ kWh/m²/year) and fossil primary energy use ($\leq 25/50$ kWh/m²/year), while requiring at least 50% of the energy to come from on-site renewable sources.⁶ (2 points)



In Austria, new buildings must generate at least 20% of their energy demand from on-site PV energy in accordance with their actual NZEB standard.⁷ (2 points)

5. Primary Energy Threshold in NZEB

The NZEB standard sets a maximum allowable level of primary energy demand, usually expressed in kWh/m²/year, to ensure that the building's total primary energy demand, whether covered by renewable or non-renewable sources, remains low. However, NZEB thresholds vary significantly across MS in terms of ambition level - while some MS require buildings to be highly energy-efficient to qualify as NZEB, others are more lenient in their requirements. This variation is influenced by several factors, including climate conditions, national energy mix, characteristics of the existing building stock and the general level of ambition of the respective MS.

To obtain some indication on possible ZEB definitions and thresholds, we considered in addition the study "Assessing the progress of NZEBs implementation in Europe", commissioned by the European Commission.⁸ The report compares the national NZEB performance levels with the recommended benchmarks. If a country's current NZEB threshold is already below the recommended benchmark level, this was evaluated positively and taken into account in the assessment of that MS. The "recommended benchmark" is derived using a harmonised methodology that allows for meaningful comparison across EU MS. Specifically, the European Commission defines indicative ZEB thresholds by reducing each country's current national NZEB level for total primary energy demand by 10%.

⁶ Ruiz, N., D'Agostino, D., Bertoldi, P., Economidou, M. and Zangheri, P. (2024) Impact assessment of minimum energy performance standards for buildings in the EU. EUR 31821 EN. Luxembourg: Publications Office of the European Union. Available at: <https://publications.jrc.ec.europa.eu/repository/handle/JRC138771>, page 10-16.

⁷ Ruiz, N., D'Agostino, D., Bertoldi, P., Economidou, M. and Zangheri, P. (2024) Impact assessment of minimum energy performance standards for buildings in the EU. EUR 31821 EN. Luxembourg: Publications Office of the European Union. Available at: <https://publications.jrc.ec.europa.eu/repository/handle/JRC138771>, page 10-16.

⁸ Ruiz, N., D'Agostino, D., Bertoldi, P., Economidou, M. and Zangheri, P. (2024) Impact assessment of minimum energy performance standards for buildings in the EU. EUR 31821 EN. Luxembourg: Publications Office of the European Union. Available at: <https://publications.jrc.ec.europa.eu/repository/handle/JRC138771>

The indicative ZEB thresholds proposed in the study, broken down by MS and differentiated between residential and non-residential buildings, are as follows:

Residential buildings (single family houses)

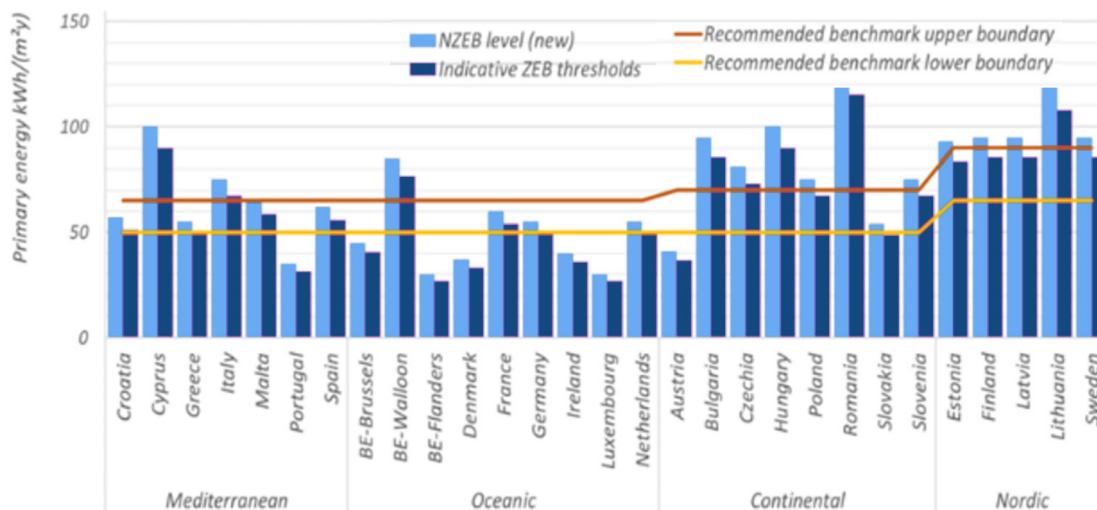


Figure 3 - Initial Indication of ZEB thresholds for residential buildings (single family houses)

Source: Ruiz, N., D'Agostino, D., Bertoldi, P., Economidou, M. and Zangheri, P. (2024) Impact assessment of MEPS for buildings in the EU. EUR 31821 EN. Luxembourg: Publications Office of the European Union. Available at: <https://publications.jrc.ec.europa.eu/repository/handle/JRC138771>, page 72.

Non-residential buildings (offices)

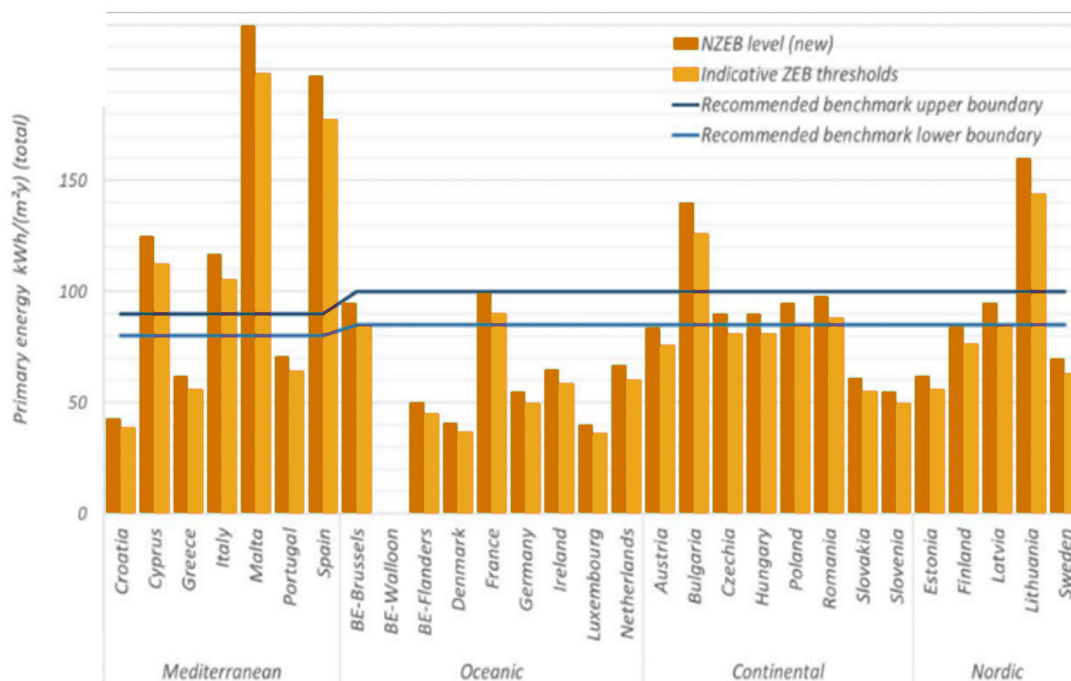


Figure 4 - Initial Indication of ZEB thresholds for non-residential buildings (offices)

Source: Ruiz, N., D'Agostino, D., Bertoldi, P., Economidou, M. and Zangheri, P. (2024) Impact assessment of MEPS for buildings in the EU. EUR 31821 EN. Luxembourg: Publications Office of the European Union. Available at: <https://publications.jrc.ec.europa.eu/repository/handle/JRC138771>, page 73.

These visual representations show the national NZEB thresholds alongside the EU-recommended levels, illustrating the performance gap (or lead) for each MS. *(For more detailed information, please refer directly to the EU study.)*

Points were allocated based on whether a total Primary Energy Threshold is defined in the national NZEB regulation, and how this threshold compares to the EU-recommended ZEB benchmark levels. This criterion received up to 3 points in total, reflecting both regulatory presence and ambition. The dual scoring approach acknowledges the importance of not only having such a threshold in place, but also ensuring it is stringent enough to support the long-term climate goals outlined in the EPBD 2024 recast.

Point-Distribution: (0-3)

- 1 Points – Primary Energy Threshold in NZEB
- 0 Points – No Primary Energy Threshold in NZEB (e.g. only non-renewable primary energy demand) / No Information available

Additional points for the national NZEB performance according to the EU study:

- 2 Points – National NZEB performance is below the EU recommended benchmark
- 1 Point – National NZEB performance is in line with the EU benchmark
- 0 Points – National NZEB performance is above the EU benchmark

Examples:



Both Luxembourg and Ireland have achieved very good NZEB levels of the total primary energy demand for both residential and office buildings, falling below the lower boundary of the recommended benchmark range, which is lower than 50 kWh/m²/year for residential and lower than 80 kWh/m²/year for office buildings.⁹ *(each 3 points in total)*



Italy uses only non-renewable primary energy indicators.¹⁰ For both residential and office buildings, the calculated total primary energy demand exceeds the upper limit of the recommended benchmark range.¹¹ *(0 points in total)*



⁹ Ruiz, N., D'Agostino, D., Bertoldi, P., Economidou, M. and Zangheri, P. (2024) Impact assessment of minimum energy performance standards for buildings in the EU. EUR 31821 EN. Luxembourg: Publications Office of the European Union. Available at: <https://publications.jrc.ec.europa.eu/repository/handle/JRC138771>, page 72-73.

¹⁰ Sesana, M.M., Salvalai, G., Della Valle, N., Melica, G. & Bertoldi, P., (2024) Towards harmonising energy performance certificate indicators in Europe. Journal of Building Engineering, 95, 110323. Available at: <https://doi.org/10.1016/j.jobbe.2024.110323>, Appendix A.

¹¹ Ruiz, N., D'Agostino, D., Bertoldi, P., Economidou, M. and Zangheri, P. (2024) Impact assessment of minimum energy performance standards for buildings in the EU. EUR 31821 EN. Luxembourg: Publications Office of the European Union. Available at: <https://publications.jrc.ec.europa.eu/repository/handle/JRC138771>, page 72-73.

3.3 Classification of MS for ZEB readiness

All MS were subsequently analysed against the above criteria and points awarded accordingly. Based on this analysis, the countries were divided into three groups, as outlined in chapter 1.3:

Front Runners (7–10 Points):

MS with advanced NZEB frameworks. While official ZEB definitions are not yet in place, these MS are moving in the right direction and already meet some of the criteria set out in the EPBD 2024 recast through the current NZEB standards. Their established calculation methods and political commitment to phasing out fossil fuels in buildings support a gradual transition towards the future ZEB standard.

Transition Movers (3–6 Points):

MS with moderately developed NZEB frameworks that require some updates to comply with the EPBD 2024 recast standards. These countries may lack key elements such as GHG emission limits or stricter energy thresholds, depending on the national context. A formal ZEB standard has not yet been defined.

Emerging Implementers (0–2 Points):

MS with no official ZEB definition, with comparatively very high energy threshold values for NZEB, no bans for fossil fuel on site, no GHG emission limits in NZEB for energy consumption and no mandatory use of renewable energy in NZEB. While some countries meet one or two of the listed criteria, most requirements are not fulfilled, leading to a low overall ranking score.

Based on this evaluation, the map below illustrates the classification of each MS within the three categories. **A detailed breakdown of the scoring per country is provided in the annex.** As described, the assessment is based on the criteria outlined in chapter 3.2, the current legal framework, and publicly available information. Preparatory work by MS to implement the ZEB standard into national law that is being carried out behind closed doors or has not yet been published has not been taken into account.

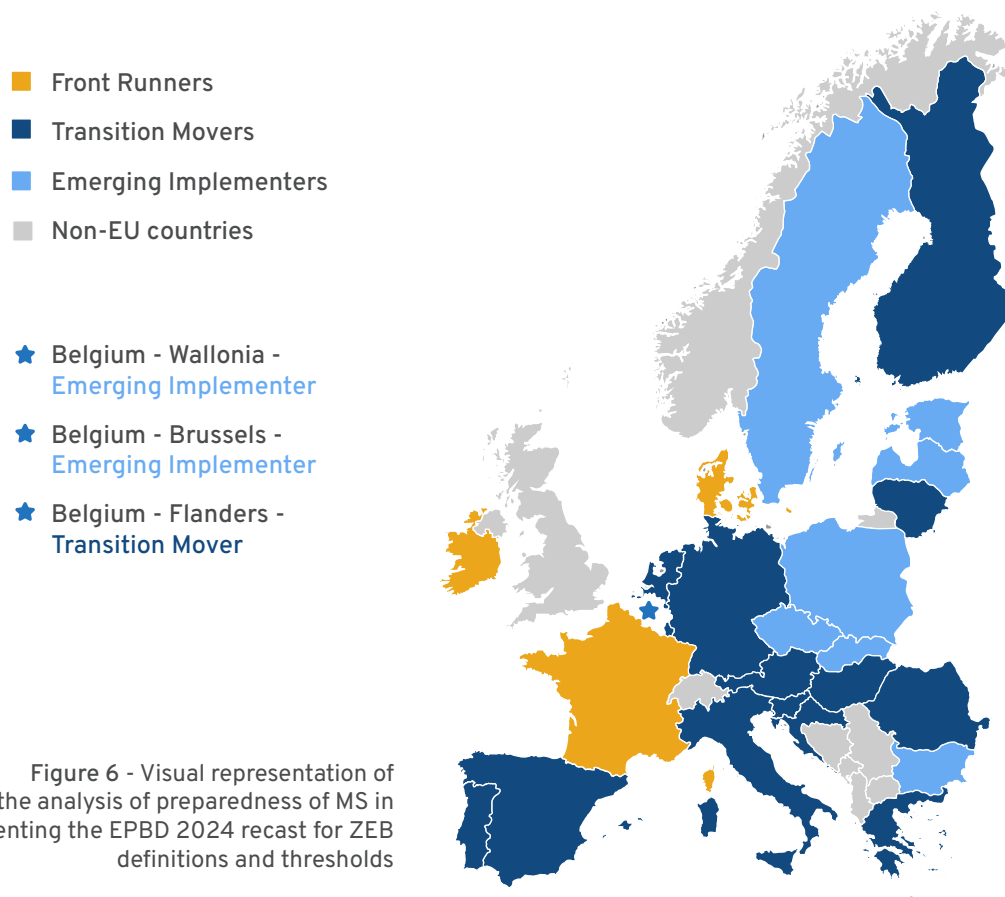


Figure 6 - Visual representation of the analysis of preparedness of MS in implementing the EPBD 2024 recast for ZEB definitions and thresholds

3.4 Key Takeaways

The analysis of national frameworks as of 30 June 2025 highlights significant variation in how EU MS are progressing towards ZEB implementation under the EPBD 2024 recast:

Implementation status:

- **No full compliance yet:** No MS has fully implemented the ZEB requirements or adopted a complete and aligned legal ZEB definition.
- **Front-runners (Ireland, France, Denmark):** These countries have already integrated elements of the ZEB framework into their existing NZEB standards (e.g., stricter energy limits, partial fossil fuel restrictions), enabling a smoother transition once national ZEB definitions are finalised.
- **Transition phase (majority of MS):** Most MS have partially implemented key elements, such as mandatory renewable energy integration for new buildings, but lack explicit GHG thresholds, comprehensive fossil fuel bans, and consistent primary energy limits.
- **Emerging implementers (~1/3 of MS):** Many still lack core components such as legal ZEB definitions, GHG performance limits, or mandatory renewable energy use. Preparatory initiatives (working groups, public consultations) are underway but were not considered in this assessment, which focuses only on legally binding frameworks.

Regulatory gaps:

- **GHG thresholds:** Few MS have introduced explicit operational GHG emission limits in their NZEB standards.
- **Fossil fuels:** On-site fossil fuel bans remain limited and will need to expand significantly to meet ZEB criteria.
- **Primary energy limits:** All MS have primary energy standards, but their strictness varies widely, reflecting different climates, building types, and national policies.

Methodology and regional variation

- The EPBD requires MS to lower national primary energy demand thresholds by at least 10% compared to current NZEB levels, but does not mandate a harmonised EU-wide methodology. As a result, national thresholds will continue to differ significantly, driven by climate, building types, and existing national policies.
- Even after the required 10% reduction, some MS are expected to remain above the Commission's indicative climate-zone benchmarks. Most MS are nevertheless expected to adopt the EU ZEB definition with only minor national adjustments.

Outlook

- Legislative and technical standards remain under development in many countries. Progress is expected to accelerate in late 2025 and 2026, supported by public consultations and national working groups.
- Substantial alignment across MS is unlikely before the May 2026 transposition deadline, but early adopters may influence best practices and market expectations.

Implications for Listed Real Estate companies:

For EPRA members, ZEB implementation progress has direct strategic consequences:

- **Country-specific compliance planning:** Fragmentation across MS requires tailored strategies for meeting ZEB thresholds, especially for cross-border portfolios.
- **Capital expenditure priorities:** Front-Runner markets will enforce ZEB criteria sooner, requiring earlier investment in ZEB-compliant developments.
- **Valuation and market positioning:** ZEB-aligned assets are expected to become more attractive to investors and lenders, creating a premium for early movers.
- **Monitoring national progress:** Active tracking of legislative timelines is critical to anticipate regulatory tightening and manage future compliance risks.

STATUS QUO ANALYSIS OF KEY CHANGES TO EPCS ►

3.1 Overview of progress and challenges

The EPBD 2024 recast introduces a harmonised framework for EPCs across all EU MS, including a common A-G rating scale, standardised formats, and comparable performance indicators. These measures aim to enhance transparency, comparability, and integration within the EU property market.

However, as of June 2025, no MS has fully implemented the revised EPC requirements into national legislation. Most are still in the preparatory phase, working through consultations, technical assessments, and legal planning. While some elements, such as updates to rating scales or initial adjustments to data collection, have been introduced in some countries, a complete and coordinated transposition is still pending across the EU.

3.2 Assessment of EPC criteria

Due to the continued lack of official documentation on national implementation plans, the approach has also focused on analysing current legislation as opposed to the planned changes as a means to assess the readiness of MS for the harmonisation of their EPC system. This approach is similar to that outlined in the previous chapter for ZEB standards.

Criteria were weighted based on their relevance for aligning EPC systems with the EPBD 2024 recast requirements and to reflect differences in regulatory ambition and implementation maturity across MS. The following table shows the criteria analysed, which will be explained in detail in the text below.

Ranking – EPC	
Criterion	Point Distribution
1. Current EPC Rating Scale	0 – 1
2. Energy efficiency class expressed in Total Primary Energy Use (kWh/m ² /year)	0 – 1
3. GHG (CO ₂) emissions indicator included in the EPC	0 – 2
4. Digital EPC Registry Publicly Accessible	0 – 2
5. Retrofit Roadmap Included in EPC	0 – 3
6. Measured Data Included in EPCs	0 – 2

Figure 7 - Summary of the categories and scoring system for the EPC implementation analysis in the EU MS

1. Current EPC Rating Scale

The national EPC system already uses a scale that goes from A-G (from most efficient to least efficient). This criterion is used to evaluate the alignment of a MS with the planned EPBD 2024 recast requirements.

Points were awarded based on whether a standardised A-G scale is currently applied in the national EPC system. This criterion received up to 1 point, acknowledging alignment with the harmonised scale introduced under the EPBD 2024 recast.

Point-Distribution: (0-1)

- 1 Point – EPC Rating does follow a standard A-G scale
- 0 Points – EPC Rating does not follow a standard A-G Scale/ No Information is available

Examples:



Several countries like Czech Republic, Spain and Sweden have already introduced the A-G energy performance scale.¹² (1 point)



On the contrary, the Netherlands instead uses a scale ranging from A+++++ to G, whilst Germany does not have a classification scale for non-residential buildings at all.¹³ (0 points)

¹² Sesana, M.M., Salvalai, G., Della Valle, N., Melica, G. & Bertoldi, P., (2024) Towards harmonising energy performance certificate indicators in Europe. *Journal of Building Engineering*, 95, 110323. Available at: <https://doi.org/10.1016/j.jobbe.2024.110323>, Appendix A.

¹³ Sesana, M.M., Salvalai, G., Della Valle, N., Melica, G. & Bertoldi, P., (2024) Towards harmonising energy performance certificate indicators in Europe. *Journal of Building Engineering*, 95, 110323. Available at: <https://doi.org/10.1016/j.jobbe.2024.110323>, Appendix A.

2. Energy efficiency class expressed in Total Primary Energy Use (kWh/m²/year)

The EPC expresses the energy efficiency class with a clear, numeric value of Total Primary Energy Use (consumption or demand) per square meter per year, typically presented in kilowatt-hours (kWh/m²/year). This criterion is a core legal requirement under Article 19 of the EPBD 2024 recast, making it a key indicator of implementation progress.

Scoring was based on whether the national EPC expresses energy performance as a numeric Total Primary Energy Use in kWh/m²/year. This criterion awarded 1 point, highlighting compliance with EPBD 2024 recast Article.

Point-Distribution: (0-1)

- *1 Point – The energy efficiency class on the EPC expresses the energy performance of an asset with a clear and numeric value of the Total Primary Energy Use (consumption or demand in kWh/m²/year)*
- *0 Points – The energy class is not based on Total Primary Energy Use (consumption or demand in kWh/m²/year) / No information is available*

Examples:



Austria and Luxembourg both display the Total Primary Energy Demand in their EPCs. Austria further distinguishes between the renewable and non-renewable shares.¹⁴ (1 point)



In contrast, Poland bases the energy efficiency class in its EPC not on total primary energy demand, but solely on the non-renewable portion of primary energy.¹⁵ (0 points)

3. GHG (CO₂) emissions indicator included in the EPC

EPCs are required to display a numeric GHG (CO₂) emissions indicator, reflecting the building's climate impact and supporting decarbonisation goals. Some MS already go a step further by including a separate rating or class for CO₂ emissions (e.g. in kg CO₂/m²/year) alongside the energy efficiency class on their EPC.

Points were assigned depending on whether the EPC includes a GHG emissions indicator and if a dedicated emission class is provided. This criterion awarded up to 2 points, reflecting both the presence and the visibility of GHG performance in the EPC framework.

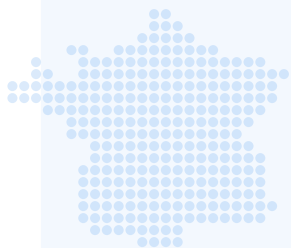
Point-Distribution: (0-2)

- *2 Points – GHG (CO₂) emissions indicator included in EPC as well as the implementation of a dedicated emission class*
- *1 Point – GHG (CO₂) emissions indicator included in EPC without the implementation of a dedicated emission class*
- *0 Points – No GHG (CO₂) emissions indicator included in EPC/ No Information available*

¹⁴ Sesana, M.M., Salvalai, G., Della Valle, N., Melica, G. & Bertoldi, P., (2024) Towards harmonising energy performance certificate indicators in Europe. *Journal of Building Engineering*, 95, 110323. Available at: <https://doi.org/10.1016/j.jobbe.2024.110323>, Appendix A.

¹⁵ Sesana, M.M., Salvalai, G., Della Valle, N., Melica, G. & Bertoldi, P., (2024) Towards harmonising energy performance certificate indicators in Europe. *Journal of Building Engineering*, 95, 110323. Available at: <https://doi.org/10.1016/j.jobbe.2024.110323>, Appendix A.

Examples:



France has implemented a GHG (CO₂) emissions indicator in its EPCs and additionally includes a dedicated CO₂ emissions scale to classify buildings.¹⁶ (2 points)



The Netherlands presents CO₂ values in its EPCs for information purposes only, without using them as a basis for classification.¹⁷ (1 point)

4. Digital EPC Registry Publicly Accessible

A national, digital database of EPCs should be available to the public and kept up to date, enabling transparency and data sharing for policymaking and market participants. The ranking evaluates whether such a digital EPC database exists and if it is publicly accessible, but excludes the quality of the database from the assessment due to the lack of transparency on this aspect across all MS.

Points were awarded based on the existence and public accessibility of a national digital EPC registry. A maximum of 2 points was given to reflect both the establishment of the system and its openness for stakeholders and citizens.

Point-Distribution: (0-2)

- 2 Points – Digital EPC Registry is publicly accessible
- 1 Point – Digital EPC Registry is implemented, but not publicly accessible
- 0 Points – Digital EPC Registry is not implemented/ No information available

Examples:



In Denmark all EPCs are available in a central database that is publicly accessible online.¹⁶ (2 points)



The French database offers no full public access; limited access is granted to certified professionals and public bodies. The general public can only search for specific certificates using a reference number or access EPC-related statistics.¹⁷ (1 points)

5. Retrofit Roadmap Included in EPC

EPCs provide a staged renovation plan with estimated costs and associated energy and CO₂ savings, guiding building owners toward cost-effective energy and low/zero-carbon emission buildings.

Points were distributed based on the level of detail and ambition in the retrofit roadmap included in the EPC. Up to 3 points were awarded, recognising both the presence of a roadmap and the extent to which it includes measures, costs, and GHG savings.

¹⁶ QualDeEPC Consortium (2020) D2.1: Overview of existing EPC schemes. QualDeEPC Project. Available at: https://qualdeepc.eu/wp-content/uploads/2020/04/QualDeEPC_D2.1_Final_V2.pdf, page 91.

¹⁷ QualDeEPC Consortium (2020) D2.1: Overview of existing EPC schemes. QualDeEPC Project. Available at: https://qualdeepc.eu/wp-content/uploads/2020/04/QualDeEPC_D2.1_Final_V2.pdf, page 91.

Point-Distribution: (0-3)

- 3 Points – The retrofit roadmap includes measures and possible costs to improve the energy performance as well as the CO₂ emissions of the building
- 2 Points – The list of recommendations includes measures and possible costs to improve the energy performance of the building
- 1 Point – There is a retrofit roadmap, which includes measures to improve the energy performance of the building
- 0 Points – There is no retrofit roadmap on the EPCs/ No information available

Examples:



Denmark's EPCs include recommendations, potential CO₂ emission and cost savings, as well as a list of short-term and long-term energy-saving measures that are considered profitable to implement.¹⁸ (3 points)



In Germany, EPCs may include optional information on payback time or cost per saved kWh. These values are based on investment costs, expected energy savings, system lifetime and energy prices.¹⁹ (2 points)



6. Measured Data Included in EPCs

EPBD 2024 recast Article 19 requires the inclusion of measured operational energy data *where available*, aiming to promote a more performance-based approach to building certification.

Measured data is therefore not mandatory in all cases—calculated-only EPCs remain legally compliant when no reliable measured data is available.

Points were awarded based on whether and how MS integrate measured consumption data in their EPC systems, acknowledging the degree to which performance-based certification is already supported. This criterion received up to 2 points to reflect alignment with the directive's intent to improve the real-world accuracy of EPCs.

Point-Distribution: (0-2)

- 2 Points – EPCs are based on measured consumption data in combination with calculated data
- 1 Point – EPCs can be based on measured or calculated data
- 0 Points – EPC is solely based on calculated data / No information available

¹⁸ QualDeEPC Consortium (2020) D2.1: Overview of existing EPC schemes. QualDeEPC Project. Available at: https://qualdeepc.eu/wp-content/uploads/2020/04/QualDeEPC_D2.1_Final_V2.pdf, page 44-45.

¹⁹ QualDeEPC Consortium (2020) D2.1: Overview of existing EPC schemes. QualDeEPC Project. Available at: https://qualdeepc.eu/wp-content/uploads/2020/04/QualDeEPC_D2.1_Final_V2.pdf, page 44-45.

Examples:

Germany distinguishes between demand- and consumption-based certificates.²⁰ (1 point)

In Sweden EPCs are based on actual measured energy consumption in combination with calculated data.²¹ (2 points)

4.3 Classification of MS for EPC readiness

Building on the methodology outlined for ZEB in chapter 3.3, the evaluation of the criteria for EPC readiness was conducted using the following scoring framework:

Front Runners (8–11 Points):

These MS are well on track with the alignment of their EPC systems with the requirements of the EPBD 2024 recast. Harmonisation is either already achieved or can be accomplished with minimal additional effort.

Transition Movers (4–7 Points):

These MS operate functioning EPC systems; however, they show deviations from the EPBD 2024 recast requirements in aspects such as scale (e.g. A++ to G), content (e.g. GHG (CO₂) emissions indicator) or database specifications. Achieving harmonisation will require legal amendments, updated data standards and database improvements.

Emerging Implementers (0–3 Points):

These MS encounter structural challenges in their EPC systems, including outdated methodologies, low data quality or weak enforcement mechanisms. Full alignment with the EPBD 2024 recast will require significant updates to legal, technical, and procedural aspects of EPC systems.

Based on this evaluation, the map below illustrates the classification of each MS within the three categories. **A detailed scoring breakdown per MS is provided in the annex.** As described, the assessment is based on the criteria outlined above, the current legal framework, and publicly available information. For this assessment it was not possible to take into account any preparatory work by MS to implement the EPC requirements into national law that is being carried out behind closed doors or has not yet been published.



²⁰ Stromback, J., Hobson, D., Streng, E., Serrenho, T. & Bertoldi, P. (2021) Advanced quality and use of energy performance certificates (EPCs) by investors and financial institutions. EUR 30886 EN. Luxembourg: Publications Office of the European Union. doi:10.2760/151167, p. 3.

²¹ Stromback, J., Hobson, D., Streng, E., Serrenho, T. & Bertoldi, P. (2021) Advanced quality and use of energy performance certificates (EPCs) by investors and financial institutions. EUR 30886 EN. Luxembourg: Publications Office of the European Union. doi:10.2760/151167, p. 3.

- Front Runners
- Transition Movers
- Emerging Implementers
- Non-EU countries

- ★ Belgium - Wallonia - Transition Mover
- ★ Belgium - Brussels - Transition Mover
- ★ Belgium - Flanders - Transition Mover

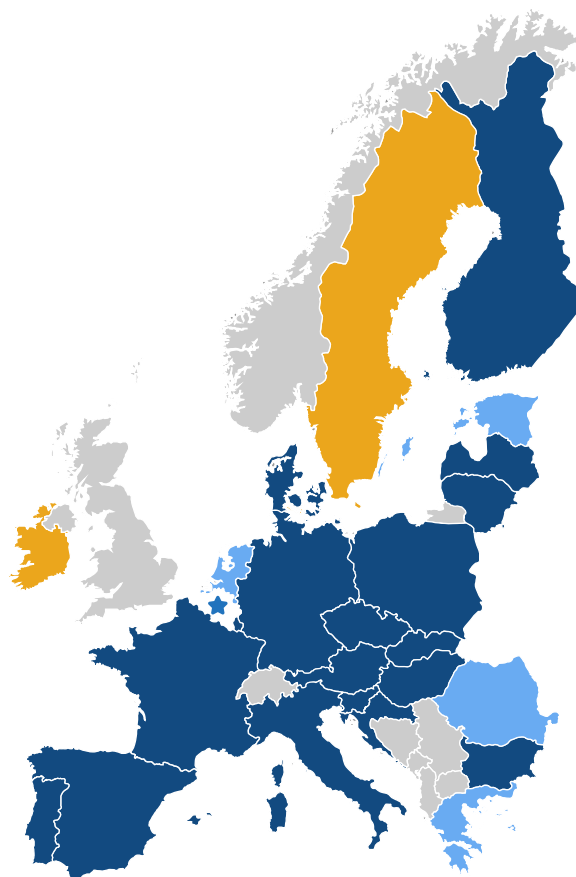


Figure 8 - Visualisation of the analysis of preparedness of MS in implementing the EPBD 2024 recast for EPCs

4.4 Key Takeaways

The analysis of national EPC frameworks as of 30 June 2025 shows steady progress compared to ZEB implementation, but significant gaps remain in achieving full compliance with the EPBD 2024 recast:

Implementation status:

- **No full harmonisation yet:** Several Member States (MS) have not yet adopted the harmonised A–G rating scale, though legislative reforms are underway in most jurisdictions.
- **Front-runners (Ireland, Sweden):** These MS already have advanced EPC systems requiring only minor adjustments to align fully with the updated Directive.
- **Transition phase (majority of MS):** Most MS are in transition, with overall compliance gaps less significant than for ZEBs, but key elements are still missing.
- **Emerging implementers (few MS):** Only a small group of MS falls behind significantly, mainly due to EPC systems lacking:
 - The standard A–G rating scale,
 - Total primary energy use as a core indicator, and
 - Integration of **measured (operational) energy consumption data**.

Regulatory gaps:

- **Indicators:** Consistent use of **Total Primary Energy Use (kWh/m²/year)** as the primary efficiency indicator is still absent in many national frameworks.
- **Digital databases:** About **50% of MS** lack comprehensive, publicly accessible EPC databases. Where databases exist, access is often limited to public authorities or certified auditors.

- **Retrofit roadmaps:** Many EPCs only provide **basic recommended measures** for improving energy efficiency. Comprehensive **retrofit roadmaps** with performance, CO₂ savings, and cost estimates remain rare, despite Annex V encouraging more detailed guidance.
- **Operational data:** The inclusion of **measured (operational) energy data** is not yet standard practice, limiting EPC reliability and investor trust.

Outlook

- Full alignment with EPBD 2024 recast requirements will require **legislative updates and robust digital infrastructure development**.
- Many MS have already initiated **technical and legislative preparations** to meet the May **2026 transposition deadline**, and harmonisation is expected to advance steadily over the next 12 months.

Implications for Listed Real Estate companies:

For **EPRA members**, these EPC implementation trends have important strategic consequences:

- **Data-driven portfolio management:** Harmonised EPCs and digital registries will significantly improve **cross-border portfolio benchmarking and ESG reporting** once fully implemented.
- **Investment and valuation:** Buildings with **Class A (ZEB-level)** ratings or strong EPC performance are expected to gain **valuation premiums** and better access to **green financing**.
- **Due diligence & acquisition:** Limited availability of public EPC data in some MS complicates **investment risk assessments**, underlining the need for **country-specific due diligence** until full database access is secured.
- **Future-proofing assets:** Early upgrades to meet stricter EPC requirements can position portfolios advantageously as investor scrutiny on energy performance increases.



5. CONCLUSIONS AND RECOMMENDATIONS ►

5.1 Conclusions

The EPBD 2024 recast represents a significant step toward decarbonising Europe's building stock and improving energy performance transparency. As of 30 June 2025, no MS has fully transposed ZEB or EPC provisions into national law, but progress is evident, particularly on EPC reforms.

ZEB implementation remains at an early stage, with most MS relying on existing NZEB frameworks as a foundation. A few front-runners, notably Ireland, France, and Denmark, have already integrated stricter energy thresholds and partial fossil fuel restrictions, positioning them for a smoother transition.

EPC reform is further advanced, with several Member States already operating systems close to the harmonised requirements. However, gaps remain in digital registries, operational data integration, and detailed retrofit guidance.

For listed real estate companies, these reforms will increasingly influence asset valuation, investment decisions, and compliance strategies, particularly in markets moving faster toward regulatory enforcement.

5.2 Recommendations

To prepare effectively for the upcoming regulatory changes, EPRA members should:

- 1. Monitor national legislative timelines:** Track developments closely in key markets, especially those nearing transposition, to anticipate regulatory changes and avoid compliance delays.
- 2. Prioritise early compliance in Front-Runner markets:** Focus investment and development strategies on countries likely to enforce ZEB and EPC standards sooner, reducing future adaptation costs.
- 3. Integrate ZEB and EPC requirements into development and renovation Planning:** Align new construction and major renovations with anticipated ZEB performance levels and EPC indicators to ensure future-proof assets.
- 4. Enhance data collection and portfolio benchmarking:** Structure internal energy and emissions data in line with EPC requirements, preparing for integration with digital EPC registries once available.
- 5. Engage with policymakers and industry groups:** Participate in consultations and working groups to stay informed about national interpretations of the EPBD recast and to advocate for consistent implementation.
- 6. Leverage early compliance as a competitive advantage:** Position high-performing assets as ESG leaders to attract investors and secure green financing as regulatory scrutiny and investor expectations intensify.



5.3 Transformation Outlook

The transition to ZEB standards and harmonised EPC systems will remain uneven across the EU. Progress is expected to accelerate in late 2025 and 2026 as legislative transposition deadlines approach. Early movers, both EU MS and real estate companies, will likely set market benchmarks and benefit from improved access to capital and stronger investor confidence.

5.4 European Commission's implementation support package (30 June 2025): Operational guidance on EPCs and ZEBs

On 30 June 2025, the European Commission released an implementation support package to guide MS in transposing the EPBD 2024 recast into national law by 29 May 2026. This new guidance replaces the 2019 version and aligns with the European Green Deal. As this development was published while the present report was being finalised, its content has not been considered in the current analysis. However, we are aware of the release and are currently reviewing its implications. Depending on the outcome of our ongoing assessment, a complementary update to this report may be considered at a later stage.

The following provides a concise overview of the key specifications introduced in relation to EPCs and ZEBs, which constitute the core focus of this report.

Energy performance certificates (Articles 19–21, Annex V) and independent control systems (Article 27, Annex VI)

The Commission's June 2025 guidance document, "*Energy performance certificates (Articles 19–21, Annex V) and independent control systems (Article 27, Annex VI)*", expands on the obligations introduced in the EPBD 2024 recast. It offers detailed specifications to support practical implementation across MS. Key areas of clarification include:

1 A–G scale and class A+

- Class A = zero-emission buildings (ZEBs)
- Class G = bottom 15–18%
- Optional A+ for buildings that are 20% more efficient than ZEBs, use no fossil fuels, and generate surplus renewable energy

2 EPC content

- Minimum indicators: energy use, GHG emissions, Renewable Energy Sources share (RES share)
- Optional: life-cycle GWP
- Includes formats for digital and cross-border use

3 Accessibility and digital integration

- EPCs must be clear, digital, and affordable
- Must support databases, building logbooks, renovation passports, and smart readiness indicators

4 Trigger events

- EPCs required for sales, rentals, major works, and public buildings
- Guidance also includes rental renewals

5 Performance recommendations

- Should cover cost, indoor environment, Heating, Ventilation and Air Conditioning (HVAC), low-temperature heating
- For class C and below: link to passports and one-stop-shop services

6 Updates after renovation

- Supports simplified updates via renovation passports, certified tools, and digital twins

Zero Emission Buildings (Articles 7 and 11)

The accompanying guidance on ZEBs, published as an annex to the 30 June 2025 support package, provides technical specifications and clarifications to assist MS in applying Articles 7 and 11 of the EPBD 2024 recast. It addresses implementation aspects that were previously left open to national interpretation. Key elements include:

ZEB definition

- Very efficient, fossil-free, low-emission buildings
- Energy must come from renewables, energy communities, district systems, or clean grid sources

Fossil fuel ban

- Gas boilers not allowed
- Solid biomass allowed only with air quality safeguards

Energy source rules and compensation

- Temporary non-compliant supply can be offset with renewable exports
- Includes detailed examples and calculations

Energy demand thresholds

- Must be 10% below 2024 NZEB levels
- Includes updated methodology and timeline

Operational GHG limits

- Requires per-m² emission thresholds
- Allows renewable energy offsets

Demand-side flexibility

- ZEBs must enable flexibility
- Smart Readiness Indicator (SRI) tool recommended for assessment

Renovated ZEBs

- Slightly different thresholds allowed
- Guidance explains how to apply ZEB rules to major renovations

Additional guidance beyond the EPBD

- Compensation logic, RES share guidance, air quality criteria, and timeline for updates

Conclusion:

This support package offers practical tools for consistent EPBD 2024 recast implementation. It provides clarity on EPC and ZEB rules and helps align national actions toward decarbonising EU buildings by 2030. MS and stakeholders should engage now to ensure smooth compliance by the 2026 deadline.

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The sources presented in this work represent the primary references used and form the main basis of the content. In addition, further relevant sources have been consulted, particularly national legislative texts and regulations that implement the EPBD into national law. This includes, for example, the respective implementation measures adopted by individual EU MS:

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Código Técnico de la Edificación (o.J.): Código Técnico de la Edificación. Verfügbar unter: <https://www.codigotecnico.org/>

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These supplementary sources were used for contextual analysis, legal interpretation, and to deepen specific aspects of the topic. Where applicable, they are cited accordingly in the bibliography or footnotes.

7. APPENDIX: COUNTRY-LEVEL OVERVIEW ►

7.1 Numerical analysis of ZEB/NZEB and EPC implementation status by MS

See page below.

7.2 Numerical analysis of preparedness of MS in implementing the EPBD 2024 recast for ZEB

Numerical analysis	1. ZEB Legal Definition Adopted	2. Fossil fuel bans	3. Requirements on GHG emissions in NZEB definitions	4. Renewable sources in NZEB primary energy demand new buildings"	5. Key indicators used in NZEB definitions	NZEB thresholds vs. EU recommended benchmark (average energy performance - average)		
MS	0 – 1 Points	0 – 2 Points	0 – 2 Points	0 – 2 Points	0 – 1 Points	0 – 2 Points	TOTAL	Tier
Austria	0	2	0	2	0	2	6	Transition Mover
Belgium-Wallonia	0	1	0	0	1	0	2	Emerging Implementer
Belgium-Brussels	0	1	0	0	0	1.5	3	Emerging Implementer
Belgium-Flanders	0	1	0	2	1	2	6	Transition Mover
Bulgaria	0	0	0	2	0	0	2	Emerging Implementer
Croatia	0	0	0	2	0	1.5	4	Transition Mover
Cyprus	0	0	0	2	1	0	3	Transition Mover
Czechia	0	0	0	0	1	0.5	2	Emerging Implementer
Denmark	0	2	2	0	1	2	7	Front Runner
Estonia	0	0	0	0	0	1	1	Emerging Implementer
Finland	0	0	0	2	1	1	4	Transition Mover
France	0	1	2	2	1	1	7	Front Runner
Germany	0	1	0	2	0	1.5	5	Transition Mover
Greece	0	1	0	2	0	1.5	5	Transition Mover
Hungary	0	0	0	2	1	0.5	4	Transition Mover
Ireland	0	2	2	2	1	2	9	Front Runner
Italy	0	1	0	2	1	0	4	Transition Mover
Latvia	0	0	0	0	1	0.5	2	Emerging Implementer
Lithuania	0	0	0	2	1	0	3	Transition Mover
Luxembourg	0	1	0	0	1	2	4	Transition Mover
Malta	0	0	0	0	1	0.5	2	Emerging Implementer
Netherlands	0	2	0	2	0	1.5	6	Transition Mover
Poland	0	0	0	0	0	0.5	1	Emerging Implementer
Portugal	0	0	0	2	1	2	5	Transition Mover
Romania	0	0	2	2	1	0.5	6	Transition Mover
Slovakia	0	0	0	0	1	1.5	3	Emerging Implementer
Slovenia	0	0	0	2	1	1	4	Transition Mover
Spain	0	0	0	2	1	0.5	4	Transition Mover
Sweden	0	0	0	0	1	1	2	Emerging Implementer

7.3 Numerical analysis of preparedness of MS in implementing the EPBD 2024 recast for EPCs

Numerical analysis	1. Current EPC Rating Scale	2. Energy efficiency class expressed in Total Primary Energy Use (kWh/m ² /year)	3. GHG (CO ₂) Indicator included in the EPC	4. Digital EPC Registry Publicly Accessible	5. Retrofit Roadmap Included in EPC	6. Measured Data Included in EPCs		
MS	0 – 1 Points	0 – 2 Points	0 – 2 Points	0 – 2 Points	0 – 1 Points	0 – 2 Points	TOTAL	Tier
Austria	0	1	2	2	1	0	6	Transition Mover
Belgium-Wallonia	0	1	1	1	2	0	5	Transition Mover
Belgium-Brussels	1	1	1	1	2	0	6	Transition Mover
Belgium-Flanders	0	1	1	1	2	1	6	Transition Mover
Bulgaria	1	1	1	2	2	0	7	Transition Mover
Croatia	0	1	1	1	2	1	6	Transition Mover
Cyprus	0	1	2	1	2	0	6	Transition Mover
Czechia	1	0	1	1	1	1	5	Transition Mover
Denmark	0	0	1	2	3	1	7	Transition Mover
Estonia	0	0	0	2	1	1	4	Emerging Implementer
Finland	1	1	0	1	1	1	5	Transition Mover
France	0	1	2	1	2	1	7	Transition Mover
Germany	0	0	1	1	2	1	5	Transition Mover
Greece	0	0	1	1	2	0	4	Emerging Implementer
Hungary	0	1	0	2	1	1	5	Transition Mover
Ireland	0	1	2	2	2	1	8	Front Runner
Italy	0	0	1	2	2	0	5	Transition Mover
Latvia	0	0	1	2	2	1	6	Transition Mover
Lithuania	0	1	1	2	1	0	5	Transition Mover
Luxembourg	0	1	2	1	2	1	7	Transition Mover
Malta	0	0	2	1	1	1	5	Transition Mover
Netherlands	0	0	1	2	1	0	4	Emerging Implementer
Poland	0	0	1	2	1	1	5	Transition Mover
Portugal	0	1	1	2	1	0	5	Transition Mover
Romania	1	0	1	1	1	0	4	Emerging Implementer
Slovakia	0	1	2	2	0	0	5	Transition Mover
Slovenia	0	0	2	2	1	1	6	Transition Mover
Spain	1	0	2	1	2	0	6	Transition Mover
Sweden	1	1	0	2	2	2	8	Front Runner



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