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IMPACT ASSESSMENT REPORT

Accompanying the

Proposal for a Directive of the European Parliament and of the Council

on the energy performance of buildings (recast)

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1. SCOPE AND INTRODUCTION

The revision of the EPBD includes a set of policy measures covering various aspects of the building sector and buildings renovation. This Annex briefly describes the different measures and analyses the impact of the proposed measures with regards to:

- Enforcement costs and benefits: incurred by public authorities linked to development of legislation, monitoring and enforcement.
- Administrative costs and benefits: incurred when undertaking administrative activities needed to comply with obligations to provide information.
- Indirect costs and benefits: incurred by stakeholders that are not directly targeted by the policy options.
- Compliance costs not directly related to physical renovation of buildings[1].

Direct renovation costs (installation of equipment, architectural works, etc.) and investments are not covered in this annex and are included in Chapter 6.

The acronyms used to identify the policy measures assessed are those indicated and described in Chapter 5 and in Annex E of this impact assessment.

The multiplicity of measures, both proposed and already existing, sometimes results in overlaps that have similar effects in practice. Where relevant, this Annex describes the interlinkages between the different measures and their effects in costs and benefits.

MINIMUM ENERGY PERFORMANCE STANDARDS (MEPS)

MEPS are policy instruments which require buildings to be renovated and improved to meet a specified energy performance standard at a chosen trigger point or date and can include standards that tighten over time. MEPS have an influence on both the rate and depth of renovation.

Effects of MEPS in the private sector

Compliance costs

Compliance costs would consist of renovation costs, which are covered by the general renovation costs indicated by the different policy packages in Chapter 6.

Indirect costs

[1] The costs categories have been defined following as much as possible the indication from Better Regulations.

The introduction of MEPS is likely to have a direct impact in the value of properties and how this value is assessed. Because of this, valuation companies and financial institutions may need to update their procedures and guidelines to account for this changes.

Administrative costs

Administrative costs are related to the need to certify that a building complies with the MEPS.

For policy option MEPS1, when MEPS are linked to sale or rental, the requirement to demonstrate compliance overlaps with the already existing requirement to produce an EPC. Under this scenario:

- If the building owner produces an EPC and the building complies with MEPS, the administrative costs are considered 0 as the obligation to report on MEPS overlaps with the EPC requirement.
- If the building owner produces an EPC and the building does not comply with MEPS, the administrative costs would cover the production of a 2nd EPC following completion of the upgrade works.

For policy options MEPS2 and MEPS3, the costs cover the procurement of an EPC to demonstrate compliance with the MEPS requirements. This would affect only those buildings that do not already have a valid EPC.

Overall, this results in higher administrative costs for MEPS2 when compared to MEPS1, since a number of EPCs under MEPS1 would be covered by existing requirements. MEPS3 costs are lower due to the more limited number of buildings affected. The impact of MEPS4 in terms of administrative costs is considered negligible.

Effects of MEPS in the public sector

Enforcement costs

Public bodies would incur in enforcement costs to cover the development and implementation of legislation, including:

- Assessment studies to define MEPS.
- Update of IT, forms and procedures.
- Development of guidelines and training material (if relevant to national scheme).
- Information campaigns.
- Monitoring and enforcement of MEPS.
- Reporting on developments of MEPS.

Compliance costs

Public bodies would be subject to renovation costs, which are covered by the general renovation costs indicated by the different policy packages in Chapter 6. In the case of public buildings, all public buildings over 250m^2 must already possess an EPC/

Therefore, their performance is already known and there are no additional costs for assessing their performance and determining if a renovation is necessary (i.e. if they are over/under the threshold).

Indirect costs
MEPS would not results in substantive indirect costs for the public sector.

BUILDING RENOVATION PASSPORT (BRP)

Building Renovation Passports provide a clear roadmap for staged renovation over the lifetime of a building, helping owners and investors plan the best timing and scope for interventions.

Effects of BRPs in the private sector

Compliance costs
BRP1 and BRP2 would generate compliance costs only for those building owners that wish to use the scheme. BRP3 would generate compliance costs for those buildings affected by the scheme (e.g. residential buildings and non-residential buildings over 5 000 m^2).

The costs for implementing the measures indicated in the BRP are voluntary and are covered by the general renovation costs indicated by the different policy packages in Chapter 6.

Indirect costs
BRPs would not generate indirect costs.

Administrative costs
The costs of producing a BRP and keeping it updated are covered by compliance costs.

Effects of BRPs in the public sector

Enforcement costs
Public bodies would incur in enforcement costs to cover the development and implementation of the BRP scheme including:

- Development of an EU framework and template (European Commission)
- Development of the national BRP scheme
- Development of guidelines and training material (if relevant to national scheme)
- Monitoring and reporting on the national BRP scheme

Compliance costs
BRPs would generate compliance costs only for those buildings affected by the scheme.

Indirect costs

BRPs would not generate indirect costs.

MEASURES TO IMPROVE QUALITY AND HARMONISATION OF EPCS (EPCQ)

Measures to improve the quality of EPCs, such as defining specific quality levels and methods of analysis as well as reporting mechanisms. Harmonisation measures include, amongst others, the development of a common EU EPC template.

Effects of measures to improve EPC quality in the private sector

Compliance costs
This measure would not result in additional compliance costs.

Indirect costs
This measure would not result in additional indirect costs.

The introduction of additional requirements for EPCs would require the training of existing independent experts. Independent experts already undergo regular training in order to retain their qualifications to produce EPCs. The additional requirement could be integrated in these existing training schemes. Therefore it is considered that the additional requirements would not result in additional costs.

The additional quality measures would also result in increased costs for the management of the EPC scheme. The public administration may or may not decide to pass on these additional costs to the private sector. The increased costs are indicated under enforcement costs.

Administrative costs
This measure would not result in additional administrative costs.

Effects of measures to improve EPC quality in the public sector

Enforcement costs
Public bodies would incur in enforcement costs to cover the following elements:

- Development of a common EU template (European Commission)
- Translation of the template and adaptation of the scheme to the common template (including adaptation of EPC databases)
- Development of guidelines and training material (if relevant to national scheme)
- Increased number and depth of quality controls (manual and automated)

Public bodies would also incur in enforcement costs to carry out the necessary enforcement of the independent control system (quality) for EPCs. The additional cost is calculated on a per analysed EPC basis (i.e. not for all EPCs produced in a year). This would include:

- Update of EPC infrastructure (e.g. calculation engine, database) to adapt to new quality requirements
- Additional automatic controls on EPCs
- Additional manual controls on EPCs (including site visits).

In some Member States, the management of EPC schemes is carried out by private bodies or institutions (e.g. professional associations). These are then in turn under oversight by the public administration. This arrangement does not result in significant differences in costs when compared to the more prevalent arrangement under (full) public administration. In order to simplify the assessment, the IA presents all the costs under enforcement costs.

Compliance costs
This measure would not result in additional compliance costs.

Indirect costs
This measure would not result in additional indirect costs.

INCREASING THE SCOPE, INFORMATION AND COVERAGE OF EPCS (EPCSI)

This sections covers the introduction of additional trigger points to produce an EPC and a number of measures to improve the information aspect of EPC, for example additional indicators and improvement to the mandatory recommendations that must be included in an EPC.

Effects of increasing the scope, information and coverage of EPCs in the private sector

Compliance costs
The additional trigger points for EPCs would result in an increase in the number of EPCs produced and the costs related to it. The additional number of EPCs would depend on the specific definition of the trigger points (in increasing ambition).

Indirect costs
This measure would not result in additional indirect costs.

The introduction of additional requirements for EPCs would require the training of existing independent experts. Independent experts already undergo regular training in order to retain their qualifications to produce EPCs. The additional requirement could be integrated in these existing training schemes. Therefore it is considered that the additional requirements would not result in additional costs.

The additional quality measures would also result in increased costs for the management of the EPC scheme. The public administration may or may not decide to pass on these

additional costs to the private sector. The increased costs are indicated under enforcement costs.

Administrative costs
This measure would not result in additional administrative costs.

Effects of increasing the scope, information and coverage of EPCs in the public sector

Enforcement costs
Public bodies would incur in enforcement costs to cover the following elements:

- Development of additional EU guidance (European Commission)
- Transposition by Member States (including adaptation of EPC databases)
- Increased requirements on the EPC scheme (including quality assessment and database)
- Development of guidelines and training material (if relevant to national scheme)

Compliance costs
This measure would not result in additional compliance costs.

Indirect costs
This measure would not result in additional indirect costs.

INTRODUCING MANDATORY NATIONAL EPC DATABASES (EPCD)

This sections covers the introduction of provisions to develop, improve and harmonise databases containing EPCs.

Effects of introducing mandatory national EPC databases in the private sector

Compliance costs
This measure would not result in additional indirect costs.

Indirect costs
This measure would result in overall indirect benefits.

EPC databases would facilitate access to building owners and relevant professionals (e.g. designers, real estate valuators, notaries, researchers) to relevant information, either at the level of individual EPCs or to general information at building stock level. Public reporting and links with other databases (e.g. cadastre) would further facilitate this access while supporting confidence in the scheme.

Administrative costs
This measure would not result in additional administrative costs.

Effects of introducing mandatory national EPC databases in the public sector

Enforcement costs

Public bodies would incur in enforcement costs to cover the following elements:

- Development of additional EU guidance ((European Commission)
- Transposition and implementation of new provisions at MS level
- Adaptation or development of national databases
- Development of guidelines and training material
- Communication and dissemination

Although not a requirement under the EPBD, most MS[2] (except Germany, Italy), already have functioning databases in their territories. Since this is not a current requirement, the costs of running the database are considered a new enforcement cost (even though they are already existing). The new provision on databases would support coherence and harmonisation between databases and would almost certainly require adaptation of the national databases to a certain extent. These adaptation costs are included under the running costs.

EPC databases are an important tool to facilitate the quality assessment process for EPCs. MS already use a number of approaches that exploit the capabilities of a database (e.g. targeting of suspicious EPCs for quality assessment). It is difficult to evaluate the full extent of these benefits. Because of this complexity, the additional benefits are not included in this assessment.

The interconnection between the EPC and other databases would facilitate quality checks. For example, it would be possible to detect differences between the building area in an EPC and the building area in the official cadastre. However, the full extent of this links is difficult to evaluate as there are significant differences between the national databases and how these could be connected and share information with the EPC database. Because of these difficulties, these additional benefits are not included in this assessment.

Compliance costs

This measure would not result in additional compliance costs.

Indirect costs

This measure would not result in additional indirect costs.

[2] Germany has multiple non-centralised databases. Italy has multiple regional EPC databases. Spain has regional databases and is planning a national database (estimated to be online by end of 2021).

DEFINITION OF DEEP RENOVATION (DEEP)

The definition of a 'deep renovation' standard aims to enable anchoring significant private financing to transparent, measurable and genuinely "green" investments.

Effects of definition of DEEP renovation definition in the private sector

Compliance costs
This measure would not result in additional compliance costs.

Additional renovation costs are covered by the general renovation costs indicated by the different policy packages in Chapter 6.

Indirect costs
This measure would not result in additional indirect costs.

Administrative costs
Many financial aid schemes (grants, subsidies, soft loans) require proof of achieving a deep renovation level. In most cases, an EPC or an energy audit report is considered sufficient proof. Compliance with a deep renovation definition would require the same level of proof. Since this would not deviate from existing practice, it is considered that this measure would not result in additional administrative costs.

Effects of definition of DEEP renovation definition in the public sector

Enforcement costs
Public bodies would incur in enforcement costs to cover the following elements:

- Development of a common EU definition for deep renovation ((European Commission)
- Transposition by Member States
- Development of guidelines and training material
- Communication and dissemination.

The concept of Deep renovation is already known and accepted in the building sector. The introduction of a legal definition would only reinforce the existing situation. Therefore, enforcement costs are not considered significant, particularly as in most cases individual elements would be integrated with other measures (e.g. integration of DEEP definition in communication material on MEPS).

Compliance costs
This measure would not result in additional compliance costs.

Indirect costs
This measure would not result in additional indirect costs.

ENHANCING LONG TERM RENOVATION STRATEGIES (LTRS)

Long Term Renovation Strategies (LTRS) establish a long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, into a highly energy efficient and decarbonised building stock by 2050, facilitating the cost-effective transformation of existing buildings into nearly zero-energy buildings. The different measures contemplate improvements to the reporting mechanisms and the update and strengthening of some of the requirements.

Effects of enhancing LTRS in the private sector

Compliance costs
This measure would not result in additional compliance costs.

Indirect costs
This measure would not result in additional indirect costs.

Administrative costs
This measure would not result in additional administrative costs.

Effects enhancing LTRS in the public sector

Enforcement costs
Public bodies would incur in enforcement costs to cover the following elements:

- Development of additional EU guidance (European Commission)
- Production of additional LTRS reports (MS)
- Analysis of additional LTRS reports and enhanced monitoring (European Commission

Compliance costs
This measure would not result in additional compliance costs.

Indirect costs
This measure would not result in additional indirect costs.

INTRODUCING A DEFINITION FOR ZERO-EMISSION BUILDINGS (ZEB)

The concept of (net) zero greenhouse gas (GHG)/carbon emission(s) buildings is gaining wide international attention and is considered to be the main pathway for achieving climate neutrality targets in the built environment. As a first step, the impact assessment has the establishment of a sound technical qualitative definition to be introduced in the EPBD, to be applicable to new buildings and based on key criteria which contribute at the same time to achieve high energy efficiency, to limit or neutralise CO2 emission and to contribute to energy system integration" (i.e. addressing flexibility and storage which

will be crucial for new constructions). The analysis also examines different timelines to its gradual phase-in and different implementation options.

Effects of introducing ZEB definition in the private sector

Compliance costs
This measure would not result in additional compliance costs.

Additional construction costs are covered by the investment costs for new buildings indicated by the different policy packages in Chapter 6.

Indirect costs
This measure would not result in additional indirect costs.

The introduction of a ZEB definition would require re-training and upskilling of the building workforce (both on-site and off-site) over a period of time. These additional costs would be transferred to the individual building owners through the renovation costs. Therefore, these indirect costs are covered by renovation costs.

Administrative costs
This measure would not result in additional administrative costs.

Effects of introducing ZEB definition in the public sector

Enforcement costs
Public bodies would incur in enforcement costs to cover the following elements:

- Development of a common EU definition for ZEB building (European Commission)
- Transposition of the definition
- Development of guidelines and training material
- Communication and dissemination.

For ZEB3, there would be additional costs related to the introduction of the LEVEL(s) assessment framework or equivalent methodology, which allows for the assessment and reporting on key areas of sustainability in the built environment. The additional costs would include:

- Development and implementation of LEVEL(s) at national level or equivalent methodology
- Development of guidelines and training material
- Communication and dissemination

Compliance costs
There would be no additional compliance costs for the introduction of ZEB1 and ZEB2.

For ZEB3, this measure would result in additional compliance costs related to the production of the LEVEL(s) assessment or equivalent methodology. Any additional costs related to improved renovation are covered by the general renovation costs indicated by the different policy packages in Chapter 6.

Indirect costs
This measure would not result in additional indirect costs.

REMOVING BUILDING-RELATED BARRIERS TO E-MOBILITY (E-M)

The 2018 amendment of the EPBD included a number of measures to support the deployment of charging infrastructure in buildings. Due to the fast development of the electric market, the current revision analysis a number of options to further support this sector and future proof buildings.

Effects of E-mobility provisions in the private sector

Compliance costs
This measure would not result in additional compliance costs.

The capital expenditure of installing the physical infrastructure and charging points in buildings are described in Annex I on e-mobility.

Indirect costs
This measure would not result in additional indirect costs.

Administrative costs
This measure would not result in additional administrative costs.

Effects of E-mobility provisions in the public sector

Enforcement costs
Public bodies would incur in enforcement costs to cover the following elements:

- Development of additional EU guidance (European Commission)
- Transposition and implementation of new provisions at MS level
- Development of guidelines and training material
- Communication and dissemination

Option EM-3 includes additional costs related to the implementation of checks and spot visits. MS could choose to carry out enforcement through the requirement to produce an EPC or an SRI. Under this alternative scenario, the enforcement costs would become administrative costs to be borne by the private sector. It is estimated that the overall costs would be equivalent. For simplicity purposes, the IA only presents the scenario of the checks carried out by public bodies.

Compliance costs

This measure would not result in additional compliance costs.

Indirect costs
This measure would not result in additional indirect costs.

ENHANCING THE ROLE OF THE SMART READINESS INDICATOR (SRI)

The Smart Readiness Indicator, was first introduced in the EPBD in 2018, with the legal instruments adopted in 2020 (Delegated and Implementing Acts). It aims to support the adaption of smart technologies in buildings by measuring how smart ready individual buildings are. The measures in this Impact Assessment cover provisions to improve the links between the SRI and other provisions, and measures to support the adoption of the SRI scheme.

Effects of enhancing SRI provisions in the private sector

Compliance costs
This measure would not result in additional compliance costs.

Indirect costs
This measure would not result in additional indirect costs.

Administrative costs
This measure would not result in additional administrative costs.

Effects of enhancing SRI provisions in the public sector

Enforcement costs
The enforcement costs related to SRI1 are very limited, as it would only require the link between the 2 schemes. For example: EPC to show the SRI value if available, EPC database reporting to include elements from the SRI database.

Enforcement costs for SRI2 include the adoption of the SRI at national level, including the preparation of national legal framework, establishment of a database, development of training material, etc.

Compliance costs
SRI2 would result in the requirement to produce SRIs for public buildings and large non-residential buildings. The analysis assumes buildings over 5000 m^2, which is a similar threshold used in the EU Green Taxonomy for reporting on GHG life-cycle emissions. The size is relevant as any additional costs would be very limited compared to the overall project and construction costs.

The requirements to produce an SRI share many similarities with those required for an EPC (e.g. area or identification of equipment). If both analysis are carried out at the same time, it results in significant savings. In the case of new buildings, an EPC is required in

current legislation. Therefore, the analysis assumes that the SRI and the EPC will be produced at the same time, allowing for lower costs.

Indirect costs

This measure would not result in additional indirect costs.

Table L.1: Effects of policy options in the private sector

	Policy Option				Cost type	Description	PRICE (€/unit)	QUANTITY (units/y)	One-off costs (M€)	Annual costs (M€/y)
	1	2	3a	3b						
Private Sector										
Introducing Minimum Energy Performance Standards										
MEPS1	x	x	x	x	A	Compliance checks	240	1.200.000		*288*
					I	Update of valuation standards			1	*5*
MEPS2			x	x	A	Preliminary compliance checks	240	2.899.800		*696*
					I	Update of valuation standards			1	5
MEPS3		x			A	Preliminary checks on compliance	240	148.500		36
					I	Update of valuation standards			1	5
MEPS4	x	x		x		Not considered to have significant additional costs.				
Introduction of Building Renovation Passport in the EPBD										
BRP1 (subsidised)	x				A	n° of BRPs triggered	100	69.500		7
BRP1 (unsubsidised)	x				A	n° of BRPs triggered	400	69.500		28
BRP2 (subsidised)		x			A	n° of BRPs triggered	100	139.000		14
BRP2 (unsubsidised)		x			A	n° of BRPs triggered	400	139.000		56
BRP3 (subsidised)			x	x	A	n° of BRPs triggered	100	695.000		70
BRP3 (unsubsidised)			x	x	A	n° of BRPs triggered	400	695.000		278
Enhancing the quality and reliability of EPCs										
EPCQ1	x					*Not considered to have significant costs additional to EPCSI measures.*				
EPCQ2		x				*Not considered to have significant costs additional to EPCSI measures.*				
EPCQ3			x	x		*Not considered to have significant costs additional to EPCSI3.*				
Increasing the scope of information and coverage of EPCs										
EPCSI1	x				A	n° of EPCs triggered	280	3.439.000,00		963
EPCSI2		x			A	n° of EPCs triggered	280	3.719.500		1.041
EPCSI3			x	x	A	n° of res. EPCs triggered	280	4.000.000		1.120
Introducing mandatory national EPCs databases										
EPCD1	x				I	Net person hours saved	30	-8.000		-0,2

	Policy Option				Cost type	Description	PRICE (€/unit)	QUANTITY (units/y)	One-off costs (M€)	Annual costs (M€/y)
	1	**2**	**3a**	**3b**						
						Private Sector				
EPCD2		x			I	Net person hours saved	30	-10.000		-0,3
EPCD3			x	x	I	Net person hours saved	30	-10.000		-0,3
Introducing a deep renovation standard										
DEEP1	x					*Not considered to have significant additional costs.*				
DEEP2		x	x	x		*Not considered to have significant additional costs.*				
Enhancing the Long-term renovation strategies										
LTRS1	x					*Not considered to have significant additional costs.*				
LTRS2		x				*Not considered to have significant additional costs.*				
LTRS3			x	x		*Not considered to have significant additional costs.*				
Introducing a definition for zero-emission buildings										
ZEB1	x					*Not considered to have significant additional costs.*				
ZEB2		x				*Not considered to have significant additional costs.*				
ZEB3			x	x		*Not considered to have significant additional costs.*				
Removing building-related barriers to e-mobility										
E-M1	x					*Not considered to have significant additional costs.*				
E-M2		x				*Not considered to have significant additional costs.*				
E-M3			x			*Not considered to have significant additional costs.*				
E-M4			x	x		*Not considered to have significant additional costs.*				
Enhancing the role of the Smart Readiness Indicator										
SRI1	x	x				*Not considered to have significant costs additional to those outlined above.*				
SRI2			x	x	E	*Additional costs to produce SRI (on top of EPC)*	50-100	6200-8200		0,31-0,82

Table L.2: Effects of policy options in the public sector

	Policy Option											
					Public sector							
	1	2	3a	3b	Cost type	UNIT	PRICE (€/unit)	QUANTITY (units)	Lower one-off costs (M€)	Upper one-off costs (M€)	Lower annual costs (M€/y)	Upper annual costs (M€/y)
Introducing Minimum Energy Performance Standards												
MEPS1	x	x	x	x	E	National assessment studies to define MEPS	200.000	27	5,4	5,4		
					E	Update of IT and forms	625.000	27	16,9	16,9		
					E	Setting up Information campaign and training	1.500.000	27	40,5	40,5		
					E	Running information campaign	375.000	81	30,4	30,4		
MEPS2			x	x	E	National assessment studies to define MEPS	200.000	27	5,4	5,4		
					E	Development of national MEPS scheme	500.000	27	13,5	13,5		
					E	Costs of reporting on compliance to EU	25.000	27			0,7	0,7
MEPS3		x			E	National assessment studies to define MEPS	200.000	27	5,4	5,4		
					E	Development of national MEPS scheme	300.000	27	8,1	8,1		
					E	Costs of reporting on compliance to EU	15.000	27			0,4	0,4
MEPS4	x	x		x	E	Implementing best-in-class scheme	200.000	27	5,4	5,4		
Enshrining the Building Renovation Passport in the EPBD												
BRP1 for EC	x				E	BRP schemes in Member States	540.000	9	4,9	4,9		
(subsidised)	x				E	Common EU framework & template (EC)	250k to 500k	1	0,3	0,5		
(unsubsidised)	x				E	BRP schemes in Member States	540.000	9	4,9	4,9		
BRP2 for EC		x			E	Common EU framework & template (EC)	250k to 500k	1	0,3	0,5		
(subsidised)		x			E	BRP schemes in Member States	540.000	27	14,6	14,6		
(unsubsidised)		x			E	BRP schemes in Member States	540.000	27	14,6	14,6		
BRP3			x	x	E	Common EU framework & template (EC)	250k to 500k	1	0,3	0,5		
(subsidised)			x	x	E	BRP schemes in Member States	540.000	27	14,6	14,6		
(unsubsidised)			x	x	E	BRP schemes in Member States	540.000	27	14,6	14,6		
Enhancing the qualifty and reliability of EPCs												

	Policy Option				Cost type	UNIT	PRICE (€/unit)	QUANTITY (units)	Lower one-off costs (M€)	Upper one-off costs (M€)	Lower annual costs (M€/y)	Upper annual costs (M€/y)
	1	2	3a	3b								
						Public sector						
EPCQ1	x				E	Common EU template (EC)	250k to 500k	9	0,3	0,5		
					E	Translating template to ntl. context & PR	200k to 300k	9	1,8	2,7		
					E	Training and qualification	100.000	9	0,9	0,9		
					E	Increased quality controls					2,3	22,5
EPCQ2		x			E	Common EU template (EC)	250k to 500k	9	0,3	0,5		
					E	Translating template to ntl. context & PR	200k to 300k	9	1,8	2,7		
					E	Training and qualification	100.000	9	0,9	0,9		
					E	Increased quality controls					4,5	45,0
EPCQ3			x	x	E	Common EU template (EC)	250k to 500k	1	0,3	0,5		
					E	Translating template to ntl. context & PR	200k to 300k	27	5,4	8,1		
					E	Training and qualification	100.000	27	2,7	2,7		
					E	Increased quality controls	15 to 150	600.000			9	90
Increasing the scope of information and coverage of EPCs												
EPCSI1	x				E	Developing training and qualification	100.000	27	2,7	2,7		
					E	Implementation by Member States	200.000	27	5,4	5,4		
EPCSI2		x			E	Developing training and qualification	100.000	27	2,7	2,7		
					E	Implementation by Member States	250.000	27	6,8	6,8		
EPCSI3			x	x	E	Developing training and qualification	100.000	27	2,7	2,7		
					E	Implementation by Member States	250.000	27	6,8	6,8		
Introducing mandatory national EPCs databases												
EPCD1	x				E	Running EPC database	150k to 350k	27			4,1	9,5
EPCD2		x			E	Running EPC database	150k to 350k	27			4,1	9,5
					E	Reports to the public	20.000	6,75			0,1	0,1
EPCD3			x	x	E	Running EPC database	150k to 350k	27			4,1	9,5
					E	Reports to the public	20.000	6,75			0,1	0,1
Introducing a deep renovation standard												

	Policy Option				Cost type	UNIT	PRICE (€/unit)	QUANTITY (units)	Public sector: Lower one-off costs (M€)	Public sector: Upper one-off costs (M€)	Public sector: Lower annual costs (M€/y)	Public sector: Upper annual costs (M€/y)
	1	2	3a	3b								
DEEP1	x					*Not considered to have significant additional costs.*						
DEEP2		x	x	x		*Not considered to have significant additional costs.*						
Enhancing the Long-term renovation strategies												
LTRS1	x				E	Additional LTRS reports	50.000	27	1,4	1,4		
					E	Update EU guidance and check reports	120.000	1	0,12	0,1		
LTRS2		x			E	Additional LTRS reports	100.000	27	2,7	2,7		
					E	Update EU guidance and check reports	300.000	1	0,3	0,3		
LTRS3		x			E	Additional LTRS reports	150.000	27	4,1	4,1		
					E	Update EU guidance and check reports	450.000	1	0,5	0,5		
Introducing a definition for zero-emission buildings												
ZEB1	x				E	EU ZEB framework	50.000	1	0,1	0,1		
					E	Adapting national regulations	100k to 200k	27	2,7	5,4		
ZEB2		x			E	EU ZEB framework	250.000	1	0,3	0,3		
					E	Adapting national regulations	50k to 100k	27	1,4	2,7		
ZEB3			x	x	E	Adapting national regulations	50k to 250k	27	1,4	6,8		
					E	Establishing LEVEL(s) as ntl. framework	50k to 100k	13	0,7	1,3		
					C	Implementing LEVEL(s) for new public buildings	500 to 1.000 EUR	5.000			2,5	5
Removing building-related barriers to e-mobility												
E-M1	x					*Not considered to have significant additional costs.*						
E-M2		x			E	Legal feasibility study & implementation (right to plug)	100.000	27	2,7	2,7		
E-M3			x		E	Legal feasibility study & implementation (right to plug)	100.000	27	2,7	2,7		
E-M4			x	x	E	Legal feasibility study & implementation	150.000	27	4,1	4,1		
					E	Enforcement: site vists / checks	100,00	8k to 20k	0,8	2,0		
Enhancing the role of the Smart Readiness Indicator												

	Policy Option				Public sector							
	1	2	3a	3b	Cost type	UNIT	PRICE (€/unit)	QUANTITY (units)	Lower one-off costs (M€)	Upper one-off costs (M€)	Lower annual costs (M€/y)	Upper annual costs (M€/y)
SRI1	x	x				*Not considered to have significant additional costs*						
SRI2			x	x	*E*	*Setting SRI network*	*200k to 400k*	*27*	*5,4*	10,80	*2,7*	5,40
SRI2			x	x	*C*	*Public buildings SRI assessed*	*50 to 100*	*3500-6400*			*0,18*	0,46

Annex M: The SME Test – Summary of results

(1) Preliminary assessment of businesses likely to be affected	
The EPBD and SMEs The EPBD promotes the improvement of the energy performance of buildings and its revision will impact the intensity of activities carried out by SMES. This will happen notably in the buildings construction and related supply chain but also in trade and services sectors, which include industrial sectors, agriculture, machinery and equipment, electricity and gas and heat sector. Most activities in the buildings construction sector are in fact based on small and medium sized enterprises. Up to 95% of construction, architecture, and civil engineering firms are micro-enterprises or small and medium-sized enterprise (SME)[3]. They supply essential technologies, materials and services. Moreover, the built environment is characterized by small and medium enterprises that act locally and provide services in their area. Only companies in the chemicals, rubber and plastic product sector are likely not to be small or medium size. In 2018, SMEs accounted for 9.3 million jobs in the buildings construction sector of the EU. This represented 86% of total employment in the sector, with 50% micro enterprises, 24.6% for small enterprises and 11.4% for medium-sized enterprises. The SMEs represented almost 100% of the companies active in the in the buildings construction sector of the EU, out of which 94% micro enterprises, 5.3% small enterprises and 0.4% medium enterprises. SMEs generated about 83% of total turnover in the buildings construction sector, out of which 38% from micro enterprises, 28.7% from small enterprises and 16.3% from medium enterprises[4]. Specific requirements The EPBD revision proposes several measures that will trigger, on one hand, an increase renovation rate and depth of the existing building stock and, on other hand, enhanced energy performance for new buildings to be constructed. These measures do not impose requirements specifically to SMEs, but indirectly will have an impact on increasing demand for products and services provided by SMEs in the above mentioned sectors and on installers and inspectors of technical buildings systems in which SMEs represent a substantial majority of employment, turnover and added value. Among the proposed measures targeting the renovation existing buildings there are minimum energy performance standards, which are policy instruments requiring buildings to be renovated and improved to meet a specified energy performance level. As these requirements apply to building's owners, those will apply also to	Section 6.4.2 of the Impact Assessment on Macro-economic impacts See Section 5.2 of the Impact Assessment describing policy options and Section 8.2 of the Impact Assessment on the preferred option

[3] https://ec.europa.eu/growth/sectors/construction_en#:%7E:text=The%20construction%20industry%20is%20very,social%2C%20climate%20and%20energy%20challenges

[4] Eurostat, Annual enterprise statistics [sbs_sc_sca_r2]

buildings owned by SMEs falling into the scope of the provisions.	
(2) Consultation with SMEs representatives	
SMEs have been consulted through online public consultation and at five stakeholders consultation workshops on specific topics. 59 SMEs directly replied to the **online public consultation** for the EPBD revision out of which 49% micro enterprises (1-9 employees), 24% small enterprises (10-49 employees) and 27% medium enterprises (50-249 employees). 95% of these SMEs originate from the EU, mainly from Belgium (24%), Germany (12%), and Spain (12%), the rest being from other Member States. Many more replied through business organizations and sectoral organizations, therefore the direct replies from SMEs represent only a limited share of the SMEs consulted. Their replies on main proposed measures for the EPBD revision has been such as in the following: • On **zero emission buildings (ZEB)**: 87% of SMEs considered that ZEB should be defined in the EPBD (i.e. 85% of micro enterprises, 100% of small enterprises and 81% of medium enterprises). 62% small enterprises and 50% of micro enterprises and of medium size enterprises considered that current NZEB requirements are not ambitious enough. 71% of SMEs considered that the definition of NZEB needs to be more harmonized and the introduction of minimum thresholds for primary energy use in the building's operation for different climate zones has been the most popular option. • On **long term renovation strategies (LTRS)**: 54% of the SMEs (mainly micro and medium size enterprises) considered that EPBD provisions on LTRS should not be modified. However, 90% of SMEs considered that the monitoring of the objectives identified by MSs in their LTRS should be strengthened. • On **"deep renovation" definition**: 67% of SMEs considered that it would be beneficial to have a legal definition of 'deep renovation' in the EPBD. • **On minimum energy performance standards (MEPS):** 78% of SMEs considered that the EPBD should introduce mandatory MEPS under specific conditions to be determined, with 83% of them being in favour of mandatory MEPS. The most popular option was for MEPS at building level, mandatory for all residential and non-residential buildings (33 SMEs). • **On energy performance certificates (EPCs):** 71% of SMEs considered that the EPC framework needs to be updated and quality improved, while 82% of them supported their harmonisation with 58% of consulted SMEs in favour of a common template. Regarding the ways to improved the EPC	See Annex B

quality, 69% of the SMEs considered that this can be done by adding further information of estimated costs, energy savings or cost savings, 66% by improving training of independent experts and 64% by including information on non-financial benefits. • **On building renovation passport (BRP):** SMEs suggested that establishing guidelines and best practice exchange are among the main measures to accompany the introduction of BRP schemes through the revised EPBD. • On renovation support schemes: direct grants to low-income households living in worst performing buildings (83% of SMEs) and tax incentives (76% of SMEs) were considered by the responding SMEs as the most important support schemes to renovation. Between April and July 2021, have been organized five thematic workshops[5] supporting the inception impact assessment. The participation of SMEs at these events is summarized in the followings: • ***Workshop 1 – setting a vision for buildings and a decarbonised building stock***: Of the 335 participants, at least 131 participants represented an SME such as: 86 a micro-small enterprise (below 20 employees), 20 a small enterprise, and 25 a medium enterprise. • ***Workshop 2 – minimum energy performance standards for existing buildings*****:** Of the 298 participants, at least 118 participants represented an SME such as:, 73 a micro-small enterprise (below 20 employees), 18 a small enterprise and 27 a medium enterprise. • ***Workshop 5 – accessible and affordable financing – energy poverty*****:** Of the 190 participants, at least 71 participants represented an SME such as: 45 a micro-small enterprise (below 20 employees), 10 a small enterprise and 17 a medium enterprise.	
(3) Measurement of the impact on SMEs	
The analysis in the Impact assessment indicates that the additional economic activities induced by the preferred option for the EPBD revision will generate by 2030 as net effect about 1.8 million additional direct and indirect jobs (out of which 1.4 million low and medium skilled jobs) and EUR billion 104 additional value-added compared to 2020 levels. The effects on employment and valued added are the economic effects that result from increased investments in buildings renovation and reduced energy consumption of fossil fuels for heating. These effects can be considered net effects as they account for simultaneous changes due to investment in renovation and subsequent reduction of energy demand. Most of additional new jobs and value-added will be notably in the construction	Section 6.4.2 of the Impact Assessment on Macro-economic impacts

[5] For two workshops the size of the organisations participating was not collected.

and materials sector (594 thousands jobs and EUR billion 48). It is expected that these impacts will be generated largely by SMEs, which represent more than 90% of the EU companies from buildings construction sector, manufacturing of machinery and equipment and manufacturing of construction materials and glass[6]. Overall, in the preferred option, the number of jobs and value added of the construction and material sector is projected to increase by about 3.6% each as compared to 2020 levels. The proposed measures will also have the effect of reducing energy demand in the sectors that provide fossil fuels for heating, i.e. natural gas, heating oil and coal. It is expected that these negative effects will be limited and will not substantially affect SMEs.	
4) Assess alternative options and mitigating measures	
Delays in the construction sector experienced since the beginning of the pandemic call for an analysis of whether the economy can adapt to higher demand on workforce and skills. Based on the assessment made, the additional demand for labour in the construction sector by 2030 due to the preferred option appears to be smaller (or comparable) to the year-to-year variations in employment between 2008 and 2030. The capacity of the construction market to adapt to higher demand should be supported by the fact that the EU is not at full employment at the aggregate level. The additional demand for labour in the construction sector by 2030 due to the preferred option appears to be smaller (or comparable) to the year-to-year variations in employment between 2008 and 2030. Demand in the construction sector is mostly for unskilled occupations, but pressure in this labour market is mitigated by the decline of unskilled employment in other sectors. Those elements nonetheless have to be considered with care. As showed in the rates of job creation and destruction, the construction sector is particularly cyclical since it depends on business and consumer confidence, but also macroeconomic factors such as interest rates linked to central banks' monetary policies and to governments' budgetary programs. It is therefore not immune to temporary shocks, which may lead to similar delays and temporary price increases as those recorded since the beginning of the pandemic. While those shocks and potential disruptions cannot be fully anticipated, an appropriate package of policies and mechanisms can limit their occurrence and impact. To this end, the Fit for 55 Package overall and the EPBD revision specifically will bring more certainty to a sector that has been facing market and policy volatility in the past. In particular, the price signal stemming from the extended ETS[7],	See Section 6.4.2 of the Impact Assessment on Macro-economic impacts, Section 8.3 of the Impact Assessment on Meeting the challenges of the proposed measures

[6] According to Eurostat structural business statistics 2018 [sbs_sc_con_r2].

[7] Positive anticipation of future carbon costs is among the relevant policy drivers incentivising the choice of energy efficient or low carbon technologies.

regulatory clarity coming from energy efficiency targets under the updated EED and the progressive roll-out of MEPS as well as a higher level of information linked to updated EPCs should incentive the construction sector to expand its capacities. Expanded capacities of both workforce and investments in fixed costs would in turn give more certainty to input suppliers to invest in expanding their own supply capacity. Regarding labour supply, the Renovation Wave Communication acknowledged the 'shortage of qualified workers to carry out sustainable building renovation and construction'. A key challenge is the capacity of the education and vocational training systems to train or re-train workers, as well as to the ability of workers to move from one job and sector to another one requiring potentially different skills[8]. For instance, it is expected that appropriate qualifications will play an increasingly important role in the construction, heating technology and refurbishment sector with new technologies and higher levels of digitalisation. The Commission's initiatives on education, skills and training such as the Pact for Skills, the green strand in Erasmus+ and the Education for Climate Coalition can help to address these challenges. The accompanying Action Plan to the Renovation Wave strategy included a deliverable on "Support[ing] Member States to update their national roadmaps for the training of the construction workforce through the Build Up Skills Initiative and helping implement the 2020 European Skills Agenda"[9]. The proposal for the EED[10] recast also includes provisions for the availability of training programmes and qualification, accreditation and certification schemes as an enabler of energy efficiency improvement measures. In addition, the updated Industrial Strategy of May 2021[11] announced the co-creation of transition pathways for industrial ecosystems, including construction. In a process of co-creation with Member States, industry and other stakeholders, the pathways will identify the scale of the needs, including on upskilling, resource efficiency and digitalisation, and will propose actions to address them. Finally, an increase in productivity in the sector would allow for an expansion of output with less use of labour. Investments in technologies for the industrialisation of construction[12] as well as project management and collaboration tools therefore have the potential to increase productivity and reduce the additional demand for labour. Industrialisation can also result in other benefits including greater resource	

[8] Climate Target Plan Impact Assessment, Part 1, p.86. It is important to acknowledge in this regard that transitional costs such as reskilling and upskilling have not been considered in the simulations of the Fit for 55 Package's impact.

[9] The European Skills Agenda was presented in July 2020 by the Commission. Action 6 is about "Skills to support the twin transitions".

[10] https://eur-lex.europa.eu/resource.html?uri=cellar:a214c850-e574-11eb-a1a5-01aa75ed71a1.0001.02/DOC_1&format=PDF

[11] https://ec.europa.eu/info/sites/default/files/communication-industrial-strategy-update-2020_en.pdf

[12] For example using techniques such as prefabrication and off-site assembly, automation, modularisation and additive manufacturing.

efficiency and less time spent on the building site (and therefore less disruption for building occupants during renovation works)[13]. While acknowledging that not all market frictions stemming from higher demand and new shocks can be tempered, the combination of the proposed policies and initiatives should help to substantially address them.	

[13] D'Oca et al 2018. Technical, Financial, and Social Barriers and Challenges in Deep Building Renovation. Available at https://www.mdpi.com/2075-5309/8/12/174

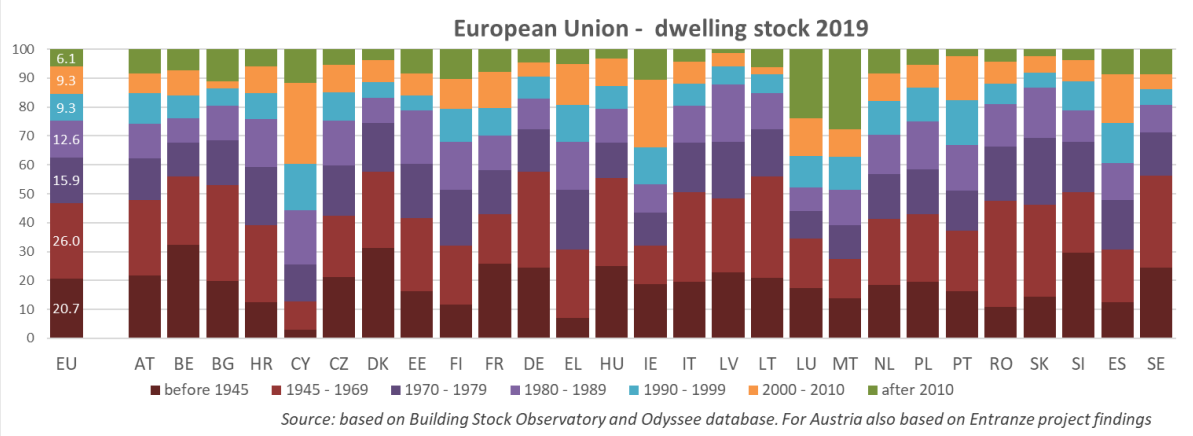
Annex N: The EU building stock

To better understand the barriers to energy renovations across the EU it is important to focus on the European building stock, the basic technical and energy performance features, population distribution and ownership structure.

Before defining the problem, we should focus on the European building stock across Member States, the basic technical and energy performance features, population distribution and ownership structure.

The residential and services (non-residential) sectors in the EU amount to some 25 billion m^2, with the former representing around 75% of the total. Of the current residential building stock, 80% was built before the 1990s, with 40% built before the 1960s (Figure N.1)[14]. The old age of buildings is a common problem across Member States.

Figure N.1: EU dwelling stock per age, 2019[15]



Space heating accounts for two thirds of energy consumption in residential buildings. Space heating and water heating together represent around 80% of the energy consumption of residential buildings in the EU (Figure N.3). This is a common trend across all EU countries; only in four countries in the Mediterranean region heating is below 50% (ES, CY, MT, PT). The energy performance of buildings is however a concept that applies both to heating and cooling. Well-insulated buildings allow for more thermal comfort and lower energy consumption for both heating and cooling.

Around 75% of buildings in the EU are energy inefficient according to current standards. They were built before the introduction of energy performance requirements, which were

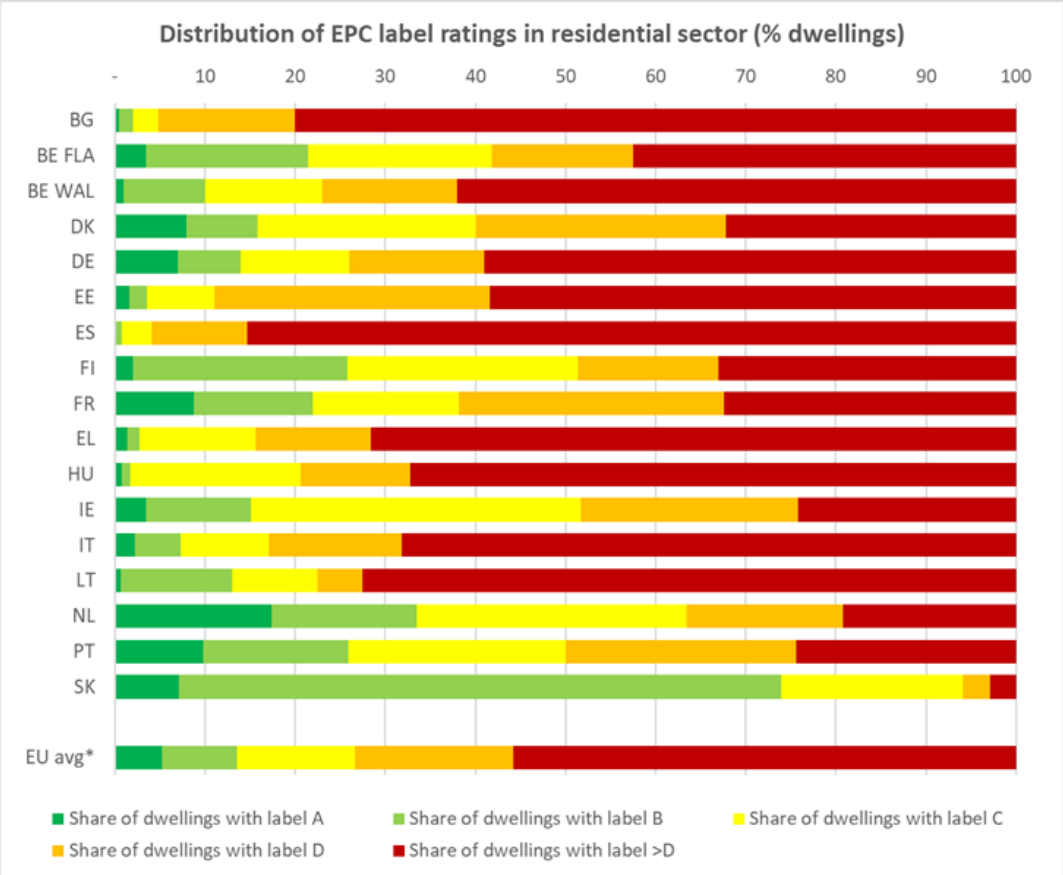
[14] A considerable amount is even older and often classified as cultural heritage. Old building stock would not fulfil state-of-the-art requirements on fire safety and seismic resistance (e.g. likely not to be compliant with Eurocodes standards).
[15] Based on Buildings Stock Observatory and Odyssee database.

first introduced towards the end of the 1970s[16]. Accessibility for people with disabilities was also not included as a general rule in the design of those buildings, and a large number of old buildings do not fulfil state-of-the-art requirements on fire safety, seismic resistance, and indoor quality and daylighting. Although these aspects are outside the scope of the EPBD, renovation of the older segment of the building stock increases the opportunities for broader improvements and integrated building renovations, addressing multiple objectives at the same time.

Longevity is a characteristic of buildings. They typically last a minimum of 50 years. Due to this, it is estimated that 85-95% of the buildings that exist today will still be standing in 2050.

The figures below provide the energy efficiency rating or energy 'class' of buildings, as attributed by energy performance certificates (EPCs)[17] for residential buildings in a number of EU countries.

Figure N.2: Distribution of EPC label ratings in selected residential buildings in the EU[18]



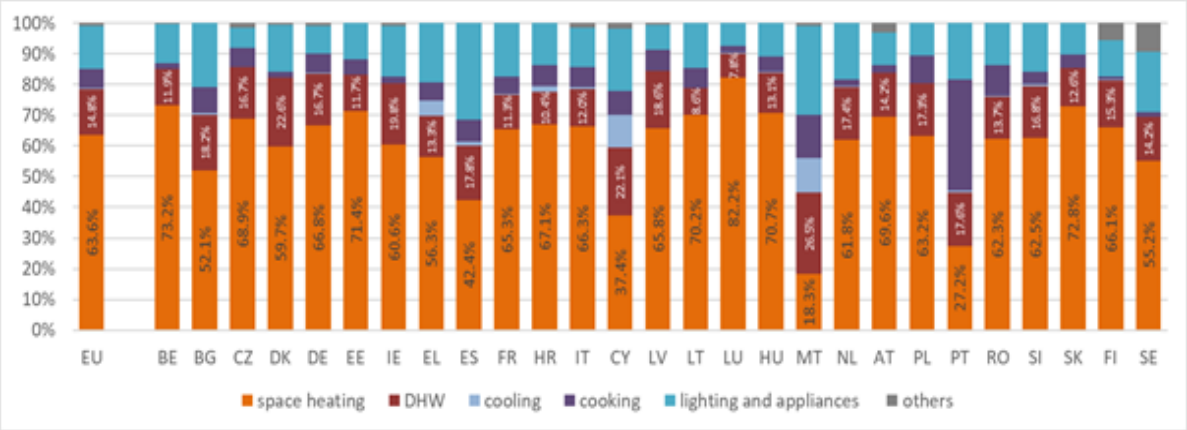
[16] JRC (2019), 'Achieving the cost-effective energy transformation of Europe's buildings', cost_optimal_energy_renovations_online.pdf

[17] Annex G explains how EPCs are used.

[18] Adapted from X-TENDO project final report. The figure covers only the Member States for which data was available.

Although several differences exist in the overall performance levels of buildings and classes, the general assumption is that the vast majority of buildings are not 'fit for 55', or in any case are not expected to be climate-neutral by 2050. Buildings in EPC class A ('A label', green), represent a negligible share of the stock, above 5% in only five Member States. To increase energy efficiency and contribute to decarbonisation by 2030 and in the longer term, a significant share of the building stock should progressively shift to the highest classes. The greatest gains will be achieved from the lowest energy class buildings (D or below), which in almost all the countries examined constitute between 50% and almost 100% of the stock.

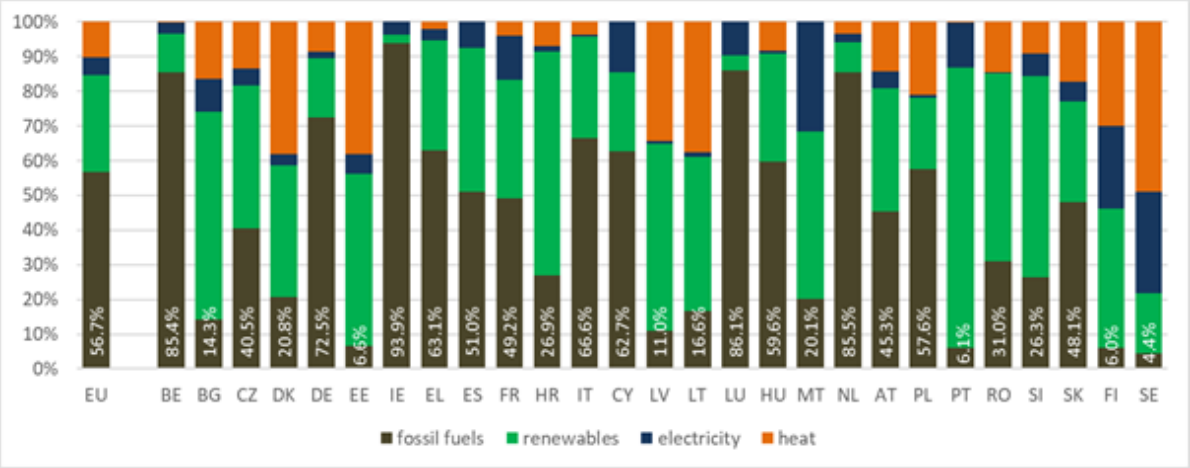
Figure N.3: Final energy consumption of households by end-use type, 2019[19]



Almost 57% of the energy use for space heating in the EU residential sector is based on the direct use of fossil fuels, 10% on district heating, 5.3% on electricity and 28% on on-site renewable energy (Figure N.4). The challenge of decarbonising heating and cooling is therefore substantial in all Member States. Although fossil fuels dominate space heating in countries such as Belgium, Germany, Ireland, Luxembourg and the Netherlands with more than 70% of the heating mix, renewable energy sources cover more than 50% of the energy needs for space heating in Bulgaria, Croatia, Latvia, Lithuania, Portugal, Romania and Slovenia. Solid biomass represents more than 86% of renewable energy used for space heating in the EU, which is largely dominant at individual Member State levels. District heating supplies more than a third of space heating energy in countries with cold climates such as Denmark, Estonia, Latvia, Lithuania, Finland and Sweden.

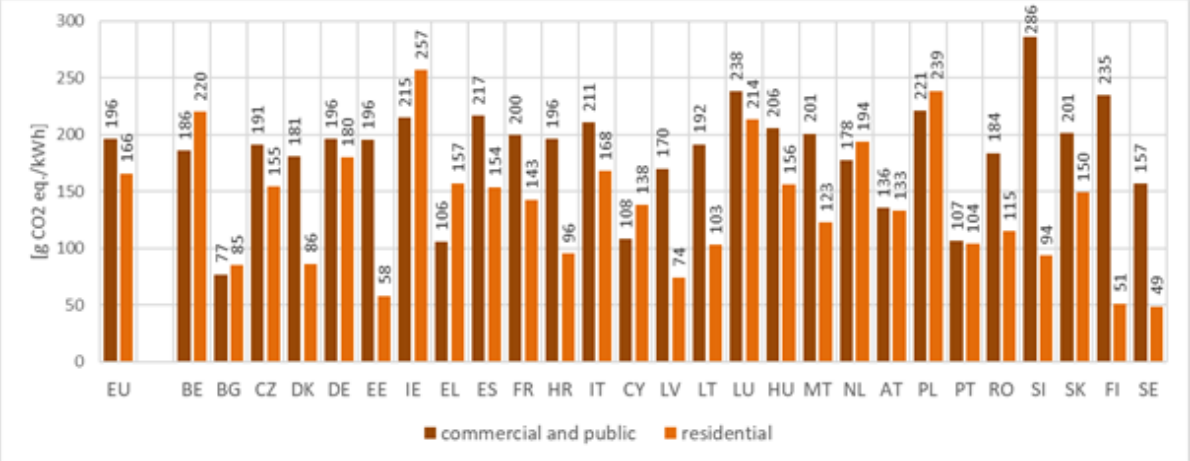
[19] Source: Eurostat.

Figure N.4: Energy mix of space heating in households, 2019[20]



The GHG emission intensities of energy-related use in EU residential and non-residential buildings is around 166g CO_2 eq (kWh/yr) and 196g CO_2 eq (kWh/yr) respectively (Figure N.5). Emission intensities vary largely across the Member States according to the mix of the direct fuels used. They are lower in countries with a higher use of renewables or where the emissions are attributed to the power and heat sector by making greater use of district heating and electricity.

Figure N.5: GHG emission intensity of direct consumption of fuels in residential and services buildings[21]

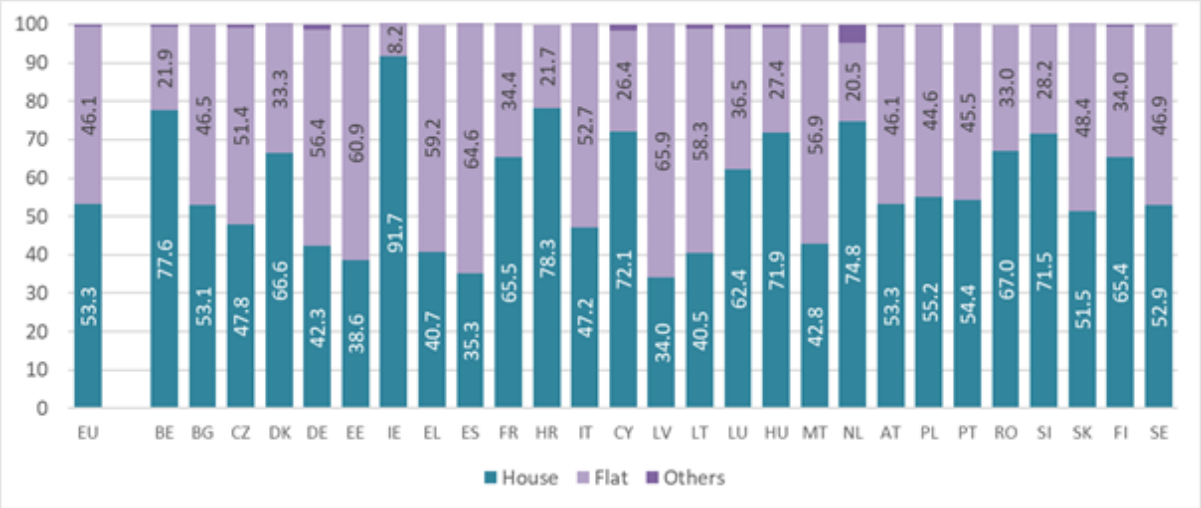


An important characteristic of building use that determines the possible obstacles to renovating buildings is related to the building type, ownership structure, and the pattern of building occupancy. At EU level, the distribution of population by type of dwelling is slightly higher for houses (53%) than for flats from multi-family buildings (Figure N.6).

[20] Source: Eurostat.
[21] GHG emissions from European Environment Agency inventory, direct fuel use from Eurostat energy balances.

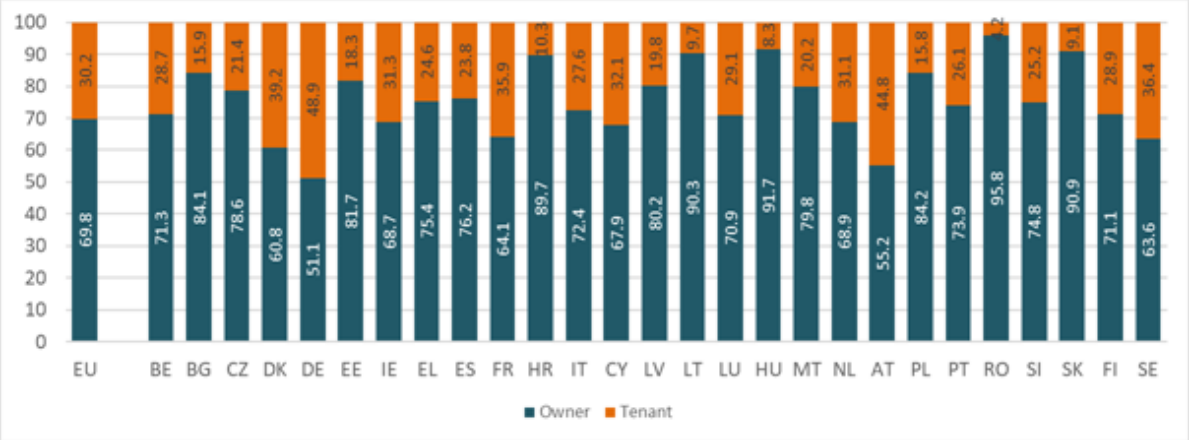
However, there are several countries such as Czechia, Germany, Greece, Spain, Italy, Malta and the Baltic countries where the majority of the population lives in flats.

Figure N.6 : Distribution of population by type of dwelling, 2019[22]



Most of the EU population (70%) lives in dwellings they also own (Figure 2.7). Although this is valid for all EU countries, the share of the population living in rented accommodation is much higher in Germany (49%), Austria (45%), Denmark (39%), Sweden (36%) and France (36%). In all EU countries, the problem of split incentives (see Chapter 2) is therefore present, although to a varying degree.

Figure N.7: Distribution of population by tenure status, 2019[23]



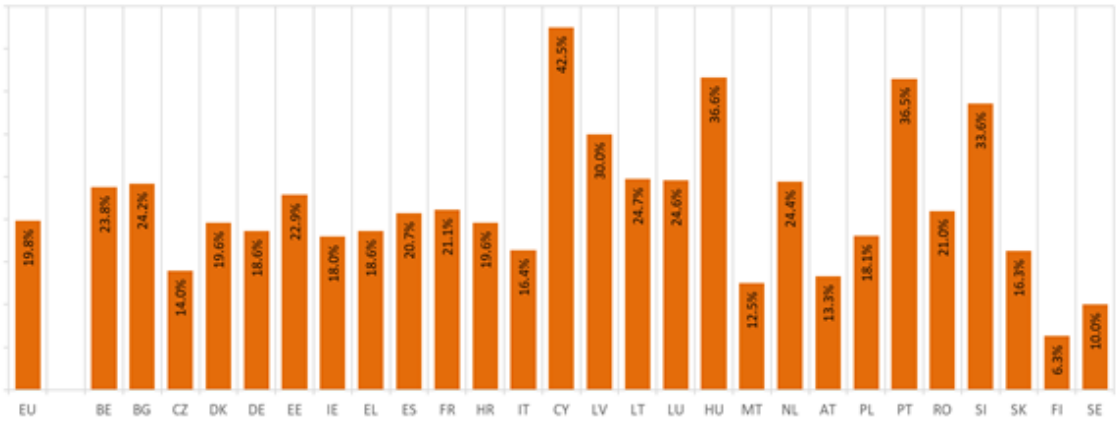
The population at risk of poverty (below 60% of median equivalised income[24]) represents 16.5% (or 74 million) of the total EU population, and the distribution by type of building

[22] Source: Eurostat-SILC.
[23] Source: Eurostat-SILC.
[24] Archive:Living standard statistics - median equivalised disposable income - Statistics Explained (europa.eu)

is slightly more for flats (51.5%), notably in Nordic countries, Baltic countries, Czechia, Germany, Spain, Italy, Malta and Austria (Figure N.6).

The poor energy performance of buildings leads to high energy costs and can affect the well-being and health[25] of people. In 2019[26], around 6.2% of the EU population had fallen behind on their utility bills, with Bulgaria and Greece close to 30%. Almost 7% of the EU population was unable to keep their home warm[27]. The inability to keep homes warm enough is also more likely to coincide with health issues for residents and/or structural building issues. The situation is much worse for the category at risk of poverty, for which the share of people in arrears on utility bills and unable to keep their homes adequately warm reached 14.9% and 18.2% respectively in 2019. These indicators are widely accepted as metrics to determine the group of people living in energy poverty.

Figure N.8: Population at-risk-of-poverty (% of population below 60% of median equivalised income) living in a dwelling with a leaking roof, damp walls, floors or foundation, or rot in window frames or floor, 2019[28]



According to the Eurostat survey on income and living conditions, around 20% of the population at risk of poverty (% of population below 60% of median equivalised income) lives in dwellings with a leaking roof, damp walls, floors or foundations, or with rot in window frames or floors (Figure N.8). Among EU countries, more than one third of the population at risk of poverty in Cyprus (42.5%), Hungary (36.6%), Portugal (36.5%) and

[25] A specific correlation analysis of 2012 EU-SILC data on housing conditions reveals for example that around 10% of adults living in single-family homes reported poor general health. With both structural problems (leaking roof, rot in windows etc.) and being unable to keep homes warm, this share increased to beyond 20%. Affected by these two issues, the reported level of dissatisfaction with homes reached around 40% across the EU, and even went beyond 50% in Central and Eastern European countries – both in single- and multi-family buildings.

[26] EUROSTAT statistics on income and living conditions (SILC): Statistics on Income and Living Conditions - Access to microdata - Eurostat (europa.eu), Arrears on utility bills - EU-SILC survey [ilc_mdes07].

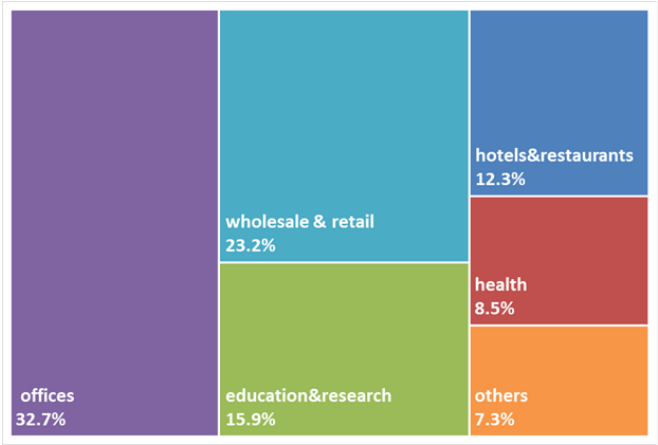
[27] EUROSTAT statistics on income and living conditions (SILC): Inability to keep home adequately warm - EU-SILC survey [ilc_mdes01].

[28] Source: Eurostat-SILC.

Slovenia (33.6%) lives in dwellings with poor conditions. The problem of energy poverty in conjunction with unhealthy living conditions due to poor building status is therefore common across Member States.

Service sector (non-residential) buildings is a more complex and heterogeneous sector compared to the residential sector (Figure N.9). Office buildings (public and private) make up around a third of the non-residential floor area, while wholesale and retail buildings are the second biggest category with a floor space corresponding to around a quarter (23%) of the total non-residential floor space. School & education buildings (16%), hotels & restaurants (12.3%) and health-related buildings (8.5%) represent large parts of non-residential building stock. Variations in usage patterns, energy intensity, and construction requirements are some of the factors adding to the complexity of the sector.

Figure N.9: Distribution of services buildings by type of activity, 2018[29]



[29] Source: Odyssee database, Building Stock Observatory.