



CONCERTED ACTION

ENERGY PERFORMANCE OF BUILDINGS

(CT5) Certification and Training Status in 2022

AUTHORS

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1. Introduction

Core Team (CT) 5 of the CA EPBD V dealt with Certification of Buildings and Training of experts and was responsible for the preparation of discussions among all CA EPBD participants. The focus of CT5 was the upgrading of Energy Performance Certificates (EPCs), their quality, visibility, usability, as well as sharing experiences and best practices and examining new approaches. This also includes the experts involved in issuing those certificates, their training, and qualification, among other topics.

This report summarises some of the main analyses and conclusions of CT5, to be eventually made available to a wider audience.

2. Objectives

The topics discussed in CT5 related to the EPBD, especially elements dealing directly with EPCs and independent experts: the Energy Performance Certificates (Article 11); Issue of Energy Performance Certificates (Article 12); Display of Energy Performance Certificates (Article 13); and Independent Experts (Article 17).

The relevance of EPCs and the role of experts extends beyond those articles to other parts of the EPBD such as:

- Developing EPC databases and examining how the data can be better used;
- Using EPCs to differentiate and promote energy efficient buildings;
- Supporting Long-Term Renovations Strategies (LTRS);
- Linking EPCs and data with financing;
- Developing databases to collect and share information.

Underpinning the CT5 discussion are three themes linked with the EPC and the certification schemes:

- **Quality** (inputs, outputs, data, methodologies, experts, etc.);
- **Visibility** (awareness, communication, image, perception of EPC, range, how EPCs call to action, advertising, etc.);
- **Usability** (information, how triggers lead to action, choices made, interoperability, etc.).

CT5 also considered the discussion in previous CA forums, mainly CA EPBD IV, so that the outcomes of past sessions could support future discussions and build upon previous findings.

3. Analysis of Insights

3.1 Energy Performance Certificates implementation across Member States

Over the years, the CA EPBD has covered several topics and contributed to the evolution, implementation and promotion of the energy performance of buildings in Europe. However, due to the context and diversity of the countries, each Member State may have approached the same range of topics differently.

Therefore, it is important to map EPC developments in Member States in order to evaluate their status and learn lessons from the implementation of different schemes.

In order to do this, several sessions were organised under the CA EPBD V in the format of presentations and discussion, poster sessions or surveys where the objective was to map, compare, and evaluate EPC quality control schemes, the energy auditors' qualification and process for issuing the EPCs, the databases and data-driven outcomes among different Member States, and the communication activities. Relevant activities were analysed to find common themes and ideas and to identify differences among Member States, as discussed in the following sections.

3.1.1 EPC schemes in the EU

Currently, all Member States have implemented an EPC framework with components such as quality and enforcement schemes, setup and use of a database, training of experts, and communication. Since these frameworks were operational, in mid-2019, CT5 set out to evaluate how many EPCs had been issued. Out of the 31 respondents, which included all EU Member States (still with the UK) plus Norway, the rough number of EPCs registered was around **54 million**, with the distribution as shown in Table 1.

Coupled with these registered EPCs, each Member State also implemented a database to collect EPC data or information. The survey identified different approaches to storing and using that data to generate the EPC, ranging from collecting data and performing the EPC calculations inside the register, to simply collecting a copied version of the EPC without individual data. Figure 1 shows the approaches taken at that time.

Country / Region	# of EPCs	Ref. date	Country / Region	# of EPCs	Ref. date
UK	20,094,859	-	Belgium - WL	576,990	23/04/2019
France	7,593,763	16/05/2019	Lithuania	233,536	19/04/2019
The Netherlands **	3,800,000	11/04/2019	Croatia	232,403	12/04/2019
Spain	3,600,000	-	Belgium - BR	230,171	10/04/2019
Germany	2,302,307	31/10/2018	Czech Republic	152,911	24/03/2019
Belgium - FL	1,810,000	01/01/2019	Slovakia	128,439	03/04/2019
Portugal *	1,675,155	31/03/2019	Finland	115,700	23/04/2019
Greece	1,574,316	31/03/2019	Austria	100,000	31/12/2019
Italy *	1,100,000	01/04/2019	Slovenia	70,000	31/03/2019
Romania *	1,000,000	-	Malta	51,300	-
Hungary	951,436	21/05/2019	Cyprus	51,172	24/04/2019
Norway	898,620	10/04/2019	Estonia	30,255	-
Ireland	864,253	-	Luxembourg	17,000	-
Sweden	700,000	31/12/2018	Latvia	9,219	26/04/2019
Poland *	667,307	01/01/2017	Bulgaria	7,804	02/04/2019
Denmark	631,260	-			-

* Estimation or based on partial information
 ** Number of valid registered EPCs. This figure gives a better impression of the number of buildings that have an EPC. The number of registered EPCs also includes multiple EPCs for one building and EPCs that are older than 10 years.

Table 1: Number of EPCs registered by country/region.



Figure 1: Collection and use of data in the EPC database to generate the EPC.

After the transposition of the revised 2018 EPBD, CT5 evaluated recent changes in 27 countries/regions in relation to the energy performance of buildings (EPB) methodologies and the EPC, and found many updates had been implemented at that time. The updates addressed the items listed in Figure 2.

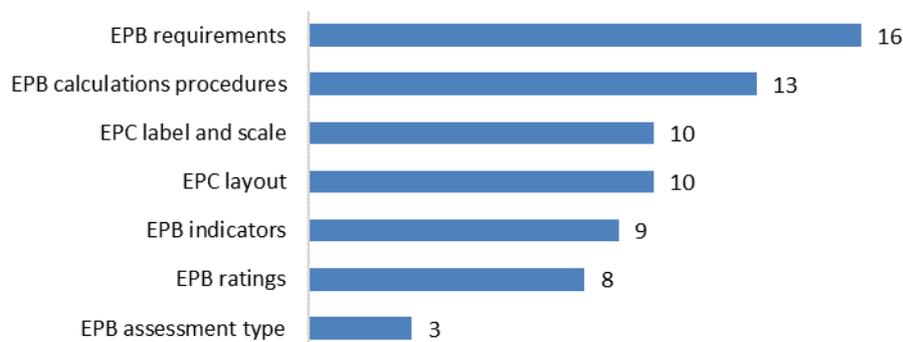
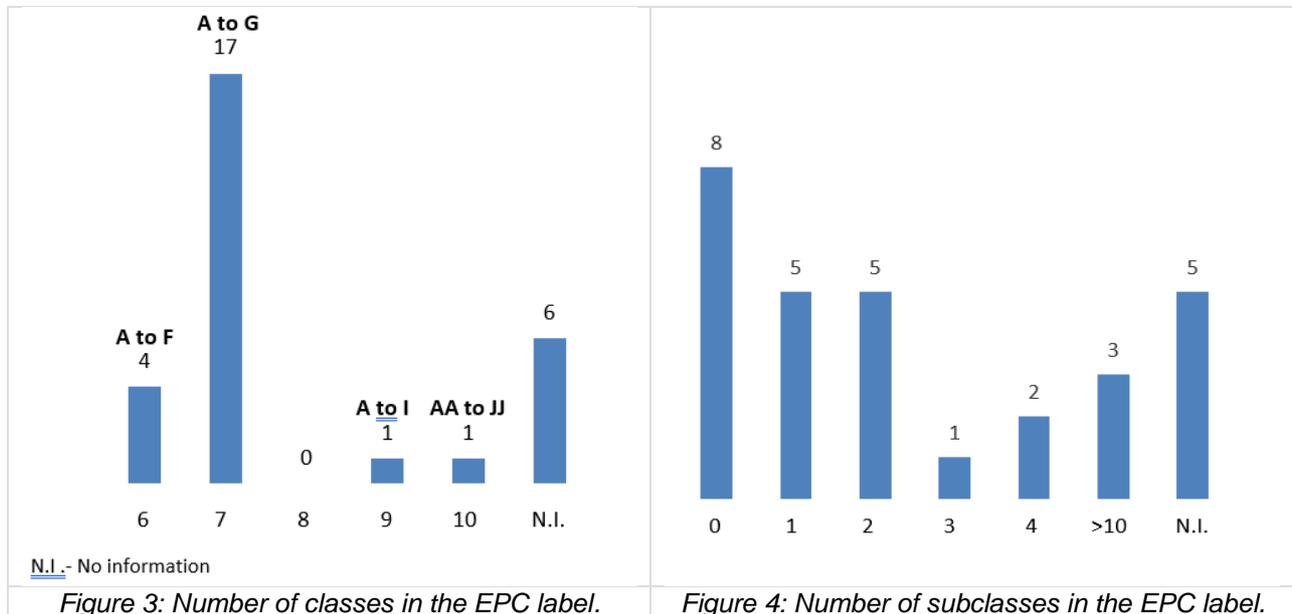


Figure 2: Changes made by Member States in the energy performance of buildings methodologies and the EPC, after the 2018 EPBD transposition.

The most relevant indicator of an EPC is its label, sometimes coupled with two indicators expressing both the actual performance and the building potential (e.g., UK) or the primary energy consumption and the CO₂ emissions (e.g., France). A little more than **60% of Member States use the traditional A-G label**, but others have implemented other approaches, not only using a different number of classes but also introducing subclasses. The following figures present the status in May 2021 based on an evaluation of 27 Member States in relation to the EPC label classes and subclasses.



Some Member States (Germany or Belgium-Flanders or in the case of Latvia, totally continuous with no steps) have also adopted a continuous scale that can be also stepped to include EPC classes.

Annex 1 provides further detail of the EPC layout adopted by each Member State.

3.1.2 Quality control

Annex II of the EPBD states that Member States should implement ‘independent control systems for energy performance certificates and inspection reports’. Out of 26 respondents, 24 implemented a compliance system to evaluate the EPC quality. Analysis shows that there is not a harmonised approach for the EPC compliance systems, which can be grouped as follows:



Figure 5: EPC compliance approach.

Despite these different approaches, the EPBD offers three verification options for these compliance checks. The method used is left open to each individual Member State and, as the results show, despite large variations, most states comply with the recommended guidelines.

EPC verification options	Minimum percentage checked	Maximum percentage checked
Validity check of the input/output data	From 0 %	Up to 100 %
Validity check of the input/output data + recommendation measures	From 0 %	Up to 20 %
Validity check of the input/output data + recommendation measures + on-site visit	From 0 %	Up to 4 %

Table 2: EPC verification options.

There are also different definitions for an inaccurate EPC. In general, mistakes in data input are considered the most relevant issue because they can lead to further errors in output data, or to erroneous calculations or inappropriate proposed measures. Figure 6 shows how Member States characterise the inaccuracy of an EPC.

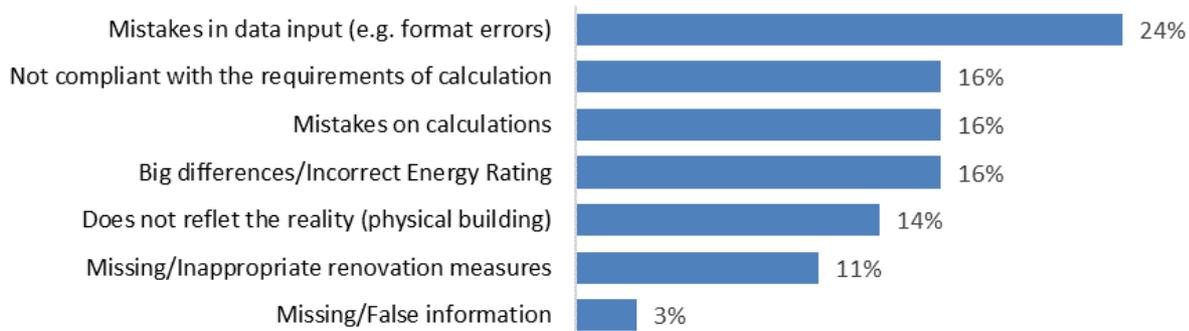


Figure 6: Categories used to define an EPC as inaccurate.

Member States discussed and shared their experiences with the processes for quality control. It was clear that an open and detailed quality control process could lead to better assessments, as assessors understand the sanctions that they can face for poor performance. Although the processes can be expensive, this is seen as a worthwhile cost. Issues identified included assessors circumventing the processes, the drawbacks of completely random selection for verification, and the most appropriate method for verifying measured EPC data. Member States are also aware that an EPC quality scheme is not only based on the quality of data. Figures 7 and 8 present actions that Member States consider most relevant to improving EPC quality and the degree in which they have been implemented, e.g., ‘more’ implemented in Figure 7, ‘less’ implemented in Figure 8.



Other actions included: more data available, better data sources, external consultation support, experts license cancellation

Figure 7: Actions ‘more’ implemented to improve EPC quality schemes.



Other actions included: CEN standards adoption, site visits, mandatory training for experts, changes in the EPC pricing (increase), simplified tools (existing buildings)

Figure 8: Actions ‘less’ implemented to improve EPC quality schemes.

Regarding the enforcement strategy to correct inaccurate EPCs, Member States generally rely on two approaches: some 'mechanisms in force' and 'sanctions'. It is important to note that it is best to have both a preventive and a reactive strategy in order to guarantee the quality of the EPC (Table 3).

Mechanisms in force	Sanctions
<ul style="list-style-type: none"> • Independent control systems • Complain from owners • Certified companies to issue EPCs • EPC inspection/control/verification • Information campaigns • Training of experts 	<ul style="list-style-type: none"> • Fines • Suspension/loss of accreditation (auditors/companies) • EPC rejection/cancelation • Publish the list of companies charged

Table 3: Enforcement strategy by Member States.

The quality of the EPC is also influenced by the cost of the EPC quality assessment scheme that is implemented and the overall cost of the EPC charged by the expert. The information gathered from 26 Member States led to the following observations:

- **EPC quality assessment scheme:** 11 Member States have evaluated the cost of running an EPC quality assessment scheme and adjusted it by implementing the following approaches:
 - Rely more on automatic software checks;
 - Change the compliance criteria;
 - Adjust the size of the samples checked every year;
 - Complement EPC checks with experts training;
 - Clarification of inspection protocols in place;
 - Simplified EPC calculations for existing residential buildings.
- **Overall cost of the EPC:** 14 Member States said that the cost of the EPC charged by the expert does not fairly represent the amount of effort for the expert to provide a qualitative EPC.

3.1.3 EPC experts

The EPBD states that EPCs must be issued by independent experts acting individually or through a company. At the end of 2020, CT5 evaluated the status of EPC experts in 25 Member States (including regions) and found that there were different categories of experts, ranging from 1 to 5, with an average of **2 categories of experts** in each state. **There were a total of approximately 160,000 experts** with more than half coming from Italy.

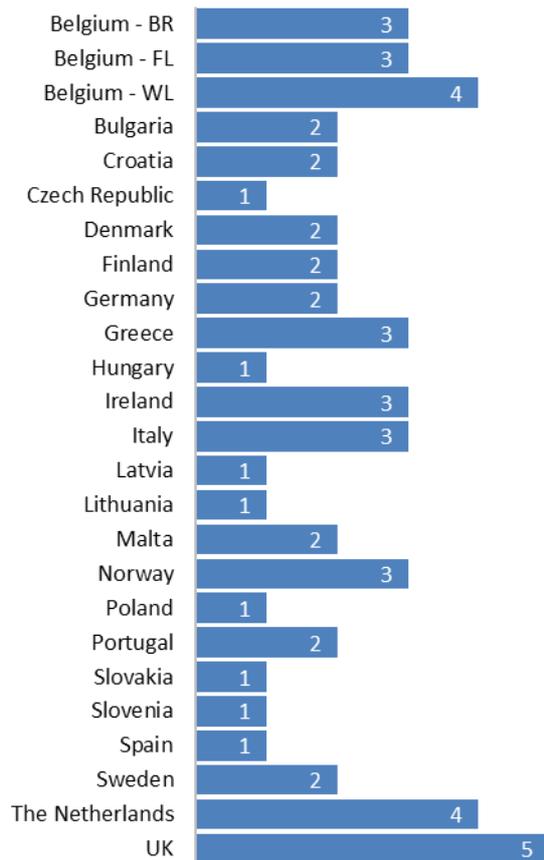


Figure 9: Number of categories of experts per Member State.

Country / Region	Number of experts	Reference data	Experts per 1,000 inhabitants
Belgium - BR	1,640	09/12/2019	1.34
Belgium - FL	2,579	2019	0.39
Belgium - WL	3,160	14/01/2020	0.87
Bulgaria	751	04/12/2019	0.11
Croatia	2,450	2020	0.61
Czech Republic	1,364	13/01/2020	0.13
Denmark	900	31/01/2020	0.15
Finland	1,195	09/02/2020	0.22
Greece	16,374	31/12/2019	1.53
Hungary	1,900	Early 2020	0.19
Ireland	720	03/02/2020	0.14
Italy	103,409	-	1.74
Malta	680	12/12/2019	1.32
Lithuania	668	2020	0.24
Poland	15,950	25/09/2020	0.42
Portugal	2,176	17/12/2019	0.21
Slovakia	395	31/12/2019	0.07
Slovenia	400	2020	0.19
Sweden	775	17/12/2019	0.07
The Netherlands	3,576	16/12/2019	0.21

Table 4: Number of qualified experts per Member State (compared to Member State' population in 2020).

Although the EPBD provides flexibility for Member States to decide whether the EPC is issued by an expert acting as single person or by companies, most decided to implement the first option. In some cases, EPCs can also be issued by companies, sometimes depending on the type of EPC, as seen in Table 5.

To issue an EPC it is necessary to have an appropriate education background. Most Member States require experts to be architects or engineers, while some also allow for other qualifications such as secondary school, experience based, or an accreditation system. Despite these options, the required qualifications in general depend on the building type. More details are included in Table 6.

Country / Region	Single person	Company / Legal
Belgium - BR	X	
Belgium - FL	X	X
Belgium - WL	X	X
Bulgaria		X
Croatia	X	X
Czech Republic	X	X
Denmark	X	X
Finland	X	
Germany	X	
Greece	X	X
Hungary	X	
Ireland	X	
Lithuania	X	
Malta	X	
Norway	X	X
Poland	X	
Portugal	X	
Slovakia	X	
Slovenia	X	
Spain	X	
Sweden	X	
The Netherlands	X	
UK	X	

Table 5: Type of entity that issues EPCs.

Country / Region	Architect	Engineer	Other
Belgium - BR	X	X	X
Belgium - FL	X	X	
Belgium - WL	X	X	X
Bulgaria	X	X	
Croatia	X	X	
Czech Republic	X	X	X
Denmark			X
Finland	X	X	X
Germany	X	X	X
Greece	X	X	
Hungary	X	X	
Ireland	X	X	X
Italy	X	X	X
Latvia			
Lithuania		X	X
Malta	X	X	
Norway	X	X	
Poland	X	X	X
Portugal	X	X	
Slovakia	X	X	
Slovenia	X	X	
Spain	X	X	X
Sweden		X	
The Netherlands			X
UK			X

Table 6: Background education needed to issue an EPC.

Some Member States have also imposed a minimum level of university degree (or equivalent) required for an expert to issue EPCs. In most cases the minimum level required is a bachelor's degree, as presented in Table 7.

Apart from type of education and degree level, some states require a certain level of experience that ranges from 0 to 10 years. In very specific cases, e.g., in Greece, the experience is measured in terms of energy audits performed. Further details are given in Table 8.

Country/ Region	Secondary	Bachelor	Master
Belgium - BR	X	?	?
Belgium - FL	?	?	?
Belgium - WL		X	X
Bulgaria	X	X	X
Croatia		X	X
Czech Republic	X		
Denmark	X		
Finland		X	X
Germany		X	X
Greece		X	
Hungary		X	
Ireland	X	X	
Italy	X	X	
Latvia			
Lithuania		X	X
Malta		X	
Norway		X	X
Poland		X	
Portugal		X	
Slovakia			X
Slovenia		X	
Spain			X
Sweden		X	X
The Netherlands	X	X	X
UK			

Table 7: Minimum level of degree required for an expert to issue EPCs.

Country/ Region	Case 1	Case 2	Case 3
Belgium - BR	-	2	
Belgium - FL			
Belgium - WL	-	2	
Bulgaria	2	3	6
Croatia	2	5	10
Czech Republic	3	6	
Denmark	2	3	
Finland	1	3	
Germany			
Greece	10 audits	30 audits	
Hungary			
Ireland			
Italy			
Latvia			
Lithuania	3		
Malta			
Norway	2	4	10
Poland	5		
Portugal	5		
Slovakia	3		
Slovenia	2		
Spain			
Sweden	5		
The Netherlands			
UK	Other		

Table 8: Minimum level of experience required for an expert to issue EPCs (in years except Greece).

In general, EPC experts must complete training to become a registered expert and be qualified to issue EPCs. A little more than **50%** of Member States **require experts to take mandatory training** while for **40% this training is voluntary**. The type of training is also differentiated by expert categories and can range from 8 to 115 hours with an **average training of 49 hours**.

Also to retain qualification, experts must attend **mandatory training in around 44%** of Member States while this **training is voluntary for around 36%**. The conditions for voluntary training are also quite varied, including the following options:

- yearly training;
- a certain number of training hours every 3 years or 5 years;
- experts could be requested to go to mandatory training;
- up-skill or refreshing trainings;
- yearly report of work done and training and re-examination every 5 years;
- voluntary training via a points system.

Table 9 provides detailed information of the level of training requested by Member States.

Country/ Region	BEFORE becoming an independent expert		AFTER becoming an independent expert	
	Type		Type	
	Mandatory	Voluntary	Mandatory	Voluntary
Belgium - BR	X			X
Belgium - FL	X		X	
Belgium - WL	X		X	
Bulgaria	X			X
Croatia	X		X	
Czech Republic		X	X	
Denmark			X	
Finland		X		X
Germany	X		X	
Greece		X		
Hungary		X	X	
Ireland	X	X		X
Italy	X			X
Latvia				
Lithuania	X		X	
Malta	X		X	
Norway				
Poland		X		X
Portugal		X		X
Slovakia		X		X
Slovenia	X			X
Spain		X		
Sweden	X		X	
The Netherlands		X	X	
UK	X		X	
Total	13	10	11	9

Table 9: Level of training requested my Member States.

As a complement to training, experts must pass an **examination to be qualified**, with the following variations:

- **20 Member States/regions require examinations** to become a qualified EPC expert;
- The average threshold of the examination ranges from 50% to +90% with an **average of 69% score**;
- The average success rate ranges from 33% to 100% with an **average of 71% rate**;
- In some cases, there's a **mix of written examination + oral examination**;
- Some countries have **different examination thresholds for different parts of the examination**;
- Some countries **mix written + oral with practical real cases**;
- Some countries have a **deducting score** (score negative for wrong answers).

The topics addressed in the EPC qualification examination are also different. Out of 25 assessed Member States, 23 identified 'building envelope and windows (U values, solar factors, etc)' as the topic most evaluated while only 4 check compliance for 'elevators/escalator's'. Interestingly, 'site visits' are only covered by 13 Member States. Figure 10 lists the topics addressed in the examination.

Regarding the number of topics evaluated in the examination, Portugal and Sweden are on top with 29 topics evaluated. Table 10 provides the number of topics covered by country.

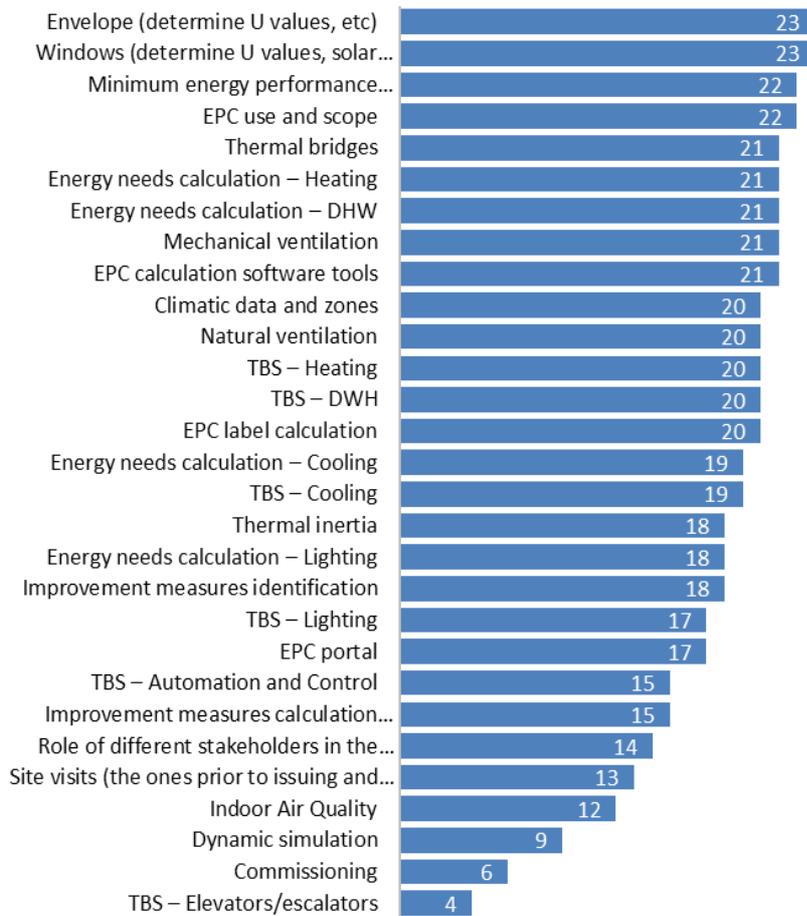


Figure 10: Topics addressed in the examination to obtain the EPC qualification.

Country/Region	Topics in the examination
Portugal	29
Sweden	29
Slovakia	28
Ireland	27
Malta	27
Croatia	26
Finland	26
Bulgaria	25
Hungary	25
Italy	25
UK	25
Slovenia	24
Czech Republic	23
Denmark	23
Greece	23
Belgium - FL	21
Belgium - WL	21
Lithuania	20
Poland	20
The Netherlands	22
Belgium - BR	12
Germany	9
Spain	7
Latvia	-
Norway	-

Table 10: Examination topics covered by Member States.

Complementary findings related to site visits where:

- Most building visits by experts are undertaken at completion of construction or renovation. At least **4 countries have no site visits for some or all building categories.**
- A site visit lasts on average **110 minutes.**
- Most Member States provide support to experts, with **5 states accompanying the experts on the site visits.**

Member States also provided their input on the link between the support provided to experts and the quality assessment results. Some statements collected where:

- *‘80% of the quality is due to the quality of the initial training; further support initiatives are diminished if initial training is not good’*
- *‘Not more than 10% are poor EPCs’*
- *‘Around 0.10% are poor EPCs’*
- *‘Quality assessment reports are available allowing to check compliance and results’*
- *‘Mandatory training in 2018 resulted in experts making less mistakes when inspecting a building’*

3.1.4 EPC databases

While the EPBD does not require Member States to set up EPC databases, many countries have done so (except Germany). Because there is no specific guidance on how to set up those databases, it is not surprising that different approaches have been taken. Member States are also required to transpose the INSPIRE Directive 2007/2/EC, which establishes an infrastructure for spatial information in Europe to support policies. To support the link between both directives, a project under the EU Location Framework produced a technical report addressing the 'Harmonisation of existing Energy Performance Certificate datasets'¹ which could be a starting point for adding value to EPCs and their related database. In addition, new requirements for databases were defined in the 2018 revised EPBD, offering an opportunity to create or upgrade existing EPC databases. There was discussion and sharing of best practice on the issue of different types of information stored in existing EPC databases and experience with interoperability with other databases and services. Member States recognised that it is important to solve these issues, as well as other concerns, e.g., compliance with the General Data Protection Regulation (GDPR), so that analysis of the information in databases can provide valuable insights into the building stock throughout the EU.

EPC databases provide a wealth of information that can be used for very different purposes such as increasing the knowledge of the building stock, supporting national renovation strategies or academic studies, and providing valuable insights for the financial sector or real estate agencies.

In order to use the EPC data, Member States have defined different types of categories of data. Out of the 31 countries/regions evaluated (which included the three regions of Belgium, Norway and the UK but excluded Germany because it does not have an EPC database), the following information was collected in mid-2019:

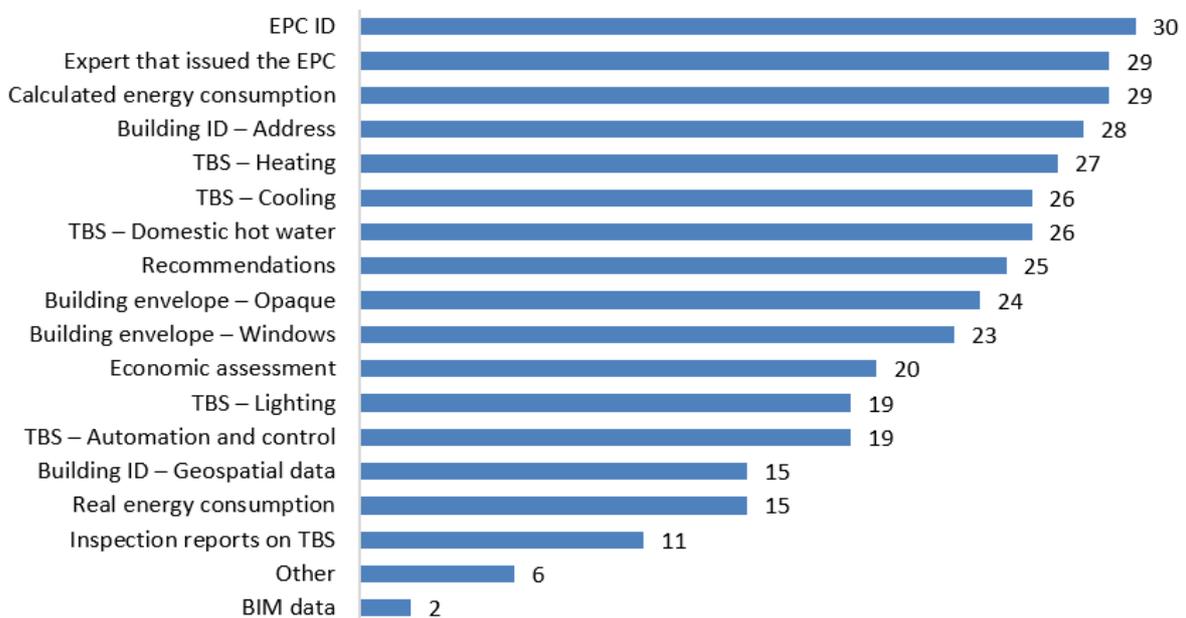


Figure 11: Type of data collected by Member States in the EPC database.

The detail and complexity of the EPC, including the number of variables collected, varies amongst Member States. On average, **195 variables for a residential EPC** and **211 variables for a non-residential EPC** were collected. The size of the database ranged from 0.3 gigabytes to 3.5 terabytes with **an average of 543 gigabytes**. This difference of size very much depends on the data stored and additional documentation or photos. On average, an EPC (and its related data/documents) takes around **1.5 megabytes of data storage**.

Country/Region	Average number of variables per EPC		EPC DB size (in GB)	EPC size (in kB)
	Residential	Non-residential		
Austria	500	600	5.0	52
Belgium - BR	200	-	130.0	592
Belgium - FL	750	750	950.0	550
Belgium - WL	400	-	1,300.0	2,363
Bulgaria	221	221	14.0	1,881
Cyprus	31	31	0.7	13
Czech Republic	-	-	750	-
Denmark	240	240	2,000.0	3,322
Estonia	-	-	430.0	14,903
Finland	80	80	64.0	580
Greece	95	190	2.0	1.8
Ireland	70	-	935.0	1,134
Italy	100	100	81.0	77
Lithuania	123	123	0.2	0.9
Luxembourg	165	-	-	-
Malta	100	100	-	-
Portugal	250	300	3,500.0	2,191
Romania	30	30	600.0	629
Slovakia	168	210	2.2	18
Slovenia	70	80	99.0	1,483
Spain	150	180	-	-
Sweden	200	200	196.0	294
The Netherlands	150	150	1.6	0

Table 11: Number of variables and size of EPC database.

The success of an EPC database comes from its use. Member States indicated that different interoperability processes have been implemented and data is flowing from and into the EPC database. The most connected services are governmental institutions, access to cadastre, academia and statistics offices. Figure 12 shows the types of service or entity that interoperate with the EPC database and the direction of the flow of data.

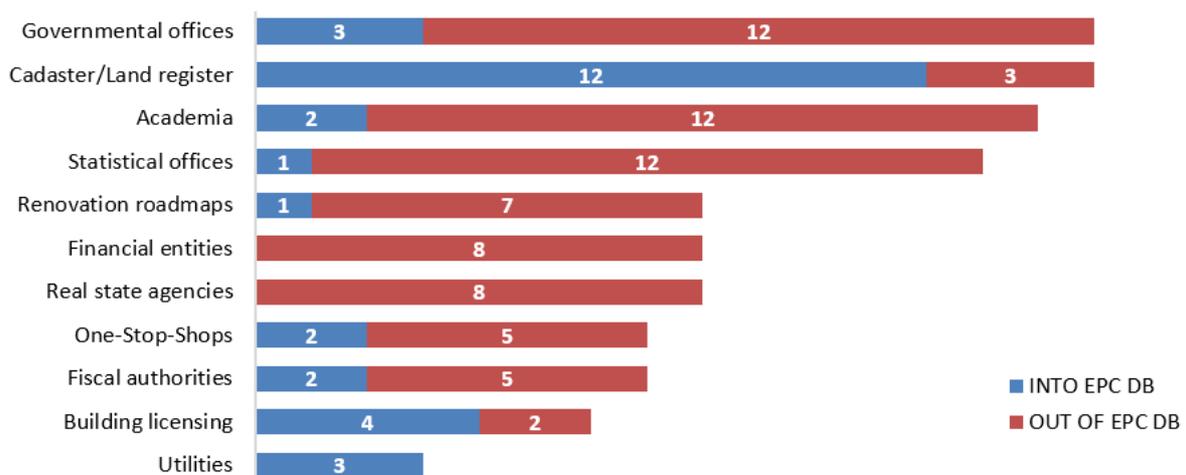


Figure 12: Type of entity that interoperates with the EPC database and the direction of the flow of data.

Additional findings on access of EPC data included:

- **2/3 of countries/regions** used EPC data for data mining, analytics, or similar uses;
- Although in most of the situations included in Figure 12 the data are also accessed in ‘real time’, **most of the accesses to the EPC database are undertaken ‘on request’**;
- **Data are generally shared on an ad hoc basis** though there are cases of real time data access. This is generally done through a webservice or a file transfer.

Figure 13 presents the case of Portugal where EPC data are accessed for three typologies of actions: i) support for policymaking, ii) incentivising renovation actions and iii) support for stakeholders.

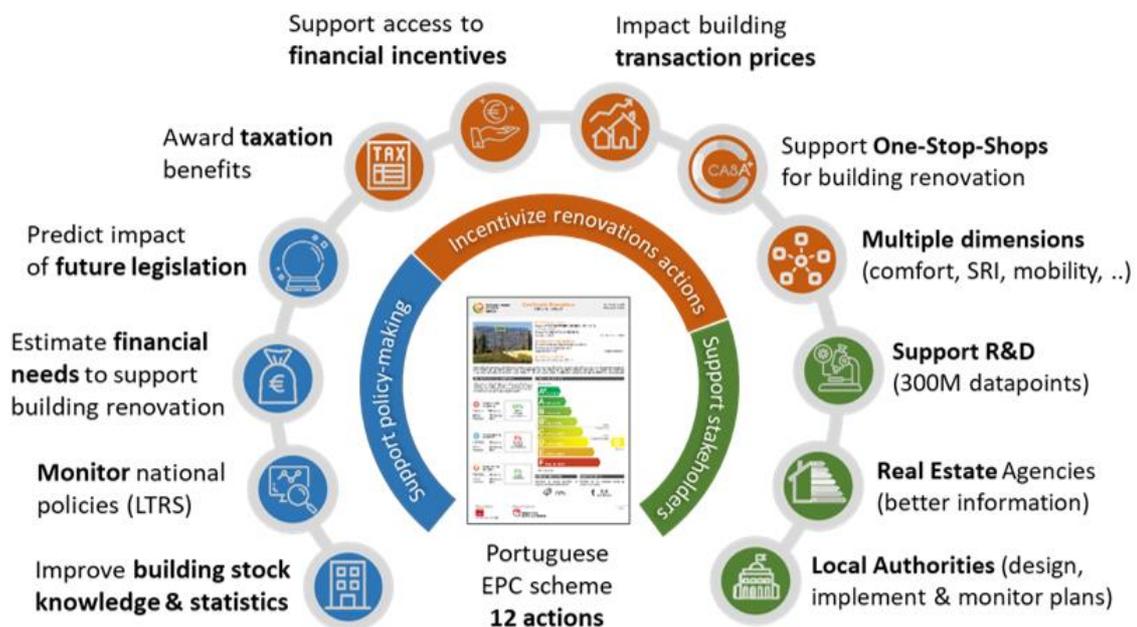


Figure 13: Use of EPC data in Portugal.

<p>Highlights of 3.1</p>	<p>Sessions evaluated the following topics:</p> <ol style="list-style-type: none"> 1. EPC schemes where different approaches from Member States to set-up an EPC framework were taken 2. Quality control, where the goal was to present best practice among the Member States on the EPC quality control scheme 3. EPC experts, where the goal was to understand the process behind the development and operation of independent experts 4. Databases, where the goal was to get an overview of the existing databases (where they exist, what data, structure, etc.) and to understand what actions have been taken by each Member States when using these data
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Main Outcomes of 3.1

For all four topics, a range of strategies have been implemented. A large number of EPCs have already been issued and EPCs are well embedded in many procedures. Member States have evolved in terms of layouts and indicators included in the EPC, with some aligning them with 2050 targets. There are several quality control schemes in place, training requirements for experts are diverse, and the method of storing data related to EPCs and experts varies. However, the results show that in all areas, an open and transparent system can achieve the best results because all parties understand the method used. This can result in more reliable data, which means it is more useful. Although there are concerns regarding data protection, most Member States have overcome them by putting appropriate controls in place aligned with the GDPR legal requirements.

3.2 The role of Energy Performance Certificates (EPC)

3.2.1 Link to renovation strategies

The EPBD revised in 2018 stresses the importance that each Member State should prepare regular medium- to long-term renovation strategies to underpin the transformation of residential and non-residential buildings into a highly energy efficient and decarbonised building stock by 2050. The EPC can support policy by drawing on its database to provide an overview of the energy performance of the national building stock, indicating the share of buildings to be renovated. An EPC can support individuals by providing information about measures a homeowner can take.

The EPBD calls for cost-effective approaches to renovation, which can also be found on the EPC. Member States should develop policies and actions to stimulate cost-effective deep renovation of buildings and to support targeted cost-effective measures and renovation. For example, they could introduce an optional scheme for Building Renovation Passports (BRP) where the EPC can provide information on the energy performance when it is issued. This helps Member States target the worst-performing segments of the national building stock and develop strategies to alleviate energy poverty. This can be linked to the mobilisation of investments and financial measures, where the EPC can be used to measure the improvement before and after renovation and to identify the less efficient buildings. This would make the EPC more relevant in overall and targeted strategies for energy performance of buildings.

Some Member States found that redesigning their EPC was very useful. They learned that by working with design companies and input from the general public, they could transform the EPC from a document that is technical and difficult to read into a tool that is more useful and user-friendly. This is achieved by making it visually attractive and focusing on the benefits to the user.

Another strategy could be setting up schemes to help owners to make use of the renovation measure information on the EPC. Owners may want to renovate but are unsure of the steps they should take. One-stop-shops have been set up in some Member States, bringing owners, experts and consultants together in the renovation process to achieve the aims of all parties. Importantly, overall simplification of the EPC process increased engagement. Many Member States are committed to adopting some of these approaches, and others, to further developing their EPCs.

Highlights of 3.2.1	There was a focus on the experiences in Member States linking the EPC with the Long-Term Renovation Strategies to evaluate examples of good practice as well as identifying possible ways of using the EPC in those strategies. The goal now is to boost the relevance of EPCs in renovation strategies throughout the EU.
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Main Outcomes of 3.2.1
<p>The re-design of the EPC emerged as a high priority in discussions on barriers and critical success factors in renovation strategies. The EPC label should be easy to read and visually attractive, with attention to the layout and, where possible, there should be a focus on images and icons to replace large blocks of text. It was widely agreed that it was crucial to focus on content that the user would find most beneficial.</p> <p>To complement the EPC, there could be websites that provide examples and stories of good practice in other similar homes, recommendations on what to do and how the owner can carry out the next steps. This could link to concepts most people would understand, for example, by equating a recommended measure to a CO₂ and cost saving or an increase in the value of the house.</p> <p>Making an EPC clearer, simpler and perhaps cheaper could engage more people and make them more likely to implement the recommendations. In most Member States, the EPC was originally designed by engineers or architects. Strategies for improvement included using skilled design and communication professionals in order to make the EPC easy to use and attractive. The experience in Belgium (Flanders) shows that consumer research and engagement are key factors in ensuring that the final document is tailored to the homeowner. Feedback from users is also useful for determining if further changes could and should be made.</p>

3.2.2 EPCs as a communication tool

In order to achieve the EU's long-term energy efficiency and climate targets, the rate of energy renovation of buildings must be increased. It is important to influence building owners by improving their awareness of the benefits of energy renovation. EPCs could be the first tool for providing guidance to building owners or managers, offering a unique opportunity to raise awareness, improve perception, and encourage action. The fact that EPCs are not sufficiently gaining the attention of building owners means the role of the EPC as a communication tool needs to be improved so that it is noticed and used by building owners. It will be important to learn more from the best practice of EPC advertising, materials, and design that focus on consumer needs and improve the relevance of EPCs, e.g., by offering step-by-step building renovation strategies.

Apart from its presentation, it is important to focus on the public perception and what motivates requests for an EPC. This will help to evaluate communication campaigns promoting the EPC at national or regional level. A session of the CA EPBD V was organised to compare Member States' main pages of the EPC layout, the public perception of their usability, and the various strategies used to promote EPCs.

Submissions from 13 Member States were analysed. There were several common themes and ideas as well as some differences. There were various differences in the information displayed, with some Member States showing a great deal of detail on the main page and a lot of text throughout the document. Others took a more icon- and picture-oriented approach to the EPC. A common approach is the use of a scale and label, which Member States found to be a useful communication tool. Almost all Member States said the

key driver for the EPC was that it was mandatory. On the other hand, this can lead to less direct engagement with building owners because they are obliged to carry out the assessment rather than doing it because it could provide clear tangible benefits. For about half of the Member States that provided input, these conclusions were based on perception rather than surveys or statistics.

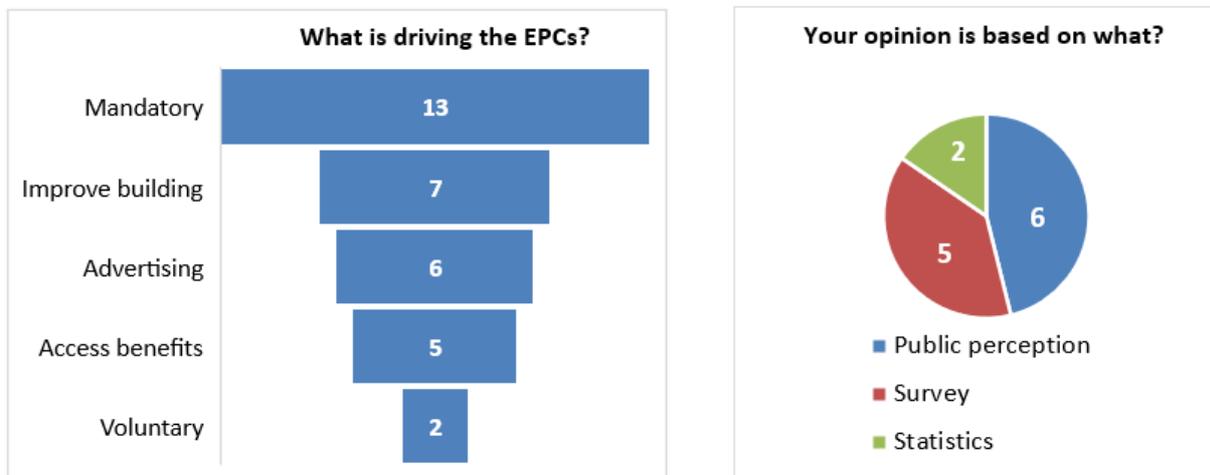


Figure 14: Results of the questionnaire on Member States EPC drivers.

Strategies for the revision process for the EPC layout improvement were discussed. The goals vary but some key ideas for improving the EPC include:

- Improving the layout of the EPC;
- Making the EPC more useful and relevant to the building owner;
- Linking the recommended measures to tangible benefits for the building owner; and
- Improving the public awareness and perception of the EPC.

Most Member States currently have a campaign for energy efficiency, many of which include EPCs. They use a range of strategies such as advertising in various forms of media and engagement with end-users. Some included non-traditional channels, e.g., YouTube adverts and TV soap operas, as a strategy to reach a wide audience.

The major barriers and challenges that can hamper the EPC promotion/advertising were:

- Low interest from consumers and third parties who:
 - do not see it as priority factor in purchasing/renting a house;
 - do not understand the EPC and the benefits in terms of energy savings;
- GDPR, EPC quality and perception (lack of trust, mandatory, etc.);
- No penalties available/difficult to control in digital/media formats;
- Absence of precise rules for publication;
- Database interoperability not available;
- Fast selling/renting process (issuing an EPC takes time);
- Lack of financing to promote the EPC.

Best practice identified to boost the EPC promotion/advertising included:

- Monitoring of compliance (e.g, inspection campaigns);
- Increase EPC visibility:
 - promote interoperability with third parties (EPC info available in their own platforms);
 - connecting EPC with financial incentives;
- Increase EPC awareness:
 - dialogue with professionals;
 - study of the impact of the EPC on the selling time and market value (promote the EPC as key value);
 - communication campaigns explaining the role of EPCs;
 - generate interest in buyers or tenants, so that they request this information as a condition of the purchase or rental.

Highlights of 3.2.2	<p>CT5 evaluated the following topics:</p> <ol style="list-style-type: none"> 1. EPC layout – what are the main pages of the EPC and what is presented on them? 2. EPC drivers – what is the public perception of the EPC and what drives their use? 3. EPC communication – what are the goals and strategies for EPC promotion?
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Main Outcomes of 3.2.2
<p>Key similarities among the various EPCs include the colour-coded scale and label which have been found to be useful in communicating the energy performance of a building. The differences between EPCs could also provide valuable information for any future revisions. One of the most important factors to take into account are the users and their needs. It is crucial that the EPC is targeted in a way that engages building owners. It was found that the information currently presented in an EPC is valuable; but many users are not reading the document to see this. Other suggestions included more use of visuals instead of text, a clearer illustration of the recommended measures, and more emphasis on the benefits to the building owner. Much of this can be learnt from consultation with a design or marketing company that specialises in communication with the public. Some Member States noted that use of communications firms was expensive but beneficial. With better presentation of the EPC, building owners were more engaged with the energy performance of their homes and more likely to carry out renovation works.</p>

Following the session conducted in May 2022, most of the EPC layouts were collected as posters. These posters are available in Annex 1 of this report with a first page, details about the number of EPC versions and content as well as access to the full EPC layout.

4. Lessons Learned and Recommendations

Topic	Main discussions and outcomes	Conclusion of topic	Future directions
Energy Performance Certificates schemes in EU	<ul style="list-style-type: none"> • High rate of adoption of an EPC database despite being voluntary under the EPBD • Having the data available and being shared is still limited, which could limit the usability of the EPC and the potential uses of its data • Several different quality control schemes are in place and there are diverse training requirements for experts in Member States • An open and transparent system can achieve the best results as all parties understand the methods used • More reliable data makes it more useful • There are concerns about data protection, but with appropriate controls in place, these issues can be overcome. • All Member States recognise the benefits that a database can bring • There are inconsistencies between the number of EPCs reported and declared • Keeping 'old' EPCs is useful in tracking progress across building stocks • There is a need to address GDPR compliance to reduce 	<ul style="list-style-type: none"> • Most Member States that adopted a database have quality control procedures in place that are compliant with Annex II of the EPBD • There are large variations in the percentage of EPCs and inspection reports that are checked • Most Member States require an examination to become certified as an expert • Requirements for training, both before and after the examination, are mixed • EPC databases available are useful for quality control and policy design • The information held in these databases is either not accessible or accessible only by request • Most Member States have already exceeded EPBD requirements in terms of setting up an EPC database • Databases are on different formats and structures (lack of consistency between them) • Solving issues across Member States is not straightforward as Member States may face different problems and have different contexts 	<ul style="list-style-type: none"> • An open and detailed quality control process could lead to better assessments • There is a need to address the data protection issues and open the EPC data to the public whenever it is possible to widen its potential use • Using INSPIRE will allow Member States to store information in a consistent, harmonised and comparable way • Through projects like ENERFUND, this data will become even more valuable and informative

Topic	Main discussions and outcomes	Conclusion of topic	Future directions
	<p>inconsistencies and ask people for consent in using their data</p> <ul style="list-style-type: none"> • Access to information and statistics are useful for issues such as policy making 	<p>(e.g., GDPR and national)</p>	
<p>The role of EPCs – linking to renovation strategies</p>	<ul style="list-style-type: none"> • Some Member States have found that redesigning their EPC has been very useful • Collaborating with design companies and the general public, the EPC can change from being a difficult to read technical document to one which the user wants to read • There are benefits in making the EPC document more visual and attractive as well as putting a focus on the benefits for the user • One-stop-shop is a concept to bring owners, experts and consultants together • An overall simplification of the EPC process can be an effective way to increase engagement 	<ul style="list-style-type: none"> • The EPC is recognised as a tool which can help to decide and promote renovation strategies <ul style="list-style-type: none"> • Building owners should be engaged in the EPC process and document • Current EPC designs and layout can in some cases be confusing and overwhelming to users and should be made simpler, more visual and more attractive • Information should be useful to the user by focusing on what they can do and how much they will save 	<ul style="list-style-type: none"> • Engage the right people in the EPC design layout (e.g., design and communication specialists) • Set up schemes that help owners make use of the renovation measure information on the certificate • Involve the end users to make the EPC more likely to be read and understood, making the renovation steps recognisable and implementable • Evaluate links between EPCs and Long-Term Renovation Strategies (LTRS)
<p>The role of EPCs – EPC as a communication tool</p>	<ul style="list-style-type: none"> • Colour coded scale and label are common among Member States and useful in communicating the energy efficiency of a building • Comparing EPCs can provide valuable information in any future revisions • EPCs can be targeted in a way that engages the users and their needs 	<ul style="list-style-type: none"> • EPCs contain a wealth of information to explain current energy performance and motivate the owner to implement more measures to increase that performance • EPC information can fail to reach the homeowner for several reasons including poor design or the owner just not reading the document 	<ul style="list-style-type: none"> • Collaborate with design experts to improve EPC communication and layout • Involve the building owners in the design process to have them more engaged with the energy efficiency of their homes and more likely to carry out renovation works • Continue with the information

Topic	Main discussions and outcomes	Conclusion of topic	Future directions
	<ul style="list-style-type: none"> • Information presented in an EPC is valuable but needs to be better presented to encourage more uses to read the document • Consultation of a design or marketing company that specialises in communication with the public is recommended 	<ul style="list-style-type: none"> • The key driver for the EPC was that it was mandatory • It is important for Member States to ensure the information is presented in a way that engages the user • All Member States have processes underway to redesign and advertise the EPC and related processes 	<p>campaigns to advertise the EPC and engage the homeowners (including using modern and unconventional methods)</p>

A key step for the CA EPBD is to learn from past meetings and Member States' practice, and to identify topics for future meetings. This will also give an idea of the current situation and the motivation of states, depending on their own national experience.

This report highlights approaches Member States used to set up and run an EPC framework. Though EPC data is well recognised as a key element for building renovation policy design and monitoring, more work is needed to understand the GDPR implications and limitations. The adoption of EPC databases amongst most of the Member States highlights the need for further standardisation in order to make the EPC data consistent and benchmarkable EU-wide. On the other hand, the building owner, the relevant stakeholders and design/communication professionals should be more closely involved in the EPC design and layout in order to guarantee the success of the building energy renovation, from certification to implementation.

Much work has been developed by Member States but there are still further challenges related to certification and training, the next generation of EPCs with a strong focus in EPC digitalisation, new/revised EPC indicators, the building capacity of independent experts, or the changes to EPC schemes in the revised 2018 EPBD and the upcoming version. Additional uses of EPCs can be related to buildings renovation strategies (e.g., Long Term Renovation Strategies, Building Renovation Passports, etc.), financing options, smart buildings (e.g., smart readiness indicator, building automation systems, etc.) or the challenges brought by the data protection issues in what concerns EPCs and building's data public access.

5. References

1. <https://op.europa.eu/en/publication-detail/-/publication/4b124f17-fb18-11eb-b520-01aa75ed71a1/language-en>

Annex 1 - EPC layout posters by Member States



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