



D5.1 Report on existing EPC attitudes, expectations and needs

Task 5.1 Analysis of user experience in current EPC schemes

WP5 Towards people-centred EPCs

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EXECUTIVE SUMMARY

crossCert D5.1 provides a fresh perspective on understanding energy performance certificates (EPCs) from a people-centred perspective. More specifically, it provides a framework for people-centred research of all EPC related things, with a specific focus on how policies are translated into practice through interaction between people, and on the elements of EPC assessment and certification service and its products (the EPCs). The essential features of the framework include tables for specification of key EPC stakeholders, tables for mapping of EPC journeys, and a structure for the development of specific use scenarios (see Annex). The background for understanding EPCs from the people-centred perspective is based on contrasting *theory* and *practice* as two largely separate perspectives on understanding existing EPBD policies and EPC schemes. Observations are derived from an initial literature review and largely focus on comparing qualitative insights from the last ten years of EPC assessment and certification practice (Backhaus et al. 2011; Bančić et al. 2021). The proposed crossCert framework largely draws on insights from social sciences and humanities, in particular theories on social objects (Ingold 2012; Nevile et al. 2014; Tateo 2018; Wagner et al. 2018) and social practices (Goffman 1990; Shove et al. 2014; Antczak and Beaudry 2019). In line with the original outline of crossCert WP5, special attention is given to the promotion and marketing of EPC products and services, design and user experience, and training of accredited EPC assessors. Although the deliverable is primarily intended for use within crossCert, and specifically in WP5 activities, the originality of our approach to the exploration of topics traditionally associated with technical sciences or policy-making makes D5.1 appealing to anyone interested in applied interdisciplinary research.

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GLOSSARY OF TERMS AND ACRONYMS

Buildings Performance Institute Europe	BPIE	Independent centre of expertise on the energy performance of buildings.
Consistency		Consistency refers to the similarity in the outputs of multiple assessments of the same homes. (Jenkins et al. 2017)
Continuous Professional Development	CPD	A term used to describe learning activities that professionals (both white and blue-collar) engage in to develop and enhance their knowledge, skills, and competences. These activities usually take the form of training or coaching, sometimes also referred to as upskilling.
Energy Performance of Building/-s	EPB	<p>Energy performance of buildings is a general technical specification of modelled energy use in buildings generated against a set of baseline assumptions, values, and standards.</p> <p>It is often used interchangeably with the notion of building energy efficiency, which has a slightly more comparative note, implying comparison of the calculated or measured buildings' energy performance to a certain set of benchmark values that represent a consensual normative value that enable us to describe buildings as being more or less energy efficient.</p>
Energy Performance of Buildings Directive	EPBD	The European Union's main policy (or legislative) instrument was set up in 2002/03 with the aim to improve the energy performance of housing stock across the EU. (Arcipowska et al. 2014: 10)
Energy Performance Certificate(s)	EPC(s)	Described either as a policy instrument or sets of standardised methods for summarising the energy efficiency of individual buildings, EPCs in practice are products of an energy performance assessment and certification service – an implementation of procedures and protocols defined and regulated by national EPC schemes.
EPC schemes		The national-level implementation of the EU-level EPBD policy framework, which was transferred into laws and regulations at the national level in a variety of ways, within the scope of autonomy of the EU-member states
EPC system		A functioning structured totality of responsible institutions, individual actors (animate), and their means (inanimate) necessary for the realisation of the EPC schemes, including the specific methods, standardized procedures, laws and other means and resources that simultaneously enable and characterize the individual national EPC schemes.
EPC assessors		Also referred to as EPC issuers, are independent EPC experts entitled (qualified and certified or otherwise officially validated by the responsible national accreditation bodies) to assess a building's energy performance and issuing of EPCs.
Harmonisation		<p>The action or process of making something consistent or compatible.</p> <p>crossCert seeks to address EPC harmonization issues in the following areas (as defined in WP6, T6.3):</p>

		<ul style="list-style-type: none"> • Regulations for energy performance assessment and certification, • Input and output parameters of the EPC process, • EPC databases, • EPC checking and verification procedures, • Training requirements and certification procedures for experts working on EPCs, • Human friendliness of the EPC, • Reduction of the performance gap, • Marketing the buildings with a better EPC class. <p>The result of this task will be a report containing guidelines for the convergence of EPCs in the EU (D6.5).</p>
Homogeneity of EPCs		See harmonisation.
Indoor Environmental Quality	IEQ	Concept encompassing indoor air quality (IAQ), as well as other health, safety, and comfort issues such as thermal comfort and lighting (glare prevention, lighting levels, etc.).
Member States	MS	Refers to the EU member states.
Minimum Energy Performance requirements	MEPS	<p>A requirement for existing buildings to meet a minimum performance standard by a given date or at a chosen trigger point in the building lifecycle. By setting a standard, or a trajectory of rising standards, MEPS can drive the desired depth of renovation. By setting out which buildings must be improved by when, they can also boost the renovation rate.</p> <p>More specifically, the EU Minimum Energy Performance Standards (MEPS)¹ are a system to require the renovation of the worst performing buildings; those in Energy Performance Certificate (EPC) classes G or F.</p>
Quality		The notion of quality in contexts related to EPC assessment and certification is being used rather generally, typically with reference to technical and methodological aspects (excellence) of reliability and trustworthiness of EPC products and services. The notion is also used in reference to non-tangible qualitative aspects, such as value, usefulness, and experience (e.g. comfort, aesthetics, environmental responsibility). For example, Jenkins et al. define quality as “the visible basis of EPC recommendations and whether there is evidence that procedure has been followed correctly” (2017).
Smart Readiness Indicator	SRI	Smartness of a building refers to the ability of a building or its systems to sense, interpret, communicate, and actively respond in an efficient manner to changing condition in relation to the operation of technical building systems or the external environment (including energy grids) and to demands from building occupants. ²

¹ See: <https://ec.europa.eu/commission/presscorner/detail/en/QANDA_21_6686>, 22. 2. 2022.

² See: <<https://ec.europa.eu/newsroom/ener/newsletter-archives/34153>>, 22. 2. 2022.

1 Introduction

This deliverable is part of crossCert WP5 and a final deliverable of Task 5.1. It has a double purpose – firstly to set the stage for understanding EPC assessment and certification as a social practice, which implies stressing the **people-centred aspects** of EPC products (EPCs) and services (the assessment and certification service), and secondly, to outline a working version of crossCert **WP5 framework** for concerted research, analysis and interpretation of all EPC-related things from the people-centred perspective.

The first chapter is intended as an **extended interpretation of crossCert WP5**, and serves as an orientation for leaders of Tasks 5.2, 5.3 and 5.4 in relation to contents presented in D5.1. To a lesser degree, it is also informative for other members of the consortium, particularly leaders of other WPs. It outlines the unique characteristics of WP5 within the project, its target audience, its goals and scope, a structured outline of the individual WP5 tasks, key relations to crossCert research activities beyond WP5, key research challenges within WP5, and finally, key research principles to follow.

The second chapter aims to define what **people-centred perspective** might mean in contexts referring to EPC assessment and certification and with regard to the improvement of EPC products and services, which we seek to promote within crossCert WP5. The chapter derives insights from **contrasting theory and practice** as two largely separate perspectives on understanding existing EPBD policies and national EPC schemes. It starts with a focus on **theoretical references** to EPCs and the EPBD and continues with a short EPC-focused **summary of EPBD history**. That is followed by a structured characterisation of how **EPC schemes and EPCs** were and continue to be experienced **in practice**. This part is largely based on insights from two studies (first dating back to 2011 and second to 2021), both of which focused on people-centred aspects and derived conclusion based qualitative research. Finally, the chapter outlines how **EPCs** can be observed, analysed, and interpreted **as social objects** (i.e. objects featuring in social interactions), as opposed to observing them as material entities, theoretical concepts or policy instruments. Given its somewhat original contribution to a different (people-centred) understanding of EPC schemes and EPCs, the second chapter is interesting for readers within and beyond crossCert.

The third chapter is a proposition for the **WP5 research framework**. As such, it is most relevant for WP5 task leaders, but is also relevant for readers interested in an applied qualitative approach for the identification of people-centred aspects of policy initiatives (or their elements) similar to the EPBD and the national EPC schemes. The chapter starts with a **step-by-step outline of the WP5 framework**, which is followed by a working definition of **EPC products and services**, a framework for the specification of key **stakeholder groups** and individual stakeholder profiles, frameworks for the specification of **EPC journeys** (both for the process of creating EPCs and for training EPC assessors), and a list of categories for **qualitative analysis of barriers and challenges** identified within the framework.

The fourth and final chapter suggests the development of **specific EPC use scenarios** as an approach to integrate the elements discussed somewhat individually in the previous two chapters. It starts by outlining two approaches to theoretical **analysis of complex real-life phenomena**, both rooted in social sciences. Firstly, the chapter promotes a **dramaturgical analysis** of EPC assessment and certification, conceptualizing EPC assessment and certification as a theatre performance. The following section suggests looking at EPC assessment and certification as a form of **social practice**, an approach that allows one to grasp dynamic social and cultural patterns of everyday life by looking at specific configurations of materials, meanings and competences. That is followed by a proposed structure that promotes building **EPC use scenarios** around specific goals and user profiles. This section is followed by an extensive complementary list of **recommendations derived from existing literature**, which serves as a basis for developing research activities within WP5 tasks. Finally, we further contextualize our quest (and ambition) for developing meaningful people-centred recommendations within crossCert WP5 with short reflections on EPCs in the light of the challenge of dissimilarity of EPC schemes across Europe, the slippery notion of value, the significance of social networks and interpersonal relations, buildings as spaces of meaning, and finally EPCs in the light of social justice. Similarly to the second chapter, this part of the report promotes

an original approach to analysis and interpretation of EPC schemes and EPCs. As such it will be interesting for anyone within and beyond crossCert looking for a fresh perspective on what applied **people-centred exploration** of specific objects, processes and concepts might look like, particularly in areas dominated by quantitative research approaches and cognitive models associated, as in our case, with policy-making or technical excellence.

Ultimately, the objective of D5.1 is to serve as a vantage point and inspiration for further work within crossCert WP5. It does not provide definite answers to all of the open questions concerning EPCs in the light of our applied people-centred ambitions. It does, however, offer an abundance of theoretical and practical ideas that have the potential for meaningful use within crossCert, and more, that contribute to the challenging field of applied interdisciplinary research.

2 crossCert WP5 outline

The first chapter is an extended interpretation of crossCert WP5. It serves as an orientation for leaders of Tasks 5.2, 5.3 and 5.4 in relation to contents presented in D5.1. To a lesser degree, it is also informative for other members of the consortium, particularly leaders of other WPs. It outlines the unique characteristics of WP5 within the project, its target audience, its goals and scope, a structured summary of the individual WP5 tasks, key relations to crossCert research activities beyond WP5, key research challenges within WP5 and finally, key research principles to follow.

2.1 WP 5 explained

The **purpose of WP5 within crossCert** is to produce recommendations for making the existing Energy Performance Certification (EPC) schemes and systems across the EU more people-centred. By **people-centred EPC schemes** we mean EPC products and services (see section 4.1) designed to serve people and societies in their everyday-life contexts while fulfilling its primary objective of decreasing energy use in buildings, and not (only) as a policy tool to realize, or rather, work towards the realization of **the projected and essentialized functional purposes of EPCs**, which we will also discuss (see section 3.1).

More specifically, WP5 first and foremost seeks to identify potential improvements to the existing EPC systems in the area of delivery and design for both the EPC service(s) and EPC product(s). In particular, we will be focusing on changes for the benefit of EPC users (both expert and general users) and accredited EPC assessors, also referred to as EPC issuers. For the users, we are interested in possible improvements in the area of user experience of EPC products and services. For certified EPC assessors, we are interested in improvements to their practice of training and work. We also search for potential improvements in the interaction which takes place between various EPC user-profiles and EPC assessors along the entire EPC assessment process. Finally, WP5 also looks at how the public image and perception of existing EPCs is (and was) built through promotion and marketing in order to identify potential improvements in that specific area.

This deliverable therefore aims to firstly provide ground for understanding EPC schemes and systems from the people-centred perspective, and secondly, provides a framework designed to identify and specify areas where EPC schemes are failing to deliver the expected or wanted results, and to identify and specify recommendations for making feasible, concrete and creative interventions which could lead to improvements of EPC products and services.

2.1.1 The unique characteristics of WP5

In practical terms, WP5 will build its conclusions largely on insights from **qualitative (ethnography-inspired) research methods**, commonly used in the likes of anthropological, sociological, and user experience (UX) research. These include hermeneutic (interpretational) analysis of existing literature and materials, semi-structured (stakeholder) interviews, participatory (co-production) workshops, field visits etc. Such an approach will enable us to engage people in a co-creative People-Centred Development research process (see Figure 1) and co-produce our conclusions and recommendations through a sequence of research and analysis iterations.

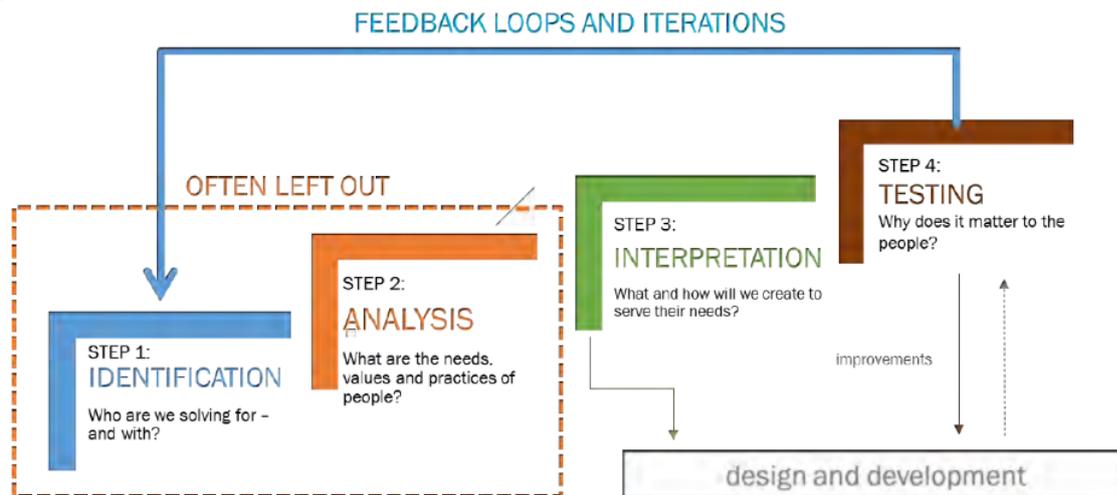


Figure 1: Four steps of People Centred Development approach (in Cerinšek et al. 2021: 799).

Most importantly, such an approach will enable WP5 researchers to focus on the people and highlight the practical and performative aspects of EPC assessment and certification. We will frame this as an **EPC journey**, meaning the sequence of stages and tasks necessary for an EPC to come to existence, including all of the stakeholders, materials and other elements of practice involved in the process. Similarly, we will describe the **EPC training journey** of certified EPC assessors, which will describe the stages and tasks necessary to train an EPC assessor, but also aspects of their work practice and continuous professional development.

What is unique to our approach is that we will be focusing on the people's perspective, observing **EPC schemes as assemblies of social processes and objects**, and not on the specifics of data quality and calculation methodology necessary to produce an EPC. Such "backstage" aspects of the certification system, although undoubtedly relevant in practice, will be secondary in WP5. In other words, the trustworthiness and accuracy of data and information communicated by the EPC, which is subject to specifics of the calculation methodology and theory, is not our focus. In fact, the quality of EPCs (assuming that the assessment was done right) should sometimes be taken for granted in order to focus on aspects that are otherwise often obscured by theory-centred arguments, such as "bad quality" outputs due to "inappropriate" calculation methodology. After all, the battle regarding EPC theory and methods can only be fought and (hopefully) won in the relevant spheres of expertise and policymaking, and not in the interaction between the EPC assessors and EPC users, where a quality product and service is (or should be) simply delivered, rather than negotiated.

To really focus on people-centred aspects, our working assumption should therefore be that quality of EPC as a product of quality certification procedure is not an issue, and that the service delivery network can factually deliver theoretically and methodologically unquestionable EPCs with reliable data and good quality information.

However, the fact is that such an assumption will not always be helpful in our quest for robust recommendations. EPC systems are complex and involve a large number of stakeholders, institutions, policy implementations, methods, software, and also tools and materials (including buildings with their variety of typologies, systems, building materials etc.). In this regard, one of the purposes of WP5 is to highlight that **EPC schemes must be understood dynamically – as a process rather than focusing only on EPCs as the final result**. In crossCert WP5, instead of focusing on the technical difficulties of producing a reliable and good quality EPB assessment, we will seek to address the practical aspects, beyond what the

expert community might agree to be the theoretical and methodological standard (e.g. from the perspective of building physics) to produce a reliable, good quality EPC³.

In WP5, we will look at EPC schemes from the point of **practice**, trying to understand how the complex EPC systems come together and materialize in simple, comprehensive real-life scenarios and cases. Our vantage point is that understanding of EPCs cannot and must not be reduced to the simplified process of issuing an EPC and its material output(s), which today is a piece of paper and tomorrow perhaps a piece of software. Rather, we must understand EPCs as an integral part of the complex realities associated with buildings where people live and work, end especially so if we wish to make impactful changes to the existing EPC schemes that will create meaningful value in people's lives.

Such approach also allows us to shift the focus beyond individual EPC "users" and consider how people use EPCs as members of wider social units and groups, such as households, social class or identity communities, which may have implications on the ways people live, work, and perhaps most significantly in the context of our interest, the ways people make decisions. For all these reasons, EPCs in WP5 will not be considered as simple as material objects or functional actions of individuals, but as social objects and practices that constitute a part of the complex realities of everyday life.

2.1.2 WP5 target audience

First and foremost, the outcomes of WP5 should inform policymakers, policy implementors, EPC scheme developers, accrediting bodies who certify official EPC assessors and other representatives of the EPC service support network (see 4.2.1) on both the EU and national levels. Our conclusions and recommendations should provide them with a range of options to make positive changes to the existing EPC schemes in the area of EPC services and products, both in the area of development and delivery.

Secondly, the outcomes will inform a wide range of next-generation EPC sister projects⁴ that deal with similar topics but from a different perspective. The report should highlight the fact, that EPC schemes are more than just compilations of methods, standards, and policies, and that EPCs are not only results or containers of derived technical facts, that both the EPC scheme and EPCs have their own quality and substance as social objects and social processes, which should not be ignored if we – as a community of like-minded projects – are to pursue changes that should make EPCs meaningful in people's lives.

Thirdly, periodic results of WP5, starting with this deliverable, will inform work within the crossCert consortium. Perhaps most significantly, they will inform WP6, focused on harmonising EPCs across the EU, and WP7, focused on project outreach. With other crossCert WPs, the flow of information will be in the benefit of WP5, meaning that WP5 will be informed by work and results from other WPs (WP2, WP3, and WP4) rather than the other way around. However, to a degree, findings and proceedings in WP5 might be relevant in some specific segments or at least influence researchers' attitudes and perceptions on EPC products and services.

Finally, the outcomes of WP5 might be considered potentially interesting and useful for a range of EPC users, however, under the condition that the output information will be tailored to their specific needs and interests. While the outcomes will undoubtedly be relevant for their benefit, the theory and analysis as such are not likely in their particular interest if it does not convey useful information (e.g. how does a certification process look like and one can best prepare for an assessment to yield optimal results).

³ Good quality EPCs refers to consensual recognition within the expert community that EPCs are a reliable indicator of buildings' energy performance, also for (but not limited to) planning possible (or necessary) management and renovation measures to optimize buildings' energy performance.

⁴ Projects working on improvement of EPBD and EPC concept, supporting development of the so-called next generation EPCs. These include U-CERT, D²EPC, E-DYCE, EUB SuperHub, iBRoad2EPC, TIMEPAC, EPC-RECAST and others. (see <https://u-certproject.eu/epc-sister-projects/>)

2.1.3 The goals and scope of WP5

In line with the general orientation of crossCert, **WP5 is applicative and goal oriented**. This means we will produce comprehensive and well-defined recommendations with capacity to meaningfully inform potential future changes to the existing EPC systems and the development of future EPCs, also referred to as “the next-generation EPCs”. To achieve the outlined purpose and ambition of WP5, we will pursue the following goals:

- To digest the **existing knowledge** related to the EPC schemes and extract people-centred aspects → Part of the work within WP5 is necessary dedicated to a deeper understanding of the EPC schemes and systems, particularly the reasons why the impact of EPC schemes has been so-far limited. Outcomes and conclusions based on literature and research review will inform the formation of recommendations and provide a fresh perspective on the issues and challenges hindering key national-level stakeholders from realizing the full (theoretical) potential of EPC schemes.
- To define and specify **EPC stakeholder profiles** → WP5 will specify stakeholder profiles clustered in three groups - (1) EPC service support network, (2) EPC expert users and (3) EPC general users.
- To outline the **value proposition** of EPCs → In WP5 we will explore what kind of practical (everyday-life) value EPCs can have (currently) and might have (theoretically, or in the future) for a range of identified user profiles.
- To describe a generalized universal **EPC journey** → A table (map) of the EPC journey (see ANNEX 2: The EPC journey) is a tool for our analysis and interpretation and will eventually describe a generalized sequence of stages and steps necessary for an EPC to come to existence.
- To describe a generalized **EPC training journey** → Similarly, we will describe a generalized sequence of stages or steps that make up a career⁵ of a professional EPC issuer/assessor certified by the responsible authorities at the national level, which will include not only training but also their work practice, periodic quality checks, and periodic upskilling or Continuous Professional Development (CPD).
- To identify **challenges, issues and shortcomings** of existing EPC schemes → Based on the identified value proposition for individual profiles, we will try to identify what hinders its realisation. The two journey frameworks will serve as a tool to pin-down and identify problems and bottlenecks that could or should be addressed in order to optimize the existing EPC schemes and systems.
- To contextualize our conclusions with **qualitative information** → Our research will be informed by existing qualitative information, such as descriptions of good and bad practices based on real-life experiences of the existing EPC schemes and EPC journey to indicate the potential for improvement.
- To produce **recommendations for improvement** of existing and development of future EPC products and services → Based on the analysis and research activities we will produce recommendations for optimization and improvement of the two outlined EPC journeys. For the users, this includes recommendations on improved user experience and design of the EPCs (graphical elements, content structure, interactive features and functionalities etc.). For the trainees and certification practitioners, this includes recommendations for improved training and Continuous Professional Development (CPD), and possibly recommendations for improved interaction with their clients (EPC users) and other stakeholders.

By focusing on the outlined goals, WP5 will analyse the knowledge and experience created by approximately two decades of running and developing the EPC schemes across the EU. The

⁵ For most professionals working as professional EPC assessors represent only one segment of their work. Even so, we can think and describe their EPC-related training and work journey largely independently. By “career” we therefore refer to the training and work of individuals that is directly related to professional (accredited) EPC assessments and certification.

recommendations we aim to produce will identify useful implications for the development of next-generation EPCs based on past and current experiences with EPCs. Implementation of our recommendations is expected to increase the odds that next-generation EPCs to be more useful in practice, both for the expert and the general public, and not only for them to be better “accepted” than the past and existing ones. This is particularly important in the light of the overarching goal of our investigation, which **is to render EPCs into a driver for building renovation and improvement in building energy performance**. As accurately pointed out in the project proposal, “*the role of EPCs to boost building energy renovation is considered relevant in the literature, because they are fundamental elements to provide better information to all the actors involved in the building renovation process*” (crossCert proposal, page 4). This observation, as we shall see, sums up the overarching agenda of the EU institutions who in the past decades pushed the policies that created EPC schemes as we know them today.

The “acceptance” issue no.1

Seeking for acceptance of EPC products and services, or more precisely, the affirmation of their acceptance simply by means of constructing narratives in favour of EPCs that masks the enforcement of the policy, should be seen as problematic. As pointed out by the EU Energy Social Sciences and Humanities Innovation Forum on the case of Green Deal policy, the search for acceptance assumes that the solutions we are working on are “already decided on, and that they are inherently acceptable” (Robison and Foulds 2021: 2). Such approach (or attitude) prioritizes “public consultations” over real engagement (ibid.), which again relates to the point, that it is *not* enough to simply rely on the premise that EPCs are here to stay no matter what.

It is true, that EPCs are – and will continue to be – enshrined in the EU policy, and hence inevitably a part of national regulations and legislation. Yet it is also true, that if we fail to enhance their meaningful substance, they will continue to be perceived as they already are – in some cases perhaps as a useful tool, but much more widely as something dull and unwanted – a tax, an administrative necessity, a nuisance.

In those terms, we therefore frame our research activities in WP5 as a way to propagate a positive change, one that generates real impact first, and only secondly to refer to “acceptance” of EPCs as a consequence of the change.

2.1.4 WP5 tasks – a breakdown

2.1.4.1 T5.1- Analysis of user experience in current EPC schemes.

Leader: IRI UL; Participants: all contributors to WP5

	Specific focus	Activities and goals	Expected outcomes
T5.1	Setting the stage for understanding and researching existing (and future) EPC schemes from the people-centred perspective.	<p>Activities</p> <ul style="list-style-type: none"> Literature review. Coordination of WP5 task leaders on the direction of WP5 research. <p>Goals</p> <ul style="list-style-type: none"> To outline key principles for people-centred understanding of EPC schemes. To outline how WP5 meaningfully relates to other crossCert WPs. To identify key reference literature and resources for WP5. To provide the analysis and interpretation framework for the following WP5 tasks (the journey and EPC stakeholder tables). To outline potentials and challenges of further investigation in the light of existing knowledge. 	<ul style="list-style-type: none"> An initial overview and synthesis of existing literature and knowledge resources. Framework for concerted research in the following WP5 tasks, including first versions of: <ul style="list-style-type: none"> EPC profiles tables (3x), EPC journeys tables (2x), and templates for: <ul style="list-style-type: none"> Reporting recommendations & conclusions, Informed consent form.

2.1.4.2 T5.2 – Research on design and experience of EPC products and services.

Leader: HWU; Participants: Energy Agencies, IRI UL, UZ

	Specific focus	Activities and goals	Expected outcomes
T5.2	Analysis of existing EPC schemes from the point of view of: <ul style="list-style-type: none"> Design and experience of the certification service, delivered by 	<p>Activities</p> <ul style="list-style-type: none"> Coordination and guidance of partners who will conduct participatory workshops. At least two participatory (co-production) design workshops with EPC users. 	<ul style="list-style-type: none"> An updated generalized outline of an EPC journey as set in T5.1. An updated list of EPC profiles (particularly the two EPC user groups), value propositions for the

	<p>certified EPC assessors and other relevant stakeholders making up the service delivery network, and</p> <ul style="list-style-type: none"> • Design and experience of EPCs as the end products of the certification. 	<p>Goals</p> <ul style="list-style-type: none"> • To provide guidance on how to research design and experience of EPC products and services from the people-centred perspective, particularly through co-production workshops (this relates also to activities beyond WP5, for example user-engagement activities in WP3). • To provide a framework for understanding of different forms of EPCs favoured by different user groups → which content is (more) relevant and how it is communicated (e.g. user-friendly features for interactivity and satisfactory experience). • To provide recommendations for the improved design and user experience of EPC-related products and services for building users and owners (e.g. by making user-experience more engaging and meaningful, bringing value and core purpose of EPCs to life). Our areas of interest may include: <ul style="list-style-type: none"> ○ Investing into building renovation/retrofitting, ○ Changing behavioural (building use) patterns, ○ Decision-making when buying houses (e.g. do energy efficiency and indoor environmental quality matter when making decisions? Can -or how can- EPCs have a significant role in this?) • In relation to T5.4, to indicate which specific forms and areas of promotional and marketing approaches related to EPCs are most interesting for research and analysis. • To explore how to combine different ways of EPC assessment and issuing practice according to our suggested crossCert solutions (related to parallel tasks from other WPs). • In relation with T5.3, potentially also to provide indications on what kind of modifications to the existing practice of (training for) EPB assessments and issuing of EPCs is needed in order to improve user experience and value of EPCs for the end-user, also with regard to what is viable and what not, taken country specifics into considerations. • In relation to T4.3, to indicate the information needed (and how to communicate it) to decide on a potential investment and which could 	<p>individualized profiles, and identified challenges and issues.</p> <ul style="list-style-type: none"> • A list of recommendations on the design and delivery of EPC products and services from the end-user perspective.
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		<p>be included in the EPC or the EPC translating tool (conclusions and best practice examples in to be included in D4.3, due M29).</p> <ul style="list-style-type: none"> In relation to T3.2, to establish an iterative knowledge exchange process through which T5.2 will help identify the type of information that may be more successful in motivating action on renovations. Through an iterative process T5.2 should help to identify if current modelling approaches are suitable to provide such type of information. 	
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2.1.4.3 T5.3 – Research on training and education of certified EPC issuers

Leader: ENEFFECT; Participants: Energy Agencies, HWU, IRI UL, UZ

	Specific focus	Activities and goals	Expected outcomes
T5.3	<p>Analysis of existing practices in training and education of professional EPC issuers, including the related work (certification) practices, also referred to as EPC service delivery (relation to T5.2).</p>	<p>Activities</p> <ul style="list-style-type: none"> Literature and policy review. Engaging with informants through interviews and collaborative workshops. <p>Goals</p> <ul style="list-style-type: none"> To understand how EPC assessors currently co-create and engage with the existing EPC markets (and beyond, e.g. with the building renovation markets). To identify good and bad training practices. To explore possible approaches to optimization of time and effort invested towards issuing an EPC and communicating it. To provide recommendations for the regulators and accrediting bodies, who enable and support the EPC ecosystem, regarding training and continuous development of EPC assessors' skills and competences. Recommendations will be directed towards increasing EPC assessors' capacity to deliver high-quality service, particular in accounting for and adapting to rapid change in policy and technology. To identify the needs and expectations of EPC issuers regarding various aspects of their EPC-related career. Depending on the outcomes of both T5.2 and T5.3, to produce recommendations for changes to training and work practices of EPC 	<ul style="list-style-type: none"> An updated generalized outline of an EPC training journey as set in T5.1. An updated list of EPC profiles (particularly the service delivery network stakeholder group), value propositions for the individualized profiles, and identified challenges and issues. A list of recommendations on the design and delivery of training for certified EPC assessors, including aspects of design and delivery of the certification services from the EPC assessors' perspective.

		<p>assessors in order to optimize the balance of costs (or efforts) and benefits for EPC assessors.</p> <ul style="list-style-type: none"> In relation to parallel tasks and WPs (e.g. T3.2), to establish an iterative knowledge exchange process through which T5.3 will help clarify if existing systems of training and certification of EPC assessors have the capacity to accommodate the proposed crossCert solutions as well as what changes should be done to increase such capacity (e.g. answering the questions – how will the crossCert proposed metrics and scales affect the training and work of EPC issuers or how public entities and/or private companies developing EPC related software comment on issues regarding the data format for storage and exchange, and what kind of impact this is likely to have on the training and work of EPC issuers). T5.3 should therefore help outline recommendations on how to optimize the existing EPC system in the area that relates to the practice of education and work of certified EPC assessors. 	
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2.1.4.4 T5.4 – Research on EPC promotion and marketing.

Leader: CA; Participants: Energy Agencies, HWU, IRI UL, UZ

	Specific focus	Activities and goals	Expected outcomes
T5.4	Analysis of past and current approaches to promotion and marketing of EPC schemes.	<p>Activities</p> <ul style="list-style-type: none"> Literature and policy review (desk research). Analysis and interpretation of how EPCs are represented and perceived in the public sphere, both within expert and non-expert communities → CA will request information from stakeholders within crossCert consortium and beyond, particularly on existing marketing approaches and measures of sister projects' knowledge about existing EPC promotion activities (e.g. what kind of information did the cluster projects already have that we can use for 5.4; examples of promotional/informational processes, obligations and materials in their own countries that already exist). Interviews with key stakeholders and complementary qualitative research methods (e.g. focus groups with project partners, cluster (or sister) projects, the crossCert LOI contacts, Energy Agencies and municipalities). 	<ul style="list-style-type: none"> A reviewed generalized outline of the EPC journeys, as set in T5.1 and updated in tasks 5.2 and 5.3. A set of recommendations for the improvement of EPC schemes from the promotion and marketing points of view, including recommendations to be followed when setting up future marketing and promotion strategies for EPC products and services.

		<p>Goals</p> <ul style="list-style-type: none"> • To define what makes a bad and what makes a good practice in terms of user-centred promotion measures for EPCs. • To understand – from the promotion and marketing perspective – how we can make EPCs actually useful for people and how to ensure meaningful and easy use of EPCs. • In relation to T5.2, to explore potentials for marketing different forms of EPCs (based on inputs from T5.2), and the other way around, to explore how to market EPCs to different user groups. • To identify and collect good and bad practices (successes and failures) in promotion and marketing of existing EPC products and services (or similar policy instruments) across the EU. • To suggest how marketing and promotion of EPCs is, could or should be different for individual user groups and/or profiles. • To explore possibilities for improving the public image of the existing EPCs and certification schemes, including positive publicity, engagement of specialized marketing channels, and capitalizing on examples of success stories (positive experiences with EPC products and services), highlighting the added value and potentials of EPCs. 	
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2.1.4.5 T5.5 – Guidelines for the development of people-centred EPC products and services.

Leader: IRI UL; Participants: All contributors to WP5

	Specific focus	Activities and goals	Expected outcomes
T5.5	Concerted people-centred outcomes of WP5 and crossCert in general.	<p>Activities</p> <ul style="list-style-type: none"> • A review of T5.2, 5.3 and 5.4 outcomes. <p>Goals</p>	<ul style="list-style-type: none"> • A final WP5 report. • A short publication (e.g. a booklet) including a set of recommendations for the development of people-centred EPC schemes contextualized with

		<ul style="list-style-type: none"> • To synchronise and refine WP5 outcomes in order to collect them in a concerted final deliverable and publication, also with regard to outcomes from other crossCert WPs. • In relation to WP6, to define what kind of output would best contribute to the goal of harmonisation of EPC approaches across the EU, particularly in the following points: <ul style="list-style-type: none"> ○ Training requirements and certification procedures for experts working on EPCs, ○ Human friendliness of the EPC, ○ Reduction of the performance gap, ○ Marketing the buildings with better EPC class. 	<p>examples of good practices and visual examples.</p>
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2.1.5 Relations beyond WP5

Transfer of useful information ● Transfer contents relevant for WP5, particularly good (and bad) practices in the design of EPCs, training of EPC issuers, and finally promotion and marketing of EPCs (e.g. T6.1 to communicate useful real-life based insights shared by the EPC Community members). In the context of WP5, task leaders will always be interested in the following:

- Design of EPC products and services,
- Training of EPC issuers,
- Promotion and marketing of EPCs, and
- Examples of good and bad practices of all of the above.

Ideally, activities planned in other WPs (e.g. testing activities in WP2) should reflect some aspects considered in WP5, as indicated in the points above. In practice, this will be a challenge due to the evolving nature of research projects, and will require good communication and collaboration between WP leaders. As for WP5, its primary focus is research and analysis of the existing state in order to evaluate potential (of) future interventions in existing EPC schemes. Active experimentation and testing of our recommendations are largely beyond our capacity, although there will be elements of that, particularly in T5.2.

Categorise the specific aspects of EPCs that we are seeking to improve ● As a project we should try to be concise regarding what exactly we are seeking to improve and specify concrete aspects that are in the scope of crossCert to address. In the WP5 context, we can suspect that crossCert research participants will have lots of opinions on EPC schemes, some also which are outside the scope of crossCert. We should therefore try to obtain specific feedback on the aspects that are indeed within our scope.

Build consensus on crossCert target groups ● It is somewhat unclear which target groups we will focus on in individual WPs. This is due to:

- A wide variety of EPC stakeholder and user profiles,
- The uncertainty regarding our capacity to engage with certain target groups (e.g. CA already stated, that they will have a hard time accessing representatives of the general public).

In the following months it would be good to specify how different WPs specify their target groups (or target markets) and define which criteria define them (e.g. geographical area, the purpose of use of EPCs, type of building they use). This includes answering questions such as:

- Does it make sense to obtain feedback on EPC schemes from e.g. energy assessor (as an important stakeholder group) across different countries for preferred EPC solutions?
- Or do we need to distinguish solutions by country (or cluster of countries) based on their different methodologies of producing EPCs?

Recognizing and dealing with country-specifics ● crossCert should define the method and criteria for identifying country specific. A consensus should be made concerning how we deal with whatever is labelled as being "country-specific" at the level of individual tasks, or even more specifically, for each research activity. This includes answering questions, such as – do we move away from country-specific issues entirely and try to identify the best-fit-for-all solution (which would, for example, also affect how data and testing are run in WP2), or do we recognise different strands of EPC approaches that exist across Europe as legitimate? Or perhaps do we feel country-specific have less impact on the areas that crossCert are looking to focus on?

Build consensus on how to standardise the description of EPC schemes within crossCert ● EPC schemes and approaches across the various countries vary significantly. Although visually many EPCs look similar, and EPC services are conducted in similar ways, for WP5 it is important to categorize the different aspects of EPC products and services in a replicable way, which also goes for the EPC framework (calculation methodology, software, application, output metrics etc.). In the following months, crossCert should therefore build consensus regarding how we define and describe:

- The EPC systems (calculation methods, software, legislative requirements);
- EPC services (application of the system in practice, taking the three key aspects into account – training of issuers, EPC services, and EPCs as products);
- EPC products (aesthetically; design-wise).

Define how to analyse and test people-centred aspects of design, EPC issuers' training, and EPC promotion and marketing in our home countries ● This is a specific task within each of the WP5 tasks. Based on how the task is set, analysis and interpretation (understanding and deductive identification of possible improvements) is the primary approach within WP5, informed but not reliant on extensive testing (also due to the fact, that certain solutions, such as digital EPCs, will be explored on a purely theoretical level but are expected to be discussed to a considerable extent).

Clarify certain notions and concepts in relation to WP5 ● As stated already, WP5 will focus on the design and content of EPC services and products, including delivery and presentation of EPCs. Although in our research we intentionally try to distance ourselves from dealing with challenges and issues that exist within the system that enable EPC schemes (particularly in terms of methods and theories that enable calculation and issuing of EPCs and have no direct relation to the users of EPCs) our conclusions will have significance for how the established EPC systems work, based on a working assumption that there is capacity and interest for change. For this reason, a clear understanding of notions such as harmonisation, and understanding how, for example, “the intention to test both numerical parameters and procedures/methodologies” is relevant to WP5, is important to produce conclusions that will meaningfully inform other areas of crossCert.

Clarify expectations towards WP5 tasks ● Conceptually, WP5 does not anticipate active testing of conclusions and recommendations that the WP is supposed to produce. Any testing exercises should therefore be designed and realised within individual WP5 tasks in relation to the ongoing activities and related tasks in other crossCert WPs.

Clarify expectations of WP5 towards other crossCert WPs ● Similarly to the above, expectations of individual WP5 tasks towards the other project WPs and tasks should be defined and continuously adjusted depending on the project developments.

2.2 Key WP5 research challenges

Research in WP5 will certainly face several challenges. Some of the most evident might be summarized as the following questions:

- **How to account for, analyse, and interpret various relevant aspects and types of information that we will gather through our research?** This refers to the challenge of meaningful processing and categorisation of gathered materials and insights.
- **How to account for differences between countries (country-specifics)?** This refers to the diversity of national and regional specifics, the fact that EPC schemes are factually very different across the EU and beyond.
- **How to standardise the description of EPC approaches across the various countries?** This refers to the fact that although visually (or aesthetically) many EPCs look similar, we want to make sure that we are categorising the different aspects of the EPC framework (calculation methodology, software, application, output metrics etc) in a replicable way.
- **How to account for aspects that refer to the expected futures of EPC schemes?** crossCert is a goal-driven project, which means that we will be thinking about possible futures. That implies our conclusions will be to a degree speculative. Providing rigorous recommendations that refer to uncertain futures therefore present a real challenge.
- **How to systematically account for aspects such as human behaviour, or the microclimate?** This refers to answering questions, such as – how is this taken into account in the EPC calculation? Is there is any information about it in the EPC? And are there any measures related to that in the EPC?

- **How to account for the complexity of EPC systems, particularly thinking about it at an EU level?** Thinking about potential improvements of EPC schemes requires consideration of a large number of factors and variables, such as technical and methodological aspects, organisational and policy aspects, practical aspects, financial aspects, etc. As such, the search for possible solutions is an extremely challenging task already at the level of individual member states, let alone Europe as a whole.
- **How exactly should cross-testing account for (if at all) the visual and practical (including interactional, and interpersonal) aspects of existing EPC schemes?** Standardisation of the approach will be important for T5.2 and other workshops/engagement activities with user groups.
- **How to deal with the notion of the value of EPCs?** This refers to differences in measuring “value” from a qualitative, legislative (policy), or financial perspective.
- **Can (and should) we keep the fixation on financial and material value in check, and how can we do this effectively?** As an addition to the previous point, it is worth noting the predominant implication in discussions on the “value” of EPC products and services tends to focus on measurable, quantifiable indicators, such as funds, quantities of things saved or spent, numbers of surveys collected etc. In anthropology, the question of value is based on qualitative insights, which comes from “*the interest in what really matters to people around the world and in how cultures differ not simply as systems of power, production, or meaning, but as schemes that help to define what is ultimately good and desirable in life*” (Robbins and Sommerschuch 2016: 8–9).
- **How do we offer a fresh perspective into the research and development of EPC schemes, one that will complement the existing and predominant expert and policy-biased analyses?** The topic of Energy Performance Certification is – by default – expert and policy-biased. People-centred aspects do not seem to be at the forefront of EPC policy development, or at least, they are not considered to be among top priorities.

These are some of the questions that indicate the challenge awaiting crossCert community of researchers and experts. Some of the questions might find an answer in this deliverable, and others will have to be addressed as the project progresses. Despite our best intentions, we have to also recognize that some of the posed questions might turn out to be too difficult for crossCert WP5 to be able to offer a definite answer, and possibly also open entirely new venues for future research.

2.3 Key WP5 research principles

With regard to the qualitative orientation of our work, inspired by ethnography as a set of qualitative methods and research principles, the following aspects should be considered in the planning and executions of all crossCert WP5 research activities:

- **Search for connections** → Ethnography seeks connections between meanings, artefacts, and practices encountered in different spheres of life. It tries to demonstrate how different aspects are integrated or linked to each other through what is sometimes referred to as *thick-description* – conceptually dense descriptions, which tend to reflect the complexities of everyday life and illustrate how researchers’ key conclusions are organically connected, and based on the experience of real everyday-life processes, events and artefacts.
- **Involve participants early and meaningfully** → When undertaking citizen engagement, EU Energy Social Sciences and Humanities Innovation Forum stressed aspects of timing, influence and inclusivity. “*Timing means the need to engage citizens early on to find out their needs and wants; influence means ensuring that citizen input will practically impact on actions taken (listening is not enough); and inclusivity means accounting for citizen diversity and how some will be vulnerable and harder to reach.*” (Robison and Foulds 2021: 2)
- **Build on existing knowledge** → Ethnography seeks to ground its conclusions in existing (peer-reviewed) theories from a variety of disciplines.

- **Derive conclusions based on experience** → A conscious (researcher's) experience is the basis for making ethnographic conclusions, identifying patterns, and developing meaningful interpretation. Reflections and testimonials of other people come second, and the existing literature third.
- **Empathize** → Acknowledge the Other's worldview, and better yet, try to understand it through concrete experience. In crossCert terms, put yourself in the position of one or more representatives of specific EPC profiles, as concretely and as naively as possible.
- **Build relations(hips)** → Ethnography tends to treat research participants as co-workers, rather than informants or users. For this, a level of trust, honesty and mutual recognition should be established. It is important to acknowledge their point of view, and try to (empathically) understand their way of reasoning about the topics that you are discussing.
- **Observe ethical principles** → A conscious observance of potential ethical risks and adherence to standards of ethical conduct is core to ethnographic practice.

Ethnographer's ethical standards

Ethical principles in ethnographic research include good practices in qualitative research, such as:

- In public space, and whenever reasonably practicable with consideration of the context of the research, **participants should be made aware** of the presence and purpose of the researcher.
- In non-public space, obtaining an **Informed Consent** (see **iError! El resultado no es válido para una tabla.**) from our research participants that explicitly states the right to withdraw without consequence, as well as the option of preservation of anonymity and confidentiality.
- **Conscious observance of ethical risks**, particularly in the case of specific sensitivities and responsibilities, such as when working with children, vulnerable adults, or other social minorities.
- Ethnographers have a duty to **protect the privacy and confidentiality of research participants**. This includes protection of all original records of their research from unauthorised access, and a duty to ensure that nothing that is published or otherwise made public, through textual or audio-visual media, would permit the identification of participants' personal information that would put their welfare or security at risk, even against their explicit consent.
- In observation studies, where behaviour patterns are observed without the subject's knowledge, ethnographers must take care **not to infringe what may be referred to as the "private space" of an individual or group**. The scope of 'private space' will vary from culture to culture. Where practicable, ethnographers should attempt to obtain consent post hoc. In any event, they should interpret behaviour patterns that appear deliberately to make observation difficult as a tacit refusal of permission to be observed.

3 Understanding EPCs

In this chapter we contrast theory and practice as two largely separate perspectives on understanding existing EPBD policies and EPC schemes. Such approach enables us to highlight some relevant considerations in our quest for improved EPC schemes and EPCs from the people-centred perspective.

3.1 Basic theoretical characterisations

At the policy level, Energy Performance Certificates (EPCs) are referred to as “policy instruments” that aim to improve (Pascual Pascuas et al. 2017: 103) or enhance (Arcipowska et al. 2014: 6) the energy performance of buildings. More specifically, EPCs are described as a “*key policy instrument that can assist government[s] in reducing energy consumption in the building sector*” (IEA by Arcipowska et al. 2014: 12). As such, EPCs have been an integral part of Energy Performance of Buildings Directive (EPBDs) – the European Union’s main policy (or legislative) instrument set up in 2002/03 with the aim to improve the energy performance of housing stock across the EU (Arcipowska et al. 2014: 10). More recently, they are also seen as “instrumental” in the EU Renovation Wave Strategy⁶ (Litiu and Hoelign 2021: 83). To contrast the policy-centred perspective, here is a technical characterisation of EPCs by Jenkins et al.:

“Energy Performance Certificates (EPC), and their accompanying assessment methodologies, are well-established across many European countries as standardised methods for summarising the energy efficiency of individual buildings. Using relatively simple inputs, and basic building physics, an estimation is provided that attempts to grade the efficiency of a property, assuming a “typical” operation within that building. /.../ EPCs allow for a large number of buildings to be assessed across a country in a similar way, thus producing stockwide results that can indicate a change of energy efficiency over time. They are essentially a means of energy compliance checking, rather than being detailed and representative energy models, using a form of ‘steady-state’ modelling that intentionally simplifies many aspects of thermodynamics.” (Jenkins et al. 2017: 480)

Before we look at some practice-based characterizations of the EPC concept, we will first look at some of the generalized **theoretical aims and goals**, sometimes also referred to as purposes or functions, by which EPCs are often characterized in the existing literature and publications.

3.1.1 Theoretical aims, goals, functions, or purposes of EPCs

To provide an assessment (technical evaluation) of the energy performance of a building and propose potential measures to improve the performance ● This aspect usually implies usefulness for property owners (in case of homeowners) and managers (in case of institutions or business entities). As such, EPCs are presented as a “powerful marketing tool to create demand for energy efficiency in buildings” (Arcipowska et al. 2014: 10), or more specifically, a tool “*to influence future investments by defining the most attractive cost-effective measures*” (Pascual Pascuas et al. 2017: 103);

To influence the real-estate market by serving as an objective reference point for valuation of quality of housing, and thus as one of the indicators of property’s value ● This refers to EPCs as an “information tool for building owners, occupiers and the property actors when a building or building unit is sold or rented” (Arcipowska et al. 2014: 10), which implies usefulness for anyone seeking to evaluate properties on the real-estate market – also but not exclusively – with reference to their energy performance rating. As such, “*EPCs have the potential to become an important benchmarking tool for the energy performance of buildings. Therefore, it is expected to directly apply to the work of real estate agents, property owners, property managers, etc.*” (Arcipowska et al. 2014: 48). Moreover, EPCs as proxies for “objective information to assess, compare and improve their properties’ energy performance” is expected not only to “transform” the

⁶ Renovation Wave is a strategy published by the European Commission in 2020, aimed at boosting building renovation and retrofitting across the EU. See <https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en>, 5. 2. 2022.

real estate market for owners and buyers of property, but tenants as well. As stated by the Buildings Performance Institute Europe (BPIE), "*the greater the tenant's interest, the greater is the incentive for the owner to improve the energy efficiency of the building*" (Arcipowska et al. 2014: 12).

EPCs as energy labels

By its definition and design, the EPC concept was set to evolve into an energy labelling scheme for buildings, similar to the ones for products, such as electrical appliances or cars. The purpose is to "transform" (Arcipowska et al. 2014: 12) or "shift" (Mudgal et al. 2013: 22) both the building renovation as well as real estate markets towards greater energy efficiency, a step which "*integrates policies into a strategy to ensure that the average product sold moves towards greater energy efficiency*" (Boardman Mudgal et al. 2013: 22). As Mudgal et al. explains the logic behind linking a number of such tools:

The combination of instruments into a strategic framework maximises the effectiveness of each. As some of these instruments are mainly at EU level and others at Member State level, the challenge of combining them into a coherent whole with sufficient clout is of course not an insignificant challenge. The value of labelling, whether for appliances, equipment, vehicles or buildings, should therefore not be understood in isolation but as an essential (enabling) part of driving innovation for better energy performance in a given market. (Mudgal et al. 2013: 23)

The difficulty Mudgal et al. highlight, which was elaborately analysed by Killip (2011), is that **property markets are much more complex than product markets**, and by the same token, more challenging to transform. Moreover, "*existing buildings are in terms of scale more important and in terms of complexity more difficult to get right than new build*" (Mudgal et al. 2013: 23). In the light of one of the principal purposes of EPCs, which is to support building renovations and retrofitting, this is not good news. As we will discuss later in the document, such conclusions have important implication for how EPCs should be perceived and developed in the future.

To direct the construction market developments and support the sector of building renovations and retrofitting

● This slightly more complex projected purpose of EPCs refers to creating "*demand-driven market for energy efficiency in the building sector*" (Arcipowska et al. 2014: 12), which implies indirect usefulness of EPCs, or the EPC system as a whole, for stakeholders that make up the construction sector, particularly the subsections of building renovation and retrofitting. This purpose comes true under assumption that the first two listed characteristics of EPCs are realised in practice, which as a consequence is expected to drive market demand for more energy efficient buildings, which includes new-builds but most importantly renovation and retrofitting of the existing building stock.

EPCs as a market(-link)ing tool

As indicated with regard to EPCs as energy labels, EPC schemes and systems were conceived with the intention to intervene in (or interfere with) markets. Yet there is another way of looking at it, or perhaps a more specified one, which is seeing **EPCs as links between the existing markets**. Mudgal et al. summarize Killip's argument:

"Killip argues that the EPC creates, for the first time, a link between two separate markets: the market for property transactions (including sales and rentals) and the market for refurbishment (including installation of energy efficiency measures, installation of micro-generation technology, and a general set of services referred to as repair, maintenance and improvement (RMI)). Within the market for refurbishment, the market for RMI is by far the most dominant in value and Killip suggests that significant savings can be made in cost and disruption by seeking to integrate energy-saving refurbishments with the 'normal' operation of this market. The link between the two markets is created through what Killip refers to as the 'dual rating' of the EPC, which in the UK contains both a current rating and a potential rating. That is, the current rating of a property and where it could get to if the Article 3 § 2 (Directive 2002/91/EC) recommendations were followed." (Mudgal et al. 2013: 23)

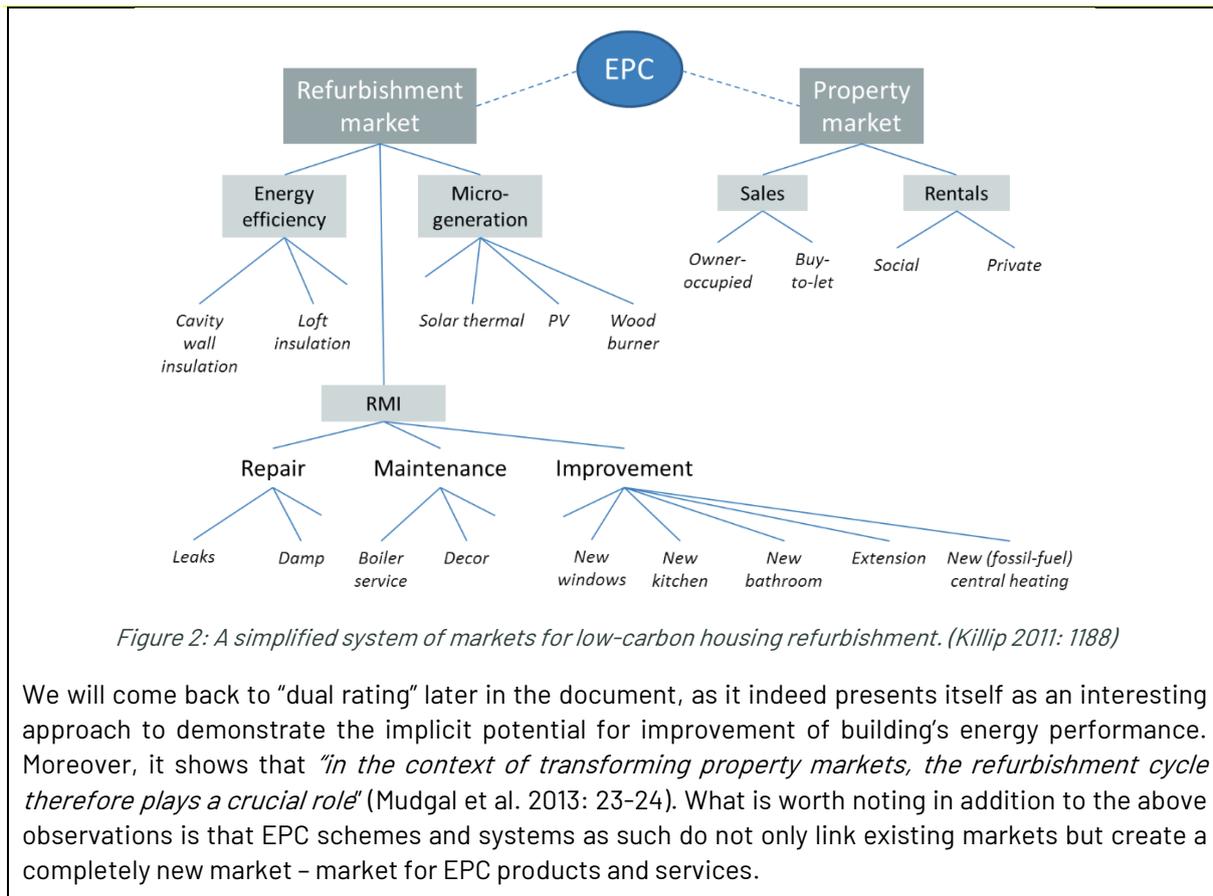


Figure 2: A simplified system of markets for low-carbon housing refurbishment. (Killip 2011: 1188)

We will come back to “dual rating” later in the document, as it indeed presents itself as an interesting approach to demonstrate the implicit potential for improvement of building’s energy performance. Moreover, it shows that “in the context of transforming property markets, the refurbishment cycle therefore plays a crucial role” (Mudgal et al. 2013: 23-24). What is worth noting in addition to the above observations is that EPC schemes and systems as such do not only link existing markets but create a completely new market – market for EPC products and services.

To provide ground for systemic data-based analysis and evaluation of the quality of housing stock, as well as monitoring and evaluation of improvements through time ● This aspect usually refers to public or private institutions (less frequently for individuals) at various levels, interested in using EPCs as an information or data source for a variety of analysis and interpretation purposes, such as “data mapping of the EU building stock” (Arcipowska et al. 2014: 10). Significantly, this also has implications for the evaluation of how impactful EPBD policies really are. A phrased by BPIE:

“EPCs have the potential to be important sources of information on the energy performance of the EU building stock and impact of renovation measures. Consequently, EPCs may be more than an information tool and become an effective instrument to map the energy performance of a country’s building stock, to monitor the impact of building policies or even to support minimum energy requirements within the regulatory process.”(Arcipowska et al. 2014: 10)

3.1.2 Theoretical wishful thinking and policy mantras

The above characterizations of EPC schemes and EPCs we intentionally stressed the theoretical aspect. Such descriptions *project* a number of potentials onto the concept of EPC schemes and systems, which paints an appealing image of EPCs, one that forecasts or anticipates desirable and agreeable impact that EPBD policies are expected to have in a variety of contexts in which they are implemented.

Existing literature often tends to focus on such theoretical “potentials” of EPCs, perhaps as a way to stress or expose the anticipated value EPCs are expected create. These expectations are based on a certain set of expert assumptions (technical, economy, or policy-related) and emerge in variants, taking one or more of the outlined purposes and develop it in relation to a particular use case and/or user profile. Stressing such “*positive attitudes and generous potential*” (Bančić et al. 2021: 20), albeit theoretical, tends to lead authors to calls for more compliance and further work on the concept, which is best illustrated by BPIE’s example:

“The concept of Energy Performance Certification and its potential impact in reducing energy consumption and greenhouse gas emissions in the building sector is also widely recognised at the

Member State level [EC, 2013]. Therefore, the compliance of the EPC schemes across Europe should be supported both in the revisions of the EPBD and EED legislations.”(Arcipowska et al. 2014: 47)

Clearly theories are based on some sort of research work, and are certainly relevant. Nonetheless, it is interesting to note that existing literature rarely tends to provide any qualitative, practice-based insights, which would *report on*, or perhaps contextualize (rather than project through different quantifiable or theorising procedures) just how successful existing policies are in practice – how they are experienced, what they involve as an organic, lived process of interaction between the key stakeholders. Such qualitative insights, if at all reported, often tend to be deduced to the quantities, or rather, statistical indicators – numbers of EPC assessments done, number of surveys answered, the measurable output of the surveys etc.

Such approaches lack the capacity to highlight more complex, practical issues and difficulties of existing EPC schemes. Moreover, one might argue they obscure them, and most importantly, obscure the voices of people who live EPC schemes and EPCs as part of their everyday life (most obviously EPC assessors), or lived through its individual practical realisation (the people who ordered EPC assessment as a service). One might even go a step further, and argue that by disproportionately stressing the theoretical aspects promoting theoretical potentials and expectations, the existing literature seemingly aligns itself with the “widely recognised” opinions, which already seems to have established EPCs as a fact – they are here to stay no matter what.

This report tries to do the opposite, and stress both the existing practice-based insights, as well as the need for a more obvious balance and methodological diversity of argumentation in the future research and development – hopefully in the policy making and implementation in general, and not only in the area of EPBD and EPC policy. As such, this report tries to be a counterweighted on the outlined theory-practice scale. Concerning the practice of existing EPC schemes, it is a challenge to the benefit-of-the-doubt to which many authors (more or less quietly) subscribe to in their many – certainly well founded! – theoretical arguments in favour of EPBDs and EPCs. We believe this is a legitimate way to identify cracks in theoretical “wishful thinking”, and highlight implications relevant to our people-centred agenda.

In such way, we firstly and truly intend to produce relevant and useful recommendations for making EPCs more people-centred. Secondly, and no less importantly, we also want to avoid making the search for people-centred improvements of EPBD policies, EPC schemes and EPCs into a ritualized policy-making mantra. As we show in the next section of the report, the research and development process in the field of EPBD policy has seemingly become an iterative process, without a clear prospect for a definite conclusion. In this regard, we want to avoid fostering a practice of (ab)using the notion people-centred as a discursive mean – a buzz-word, if you will – to create an illusion that this iterative process is in any way “people-centred,” while in practice it might remain policy-, techno-, and/or expert-centred. Despite the uncertainty of future, we are determined to succeed – at least in theory. How this might influence any aspect of practice is largely beyond the scope of our results and best intentions.

3.2 A short (and incomplete) history of EPBDs

In 2014, BPIE noted that after 5 to 12 years of experience in implementing the Energy Performance Certification in Europe, EPC schemes were “not yet fully implemented” nor were they “sufficiently enforced” in all member states (Arcipowska et al. 2014: 52). And what is the status today? In 2022, we have at least 11 active projects, all focused on various aspects of the EPC schemes and systems across Europe,

worth € 23.782.269,75⁷ of the EU funds, that will together do approximately 33 years⁸ of expert research and development work. If we take this on top of all past EU-funded projects with a similar purpose, one could argue that this is not an insignificant amount of work, finance, and energy that is – and continues to be – invested towards improvement of the concept.

Recently RHEVA – the Federation of European Heating, Ventilation and Air Conditioning Associations – in their response to the most recent revision of the EPBD, which is currently in progress, explicitly stated that *“current EPCs are not consistent with actual energy use, which decreased the trust on end users in the overall approach”* (RHEVA 2021: 2), and more, that *“the differences in national performance calculation methodologies and input data (e.g. primary energy factors, inclusion on non-EPBD uses) make it impossible to compare national EPC values across Europe”* (RHEVA 2021: 4).

It therefore seems that even today, in 2022, 13 to 20 years after the EPBD legislation has been implemented and practiced, we can repeat BPIE’s conclusion that EPCs are not fully and sufficiently implemented. One might be tempted to pose a question – how can it be, that even after two decades of revisions, and tens of millions of euros invested into research and improvement of the concept, we continue to be stuck with such a less than perfect situation?

Following is a quick revision of developments of EPBD policy at the highest policy level that will summarize the most important developments of the policy. Unfortunately, it will also fail to answer the tempting question. A hint to a possible way to an answer, however, awaits at the end of the section.

3.2.1 The 1st EPBD – establishing the EPC scheme(s)

As mentioned earlier, the first Energy Performance of Buildings Directive⁹ (EPBD) as a policy-instrument framework for European and national-level legislations was set up in December 2002 (Arcipowska et al. 2014: 10), including Energy Performance Certifications (EPCs) in from the beginning. The implementation followed in the months of 2003 (Arcipowska et al. 2014: 12) and initially required “all Member States to bring into force the necessary laws, regulations and administrative provisions by 4th of January 2006” (Mudgal et al. 2013: 11). However, as Mudgal et al. note furthermore, the actual *“final deadline for all Member States to implement a mandatory energy labelling scheme for new and existing buildings or building units (e.g. apartments), along with periodic certification of public buildings, was ... 4 January 2009”* (2013: 17), which indicates how time-consuming policy implementation processes can be.

Broadly speaking, the 1st EPBD required EU member states to introduce some form of an EPC scheme for buildings or building units that are:

- Newly constructed or undergo major renovation,
 - Sold or rented out to a new tenant; and
 - Occupied by a public authority and frequently visited by the public.
- (Arcipowska et al. 2014: 12)

The 1st EPBD served as a basis for policy-making, policy-implementation, and policy-realisation framework for the EU member states, which resulted in a patchwork of EPC schemes across the EU by May 2010, when the revised 2nd EPBD, also referred to as EPBD recast¹⁰, came into power. In this period, the number of countries with *some* form of EPC scheme for *at least some* types of buildings has gone from four (4) in

⁷ This number is a total sum of EU funds granted to the 11 Next-generation EPC sister projects – crossCert, U-CERT, D²EPC, E-DYCE, EUB SuperHub, iBRoad2EPC, TIMEPAC, EPC-RECAST, ePANACEA, QualDeEPC, and X-tendo (see <https://u-certproject.eu/epc-sister-projects/>) – according to data available at the EC’s Community Research and Development Information Service (CORDIS) portal on the 19th of January 2022 (see <https://cordis.europa.eu/>).

⁸ This is an approximate sum of years planned for the Next-generation EPC sister projects, based on information available at CORDIS portal (see link above).

⁹ Directive 2002/91/EC See < <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32002L0091>>, 5. 2. 2022.

¹⁰ Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast). See <<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32010L0031>>, 19.1.2022.

2002, to twenty-six (26) in 2010, finally reaching the total of twenty-eight (28) in the years after the revised version came into power (see Figure 3).

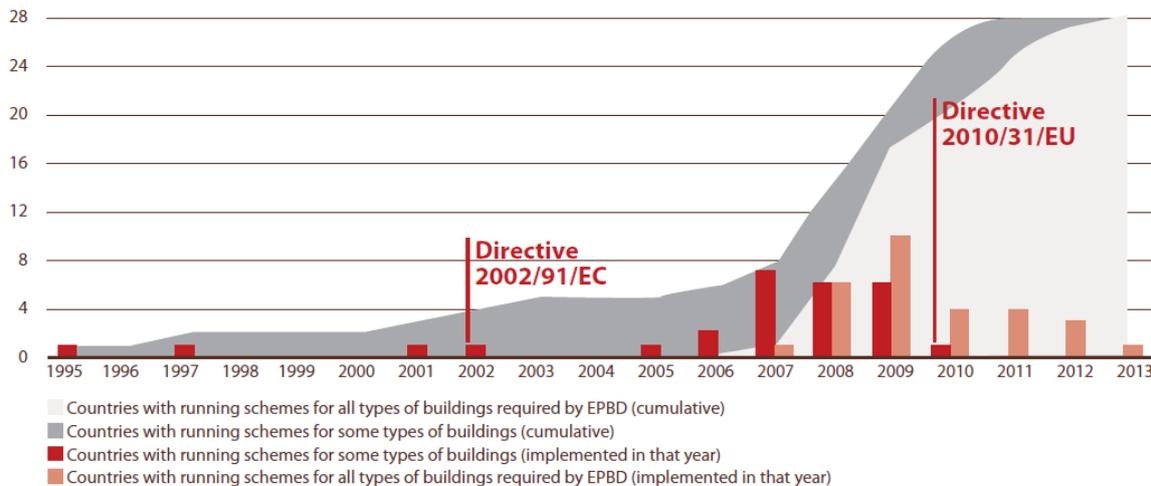


Figure 3: BPIE’s analysis of the implementation of the two EPBD directives in the EU by the year 2014 (Arcipowska et al. 2014: 13).

The graph above (**iError! No se encuentra el origen de la referencia.**) also shows that all of the EU member states have formally implemented *all* of the EPBD requirements for *all* buildings in their national legislation by 2013/14, which should remain in force to this day, with exception of minor changes and updates to the national-level EPBD schemes and regulations (Arcipowska et al. 2014: 13).

3.2.2 The 2nd EPBD – improving the national-level implementations

The 2nd EPBD from 2010 is said to have been “a unique opportunity to evaluate the effectiveness and impacts of EPCs” and “introduced a set of additional requirements to improve the Energy Performance Certification scheme” (Arcipowska et al. 2014: 13). These are summarized main areas for improvement as presented by BPIE:

Quality assurance, which refers to:

1. An **independent control system** that – ideally but not necessarily – includes validation of the input data, verification of results and recommendations, and on-site visit of the building or other equivalent measures;
2. A system for **qualification and/or accreditation of EPC assessors** that includes validation of their competence with regard to the official national accreditation procedure;
3. An officially validated (as a warrant for quality) and regularly updated **public lists of qualified and/or accredited EPC issuers/assessors** and companies that offer the such services.

Availability, which refers to:

1. A **mandatory requirement for EPCs to be “handed over”** to new tenants or buyers, and to be displayed in any form of advertisement in commercial media.
2. A **strengthening of rules on how and where EPCs are displayed**. For example, this includes display of EPCs in buildings occupied by public authorities and frequently visited by the public. All those buildings with a floor area over 500 m² (and as from 9 July 2015 over 250 m²) need to show the EPC in a prominent place and it must be clearly visible to the public.
3. **Mandatory penalties** for all aspects of non-compliance with the legislation introduced at the national level to implement the EPBD¹¹. This refers to any “infringements” on the explicit requirements included in the national regulation and legislation regarding EPB.

¹¹ As BPIE points out, the EPC system is only one element of the EPBD.

Usability of the EPCs information, particularly for building owners and tenants, which refers to:

1. **Obligatory recommendations for a cost-effective optimisation of energy performance** of the buildings subject to the certification, unless there is no reasonable potential for such improvement compared to the energy performance requirements in force,
2. **Obligatory technical feasibility of the recommendations**,
3. **Obligatory indication as to where the owner or tenant can receive more detailed information regarding the suggested recommendations**,
4. **Recommended additional information**, such as the actual impact of heating and cooling on the energy needs of the building, on its primary consumption and the carbon dioxide emissions, and
5. **Recommended estimate for the range of payback periods or cost-benefits over its economic lifecycle**, which also refers to financial incentives or incentives of other nature.

(see Arcipowska et al. 2014: 13-15)

The need for such changes was confirmed and substantiated, as BPIE claimed, by research of the IDEAL EPBD – a European project on consumer response to energy labels in buildings – which in 2011 exposed various areas in which EPCs “lacked” impact. Among other conclusions, IDEAL EPBD suggested that in order to address these “low impact” areas, EPCs should be(come) “*an active and engaging tool, rather than a passive information ‘device’*” (Backhaus et al. 2011: 3).

3.2.3 The 3rd EPBD – growing ambitions and introduction of qualitative aspects

Next came the 2nd recast or “amendment” of the EPBD¹², which happened in January 2018 as a response to the Clean Energy for All Europeans¹³ package. Hogeling and Derjanecz (2018) highlighted the following changes:

- **An agreement to develop national renovation strategies to achieve an energy efficient and decarbonised European building stock by 2050**, reducing the EU greenhouse gas emissions by 80–95% compared to 1990,
- **Mandatory inspection of heating, ventilation, and air conditioning systems**,
- **A voluntary Smart Readiness Indicator (SRI)**, promoting digitalisation and smart technologies. The rating is based on assessment of the buildings’ or building units’ capabilities to adapt its operation to the needs of the occupant, and the grid, and to improve its energy efficiency and overall performance, including indoor comfort and health.
- **Strengthened health aspects and IEQ**. The compromise legislation contains some improvements, although it doesn’t set binding European IEQ criteria. It does, however, refer to the 2009 World Health Organisation guidelines¹⁴ concerning indoor air quality, and better performing buildings that provide higher comfort levels and wellbeing and improve health.
- **Further updated energy performance calculation and EPB standards**.

(see Hogeling and Derjanecz 2018)

The revision therefore did not bring concrete change in terms of making EPCs more engaging, but it did set a direction towards such developments, particularly with opening the prospect for digitalization and introduction of new indicators (such as the SRI). It also put more emphasis on quality of the indoor environment, particularly health and safety aspects. Although no binding EU level criteria were set,

¹² Amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency. See <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L._2018.156.01.0075.01.ENG>, 20. 1. 2022.

¹³ See https://ec.europa.eu/commission/presscorner/detail/en/MEMO_16_3986.

¹⁴ WHO guidelines for indoor air quality: dampness and mould. See <<https://www.euro.who.int/en/health-topics/environment-and-health/air-quality/publications/2009/who-guidelines-for-indoor-air-quality-dampness-and-mould>>, 20.1.2022.

introducing such qualitative aspects into the policy was a step beyond strictly technical (quantitative) aspects of building performance.

3.2.4 The 4th EPBD – aligning with the EU Renovation Wave Strategy

The most recent EPBD recast proposal¹⁵ is in the making during the writing of this report. The next review was originally planned for 2026 (Vermaut 2021: 22) but RHEVA's experts explain that the European Commission wanted to review the EPBD early, and align it with the Renovation Wave Strategy¹⁶, the aims of which are:

- To at least double renovation rates in the next ten years and make sure renovations lead to higher energy and resource efficiency,
 - To enhance the quality of life for people living in and using the buildings,
 - To reduce Europe's greenhouse gas emissions,
 - To foster digitalization, and
 - To improve the reuse and recycling of materials.
- (Litiu and Hogeling 2021: 83).

Litiu and Hogeling summarized the most important developments, also with reference to the BPIE's recent briefing on the matter¹⁷, in the following points:

- **Introducing mandatory minimum energy performance requirements (MEPS)¹⁸:** When gradually phased in, enabled by well-functioning energy performance certificates (EPCs) and financing, MEPS can success-fully tackle the worst performing buildings.
- **More effective EPCs, integrated with a digital building logbook, building renovation passport, smart readiness indicator, Level(s):** As quality and increased availability of EPCs are necessary to guide occupants' choices, the Renovation Wave suggests reinforcing and strengthening existing EPCs, introducing a more standardised format for digital use and improved accessibility, supported by smart technologies.
- **Better data for buildings:** Effective building policies and measures can only be designed and implemented with consistent and reliable data, for example on energy consumption or environmental performance. The Renovation Wave proposes the introduction of a digital building logbook as a common repository for all relevant data over the entire lifecycle of the building, and to strengthen data collection through an updated EPC framework, with stringent rules on availability and accessibility of databases. The European Commission will also explore if and how the European Building Stock Observatory¹⁹ can become more reliable and robust.

¹⁵ Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the energy performance of buildings (recast). See: <<https://ec.europa.eu/energy/sites/default/files/proposal-recast-energy-performance-buildings-directive.pdf>>, 20.1.2022.

¹⁶ See <https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en>, 19. 1. 2022.

¹⁷ See <<https://www.bpie.eu/publication/epbd-recast-new-provisions-need-sharpening-to-hit-climate-targets/>>, 5. 2. 2022.

¹⁸ Sunderland explains MEPS as a "require[ment for] existing buildings to meet a minimum performance standard by a given date or at a chosen trigger point in the building lifecycle. By setting a standard, or a trajectory of rising standards, MEPS can drive the desired depth of renovation. By setting out which buildings must be improved by when, they can also boost the renovation rate" (Sunderland 2021). For complete comprehensive explanation of MEPS for various sectors, see <<https://energypost.eu/eu-buildings-renovations-get-ready-for-minimum-energy-performance-standards-meps/>>, 20.1.2022.

¹⁹ See <https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/eu-building-stock-observatory_en>, 5. 2. 2022.

- **The link between Energy Performance Certificates and financing:** This refers to the Platform on Sustainable Finance²⁰ that assist the European Commission to develop its sustainable finance policies, notably the further development of the EU taxonomy²¹ (classification system, establishing a list of environmentally sustainable economic activities).
(all Litiu and Hogeling 2021: 83)

3.2.5 What does the above summary (not) tell us

The above summary of EPBD development aligns well with our theoretical characterisation of the EPCs, showing that EPBD and EPCs were and largely remain a policy-focused invention with a “big theoretic potential”, which is periodically “recast”, “amended” and thus reinvented to serve various ambitions and idea(l)s set at the EU policy level. As we will see in the next section, this potential indeed gradually translates into practice, yet judging on the tone in many analyses of development of EPCs, not at the rate or speed that would be desirable for (at least some of) the key stakeholders.

What is not obvious from the summary above, and thus has to be explicitly stated, is that development and implementation of EPBD directives and EPC schemes is far more than just the “history” of developments of the policy’s content. A true history should also account for the people who make the wheel of history turn. As an example, here is a section describing the developments before the confirmation of the 3rd EPBD, in 2018:

“Over the course of the past year, EU institutions and stakeholders conducted long negotiations on the 2nd review of the EPBD. REHVA has worked with its Member Associations to define its position about the draft legislation and contributed with its comments during the legislative process. As expected, the EP proved to be more ambitious and listened to the voice of EU level stakeholders in key issues for REHVA, including the strengthening of IEQ requirements, ensuring proper maintenance supported by effective inspections schemes and committing to ambitious EU energy efficiency targets. Members States (MS) were reluctant to approve additional binding requirements, the difference in the positions even resulted in a temporary collapse of the triilogue talks between Council and EP end of 2017. Finally, the parties reached an agreement just before Christmas in an 8-hours intense 3rd negotiation round. This agreement was confirmed by the ambassadors of MS on 31 January 2018, so the compromise directive text can be approved in April 2018.”(Hogeling and Derjanecz 2018: 70)

What Hogeling and Derjanecz describe gives us only a hint at what is *actually* going on “behind the scenes” of EPBD policy revisions. Such descriptions are – to the loss of everyone interested in the true history EPCs and their implications – surprisingly rare. The vast majority of literature does not even go as far as to point out the institutional level dynamics, such as that Member States might be “reluctant” to deal with EPBD novelties. The incompleteness of our summary, anticipated in the title, is this very absence of the social and political dimensions in the “history” of EPBD development, of how people and communities interact with (and with regard to) the invented concepts of EPBDs and EPCs (not to mention the many individual theoretical constructs hidden within them). That is to say, it certainly is so from the people-centred perspective of any ambitious interdisciplinary research that involves people-centred disciplines.

It would, therefore, indeed be interesting to dive deep into aspects, such as who has initiated the idea of EPBD in the first place, what was their personal expectation, and how do they reflect on the current state of things. Besides such basic background insights, it would be interesting to investigate concrete national-level cases of EPBD implementation, and its impact on dynamics of various forms of social practice – how did the policies affect the everyday life of people (both the professional and quotidian life). A particularly interesting angle would be to investigate how the policy disturbed the work in the national-level policy (and politics) arena, and how the established systems reacted and adapted to it, including the possible

²⁰ See <https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/overview-sustainable-finance/platform-sustainable-finance_en>, 5. 2. 2022.

²¹ See <https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-taxonomy-sustainable-activities_en>, 5. 2. 2022.

disturbance of established power relations promoted by the EPBD. Last but certainly not least, a deep and comprehensive analysis of the reasons why the important technical details of the EPBD implementation are not actively “harmonized” already at the EU level, but left to individual member states. Such analysis would certainly bring us closer to answering the tempting question from the beginning of this section, and more than that, perhaps even teach us something about the way the EU institutions function (and struggle) in their attempts to unite the EU member states and citizens around common causes.

3.3 Some insights from practice

As outlined in the first chapter, crossCert’s WP5 seeks to define recommendations on how to make EPCs more people-centred. This pursuit is motivated by the **discrepancy between the conceptualized (declared) theoretical value** of EPCs, which we outlined in section 3.1, **and the actual experienced and perceived value**, which in practice, as we will show in this section, is often reflected in dull descriptions of EPCs, such as them being an administrative necessity or a tax.

A way to think about our aims is analogical to the ambition to address the issue of a performance gap. Pascual Pascuas et al. describe this as a “*deviation between the calculated and the monitored energy consumption*,” (Pascual Pascuas et al. 2017: 103) and express their belief, that exactly this gap “*seems to be one of the main reasons that impair the nZEB market penetration*” (ibid.).

Similarly, our theoretical assumptions and expectations regarding the impact (or performance) of EPC schemes and EPCs do not match its actual effect on the markets, the people, or society, at least with regard to reflections in lived experiences shared by many relevant stakeholders. In WP5 we are interested in closing the gap, or at least to understand the causes that create it. Understanding the causes might produce the knowledge to necessary to bridge this gap. Although bridging this gap might turn out to be an indivisible part of the continuous process of EPBD revisions, and either way is certainly beyond the crossCert capacity, we will hopefully contribute meaningfully to this process.

3.3.1 On our sources

A significant amount of work has already been done to identify issues with existing EPC schemes and EPCs. In line with WP5 ambition, this sub-chapter gives preference to qualitative ethnography-inspired insights rather than statistical or plainly theoretical ones. With more than a decade of practising the policies and regulations that make up the EPC schemes, a large portion of the European population is at least acquainted with the concept or has experienced what it means in practice. To put the EPC theory in context, crossCert WP5 aims to characterize it with qualitative insights supported with ethnographic evidence, such as quotes and comments of people interviewed for research purposes, or short descriptions that illustrate the existence and functioning of EPCs in everyday life environments.

In this section we will therefore focus mostly on insights from two projects that dedicated a significant part of their research to analyse qualitative aspects of existing EPCs. First is the **IDEAL EPBD project**. In its 2011 report on *Key findings & policy recommendations to improve the effectiveness of EPCs and EPBD*, Backhaus et al. of the Energy research Centre of the Netherlands promote recommendations with a particular focus on “*factors that influence homeowners’ decision-making with respect to a home purchase and home renovations*” (Backhaus et al. 2011: 2). Their conclusions are based on in-depth qualitative research in eleven countries²² participating in IDEAL EPBD, involving more than 100 interviews and an extensive survey of more than 3000 households (ibid.). The second project is the still active project U-CERT. In its 2021 *Report on users’ perception about EPC scheme in U-CERT partner countries*, Bančić et al. of the Institute for innovation and development of the University of Ljubljana used an ethnography-inspired qualitative research approach to collect perspectives and feedback from experts and representatives of the general public with the aim to identify key features of the Next-generation user-

²² Belgium, Bulgaria, Czech Republic, Denmark, Finland, Germany, Finland, Latvia, the Netherlands, Portugal, United Kingdom (Backhaus et al. 2011: 11).

centred EPCs. This research also involved more than 100 in-depth stakeholder interviews conducted in the eleven countries participating in U-CERT²³, complemented by 11 focus groups (see 2021: 15).

In this sub-chapter, we will highlight and compare some of the most relevant observations and conclusions noted in the two papers. Such analysis will give an indication of **what has (not) changed in the 10 years that passed between the creation of the two reports**. We will point out the noted positive (successful) aspects of existing EPC schemes as well as the various problems, which are typically framed in terms of barriers, issues, or challenges. We will structure these observations in four main categories, tailored to the specific focus of crossCert WP5 – (1) general observations, (2) design and experience of EPCs, (3) training of EPC assessors, and (4) promotion and marketing. The two papers, besides highlighting the concept's shortcomings, also highlight potentials for improvement, which are usually specified as recommendations related to expectations, needs, or drivers of change. These are collected in section 5.3.2 with the purpose to support the development of use(er)-scenarios for EPCs with reference to the projected theoretical purposes of EPCs.

3.3.2 General observations

3.3.2.1 Awareness, perceptions and impact

In 2011, Backhaus et al. reported the following figures regarding awareness of EPCs in the countries participating in the IDEAL EPBD study:

On average, nearly 90% of all survey respondents reported having heard about EPCs already. The percentage was highest in the Netherlands with 99%. The awareness of having actually received an EPC differs significantly per country. In England, Denmark and the Netherlands, 75-80% of the respondents indicated they had received an EPC. In Germany and Finland, this number dropped to about 40% and 20%, respectively. (Backhaus et al. 2011: 14)

They illustrated this with two graphs, one dedicated to illustrate “general awareness” (See Figure 4, left), meaning people who have already heard of EPCs, and the other illustrating “personal awareness” (See Figure 4, right), meaning people who (are aware of having) had received them.

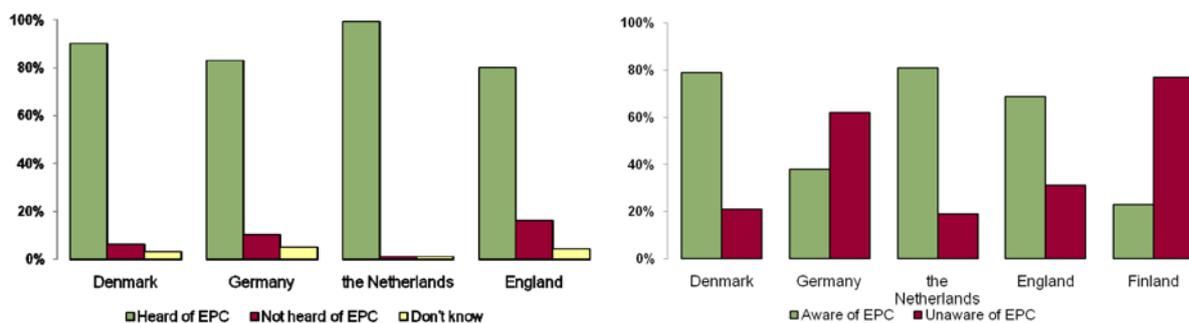


Figure 4: Left a graph of general awareness of EPCs, and right a graph of personal awareness of EPCs. (Backhaus et al. 2011: 14)

Regardless of the relatively high rate of general awareness, IDEAL EPBD's Backhaus et al. concluded that **EPCs in 2011 had little impact on homeowners' decision-making**, illustrating people's sentiment with the following quote:

"Of course, I have the certificate, it is stored in a drawer... It is there, waiting to be shown to the municipality." (AB, man, Portugal, 55 years old, psychologist; Bartiaux in Backhaus et al. 2011: 2)

They also note that EPCs were "sometimes used as a reference on what kind of (additional) renovation works could help to (further) improve the energy efficiency of a building. In a few cases, informants

²³ Bulgaria, Denmark, Estonia, Spain, France, Hungary, Italy, The Netherlands, Romania, Slovenia, and Sweden (Bančić et al. 2021: 15).

expressed that EPCs can be useful to inform about possible efficiency measures that were not known or considered before" (Bartiaux in Backhaus et al. 2011: 3). In 2011, EPCs as such therefore inspired few people to do voluntary investments towards improvement of building's energy efficiency, and in the few cases they did, it was the people who have already done at least some measures with such purpose.

Things have not changed much until the U-CERT project in 2021. Bančič et al. noted that "two of the most widely reported and arguably most problematic perceptions are that people are either largely unaware of the existence and purpose of EPCs or that they are simply perceived as an 'administrative necessity" (Bančič et al. 2021: 24). Here are some comments by representatives of both the experts and the general public that illustrate the conclusion:

"Never seen it."(A building owner from Bulgaria; in Bančič et al. 2021: 24)

"The energy performance certification mostly contains information that can only be interpreted by professionals. I.../ The existing form of the EPC is useless."(a general user from Hungary; in 2021 35)

"In most cases, how should I say, the EPCs are safely kept in the drawers, and the consumptions after the measures is not compared to what is prescribed, if the parameters are maintained... at practical level, it all stays on paper."(Building auditor and EPC issuer from Bulgaria; in 2021: 23)

"The energy certificate is required for issuing a building permit, it specifies the project energy characteristics of the building. For old buildings – I do not know what benefits it could have."(a professional building designer from Bulgaria; in Bančič et al. 2021: 24)

"Added value of EPCs has not yet been fully realized in the market, EPCs are still seen as a 'must-do' activity rather than an opportunity to improve the asset."(Energy expert from Estonia; in 2021: 24)

"The state should finance the EPCs. As some informants commented, reflecting on the notion of EPCs as a mere administrative necessity, the one who benefits most from the scheme should pay for it"(EPC expert from Estonia; in 2021: 72)

"Our EPC... the story goes like so. We have had one made because we had to. We've put it up at the reception, on a visible spot, and here the story ends. Sincerely speaking. /.../ It has no functional value."(Building manager of a large educational facility building from Slovenia; 2021: 80)

"Generally speaking, people do not understand the EPCs as they are given to them without explanation and they do not have sufficient motivation and time to dwell on what is hidden behind these numbers."(Building auditor and EPC issuer from Bulgaria; in 2021: 36)

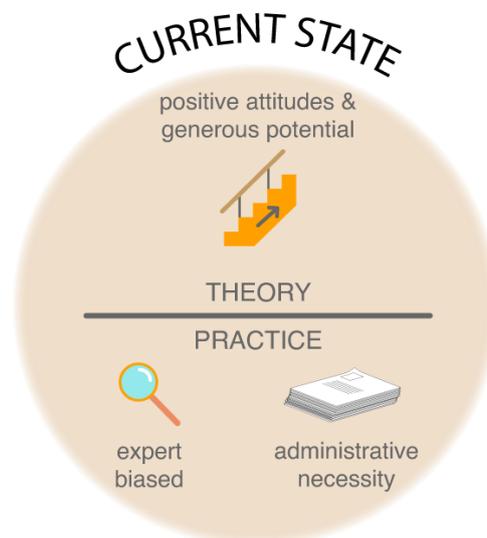


Figure 5: People's perceptions of existing EPCs. (Bančič et al. 2021: 16)

Based on their ethnography-inspired research, Bančič et al. were led to conclude (see Figure 5) that from the theoretical point of view, EPCs were largely perceived positively, having generous potential for future development and implementation. In practice, however, people were often not aware or had little knowledge about or experience with EPCs. People who did have at least some knowledge and experience also often described and experienced them negatively, as being biased towards experts both in terms of understanding and use, lacking qualities that would fulfil the projected theoretical expectations of value and usefulness, which we outlined in section 3.1.

3.3.2.2 Trust

With regard to how people experience and perceive EPCs, Backhaus et al. already in 2011 recognized the key role of trust. Here is how they described it:

Of course, trust plays a role and the key to influencing behaviour is providing competent, tailored information, advice and support. Clearly, the EPC cannot deliver all of that, but it can point the way to help people find the kind of information and support they specifically need. In other words, the EPC needs to succeed in connecting people and information in order to enhance its impact.”
(Backhaus et al. 2011: 3)

Besides the agreeable point on the role of trust, it is interesting to note how their argument points out key aspects of good quality and hence trustworthy service (competence, tailored information, advice and support) but fails to mention the **person responsible for delivering the service**, leaving them at best as an implication. As much other EPC-focused literature and resources, their observation is fixed on the EPC as the final product of the certification service, and not the service itself. What is questionable, and if they are right, problematic for the future of EPC scheme developments, is also their conclusion that EPCs “clearly cannot deliver” on the outlined aspects that enhance the trustworthiness of EPCs. To keep our hopes for crossCert WP5 open, let us assume their conclusion is not altogether accurate.

Coming back to the notion of trust, Backhaus et al. concluded that trust in the EPC in 2011 was relatively high according to their research outcomes (see 2011: 18) but that there was room for improvement. In comparison, Bančič et al. also made several references regarding the trust and trustworthiness of EPC schemes. They pointed out “*a need for EPCs to be a reliable and trustworthy source information*” (2021: 88) but also several aspects of how existing EPCs fail to be trustworthy and hence impactful, including lack of reliable information about energy efficiency and building renovation (ibid.), more realistic and/or case-specific recommendations for the proposed renovation measures (2021: 38), distrust of some experts towards the established or newly-proposed certification methodologies (2021: 54), and distrust towards key stakeholders involved in the certification processes (2021: 55). Here is Bančič et al.’s illustration related to the latter point:

“Several informants have indicated that illegitimate business practices are part of the broader field of EPC schemes. A given example, from a contractor, was building or facility managers demanding or expecting percentages of EPB investments from potential contractors in exchange for being chosen for the job. Another example, given by EPC concept developer, was delegating tasks (and funds) related with developing the national EPC scheme on the basis of affiliations and acquaintances rather than quality and necessary qualifications. Such practices cause distrust on the side of the users and business difficulties on the side of the experts and expert users, especially different types of building professionals and contractors.” (2021: 55)

The highlighted issues with people’s trust *in* and the trustworthiness *of* existing EPC schemes, which imply both distrust in people carrying out (or enabling) the certification service as well as the product (the EPC) as such, contributed to the following Bančič et al.’s conclusion:

“Existing EPCs do not function as a benchmark for quality housing. With exception of few well informed and/or enthusiastic individuals, businesses and institutions, the majority of people do not consider existing EPCs as a relevant reference point when buying or renting a property.”
(Bančič et al. 2021: 6)

3.3.2.3 Reluctance, hesitation, doubt

Focusing solely on the notion of trust can obscure other aspects and modalities of people's perceptions of and attitudes towards EPC schemes. Backhaus et al. pointed out that despite people's recognition, that EPCs appear "*useful to raise attention to unknown insulation possibilities, especially for the external walls, the floor and/or the cellar ceiling*" (2011: 2), people showed reluctance and hesitation towards EPCs and their qualities, which they illustrated with the following quote:

"So I think that I have now done nearly all of what was to be done. The only thing that one could possibly still do, (hesitation) – because I had a ... an energy assessment of the house done, that is how I learned that what was interesting was the insulation of the walls, (hesitation) and the boiler – is to possibly insulate the... the ceiling of the cellar." (Pol, Belgian man, retired lawyer; Bartiaux in Backhaus et al. 2011: 2)

Moreover, they stressed people's lack of interest in or disregard towards EPCs with another illustration.

I: "Where you informed on the results of the energy audit?"
Mr: "This was already clear without knowing the results."
I: "And what was clear for you?"
Mr: "That it was needed (laugh)."
 (Bariaux in Backhaus et al. 2011: 22)

IDEAL EPBD researchers, as Backhaus et al. report, interpreted this saying that EPCs did not deliver any new information that the informants had already known. From the illustration that is not entirely evident. The illustration does, however, indicate once more that EPCs were perceived as a necessity, and not much more beyond that, which is an attitude that we have already discussed.

What is certain is that the "blame" for EPCs having a low impact is not entirely on the EPC schemes as such. Based on the U-CERT research, Bančič et al. concluded that "*people often tend to avoid action related to investments and improvements of their property for a variety of reasons, including [1] aversion to change, [2] costs and disruption of life, [3] lack of knowledge and interest, [4] lack of insight into benefits and opportunities, [5] distrust towards key stakeholders involved in the certification process etc.*" (2021: 9). Here are some statements that substantiate that conclusion:

"Even in Italy, and I think people all over the world, are not inclined to change because they are strongly attached to certain aspects of their life and do not like to change it." (EPC expert from Italy; 2021: 29)

"In France if there is no obligation, it will be difficult to change the people mind/habits; they will not be interested in. If the new EPC version is based on volunteering, it will be hard to make users interested in" (EPC expert from France; 2021: 29).

"You issue a law and it [the EPC] becomes widely accepted. /.../ Or to answer the other way around, if we wouldn't have it written in the [EPBD] directive, we would never have implemented this." (Public authority representative from Slovenia; 2021: 82)

The latter comment indicates the basic principle, or more expressively, the bitter truth of how EPC schemes seem to have generally been practised and also thought about in the past decade or two of their existence. To expand on it, here is another comment that points towards how relevant an in-depth study(-ies) of policy implementation at the national level would be to have a better understanding of the shortcomings of the existing EPC schemes:

"... it's like so, really, you have to invest a lot of your energy into it, so that you bring it [the national EPC scheme] to life. And at the end it fires back at you anyways, because everyone only sees the negative part of the story, everything that went wrong. They don't see the process and dilemmas that you have fought with." (Public authority representative from Slovenia; in Bančič et al. 2021: 84)

This aspect, however relevant it might be to the actual effectiveness of EPC schemes across the EU, is not the focus of crossCert. We will now turn to the key aspects that are our focus.

3.3.3 Design and experience of EPCs

3.3.3.1 *Bad, better, good -vs.- bad, less bad, even less bad → which is the trajectory?*

In an analysis of the impact that EPCs have had on the real estate market, Pascual Pascuas et al. (2017) state that EPCs “turned out to be unreliable and useless, with several difficulties related to their readability and understandability” (2017: 103). As we will see in this section, they might have a point.

Backhaus et al. in their analysis provide little indirect reference to the design and experience of EPCs. They highlight that “distinct label categories,” also referred to as “A-G scale,” appear to be more understandable than a continuous scale (2011: 5), which prompted them to call for making the A-G scale obligatory for all countries (2011: 15). They also call for “further /.../ attention to how information on the EPC is presented and to how it can be made more understandable and thereby more effective.” (Backhaus et al. 2011: 5).

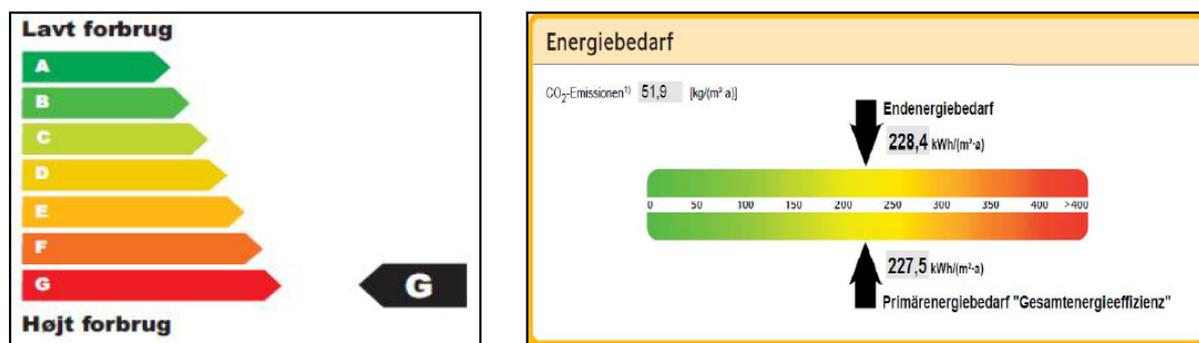


Figure 6: Difference in labelling building's energy performance with an “A-G scale (left) and continuous scale (right). (in Backhaus et al. 2011: 5)

In comparison, Bančić et al. indeed have put quite some attention to aspects of design, particularly in the chapter on User-friendliness (see Bančić et al. 2021: 31-46). There they included a list of positive properties, negative properties, and prospects for improvement of existing EPCs to make them more people-friendly. In summary, the positive things of existing EPCs with regard to their design are (1) that they provide data and information regarding energy performance and possible renovation measures for the building, (2) that they provide some visualized reference with regard to the building's energy performance, and again, (3) that such a tool exists in the first place. Some of the key negative aspects they highlight are (1) lack of context and explanations, (2) high density of data and information, (3) poor visual presentation of information, and (4) absence of certain information (e.g. cost-related info, further sources of information, possibility for monitoring energy use).

3.3.3.2 *Strong expert-bias*

An overarching characteristic of existing EPCs that seems to unite most of the highlighted negative aspects is, as phrased by Bančić et al., that EPCs are strongly expert-biased, “both in terms of design and content of the EPC as well as the benefits and values that they create” (2021: 23). As they explain, “for users with little relevant knowledge background and without strong intention (and capacity) to invest in construction or renovation of buildings, the existing EPCs present poor value and are often described as being difficult to understand or even ‘useless’” (ibid.). Here are some of the quotes they used to contextualize such a conclusion:

“But tell me, how often do you look at your ID card? Except when someone requires you to. This [EPC] is really just an ID or doctor's certificate for a building. You look at it when you have to, one that has to, not others.” (EPC assessor from Slovenia; ibid.)

“The practical value is for project developers, ok, not for the users. This is the purpose. /.../ Who makes buildings? It is not the users. That's my perspective.” (EPC scheme and guideline developer from Slovenia; Bančić et al. 2021: 77)

"The user does not concern me. What concerns me is what the project developers have to learn, so that they will get to these indicators." (EPC scheme and guideline developer from Slovenia; *ibid.*)

It therefore seems that EPC schemes, at least in some countries, have been created *by* experts *for* experts, and not for the general population, or at least not with the understanding of what (non-expert) users of EPCs might need to understand in order to use them meaningfully. Bančič et al. pointed out, that existing EPCs are:

- Complex and difficult to understand for general users (terminology, incomprehensive measuring units used, no clear relation between individual pieces of data and information etc.),
- Lack clear references to long-term benefits of performance improvement and further sources of information,
- Often do not relate to the actual building which is subject to the assessment, etc.

Unsurprisingly, this led Bančič et al. to call for more (1) guidance on how to read, understand and use EPCs, (2) visual representation of information, and (3) more contextualization with relatable information for general users (financial references, comparisons to buildings they already know etc.) (see 2021: 33).

3.3.3.3 Lack of support by experts

An aspect that makes the entire situation even more complicated is the lack of support and/or trust in the EPCs (and/or the EPC system) on the side of experts and professionals who are factually part of the system end enable its functioning. Similar observations were made for experts who should be using EPCs meaningfully for professional purposes. As Bančič et al.'s observations indicate, there is a significant lack of such support and conviction even decades after the implementation of EPC schemes:

"Current Report is experienced as long and unmanageable. It's difficult for normal building owners and users to fully understand the conclusions of the EPC, which doesn't offer a real link to the current conditions of the property and how to improve the energy performance." (EPC expert from Denmark; Bančič et al. 2021: 23)

"As far as comprehensiveness [of EPCs] is concerned, individuals do not understand them. Even I, and I'm from the expertise, but I don't really understand them." (a professional facility manager from Slovenia; 2021: 34)

Bančič et al. pointed out, that *"unclear and varied understanding of EPCs purpose creates confusion and space for conflicting beliefs and opinions, which ultimately undermine the impact and value of EPCs"* (2021: 77). All this leads us to pose the following question – if existing EPCs fail to serve both the expert and non-expert community, whom or what do they then serve? A hint to that answer is perhaps in the following conclusion:

"Research outcomes indicate that the existing EPCs are seen as little more than part of the necessary paperwork on the path towards an end-goal, which at present includes either selling, buying, or renting a house/building. Although intuitively one might expect them to also be used in close association with renovation, /.../ existing EPCs are rarely used in this context, especially by individual homeowners. /.../ The existing EPC schemes seem to primarily serve the administrative systems and structures of established knowledge and expertise that help(ed) establishing and maintaining it." (Bančič et al. 2021: 25).

3.3.4 Training and CPD of EPC assessors

crossCert aims to address weaknesses in the existing EPC systems that relate to training and education of EPC assessors accredited at the national as being competent and thus eligible to issue EPCs. In 2011, Backhaus et al. voiced the following recommendation:

"Improve the quality of the EPC and auditors through an accreditation system. If households get poor advice, unrealistic figures and unpractical recommendations, this will have an adverse effect on trust levels of homeowners. Improving the quality of both the EPC and the auditor is one of the basic requirements for developing trust in the EPC" (2011: 18).

Their recommendation comes soon after the 2nd EPBD came into effect, which required EU member states to set up a mandatory accreditation system, which at the moment of the IDEAL EPBD research most likely was not yet implemented effectively, if at all. The idea, however, is clear – poorly trained auditors lead to poor EPCs, and more importantly at this stage of discussion, poor, unrealistic, and unpractical advice and recommendations.

Despite such calls, as we had briefly touched upon in the section concerning trust, Backhaus et al. somewhat failed to stress the importance that the certification service(s) play in delivering the expected “value” of EPCs. **EPC services** can be understood as the entirety of processes and actions needed to create an EPC, or the intangible practical aspects related to what we refer to as the EPC journey. **EPC assessors clearly play a pivotal role in delivering the certification service**, and are arguably the people who (should) carry the largest responsibility with regards to how people experience the service, how they will establish their perceptions and opinions about EPCs, and what kind of effect the service will have with regard to the expected added value(s) of EPCs, which we outlined in section 3.1.

The failure to recognize this aspect explicitly seems to be universal. Bančič et al. also failed to stress the role of the certification service clearly, although implicitly – similarly to Backhaus et al. – they made several less explicit references to such argument. Here is one example from the concluding part of the U-CERT’s D2.3 introductory chapter:

“If we are to secure the desired widespread (public) support and improve their positive impact, EPC schemes and EPCs must be understood and developed as a conglomerate of products and services that serve in the best interest of everyone in the value chain”(Bančič et al. 2021: 19).

3.3.4.1 Blame on individual EPC assessor(s)?

As already mentioned, the responsibility of EPC assessors to perform well certainly plays a vital part in delivering quality EPC service and EPC products. But a question rises – to what extent should they be charged with and – consequentially – blamed for the lack of expected impact of the EPCs? Here are some opinions reported by Bančič et al.:

“EPCs are considered reliable, however when issues appear they are due to human error and not the calculation methodology. This basically then is linked to the EPC issuer’s responsibility.” (Building services designer from Sweden; in 2021: 54)

“It is presumed that the company that issues the building certificate is licensed and bears responsibility for the quality. They are subject to sanctions. We completely depend on their responsibility.”(public authority representative from Bulgaria; ibid.)

“The quality and responsibility of EPC issuers must be high enough to discourage dishonesty during the modelling and calculation procedure.”(EPC expert from Estonia; ibid.)

“Today we see houses that are energy sieves and yet they are classified as C or D. One wonders how that’s possible, even though it’s done by state-certified diagnosticians.”(EPC expert from France; in 2021: 56)

Here is another illustration of how relevant EPC assessors and their practice can be, from a study focusing on consistency and quality of EPC ratings and assessments conducted in the UK:

“Some variations to quality of EPC assessment output could have been attributable to an assessor not accessing the loft space and therefore recording a default poor rating [NB It was noted, in the householder feedback survey, that some lofts were not accessed by all assessors for that dwelling suggesting that accessible lofts were sometimes ignored]. There may also have been disagreements around the effect of boarding and/or compression of insulation in loft spaces.” (Jenkins et al. 2017: 484–485)

Skipping certain steps in the assessment procedure, or making false assumptions, might therefore significantly affect the assessments. Bančič et al. dedicated an entire section of their report to structure and illustrate sentiments and opinions in this regard in their U-CERT research (see 2021: 54–55) in which they highlight the following points:

- Negative opinions and beliefs, some better founded than others, regarding personal responsibility of EPC assessors for poor quality and hence effect of EPC schemes,
- Reported instances of “manipulated” EPC assessment in order to fabricate desired EPC assessments (e.g. to manipulate the value of properties in cases of property sales, or condition of the property in order to apply for financial subsidies),
- The changing perception on usefulness and value of the EPCs and certification service depending on the user, and how that influences the certification practice (aspect of purpose, trust, corruption etc.), and
- The role of quality regulation and enforcement.

Despite many existing opinions that put the blame for the poor effect of the EPC schemes on the EPC assessors as individuals, Bančič et al. conclude that *“although important, individual responsibility of EPC issuers to do their work properly is not to be regarded as the exclusive factor impacting the quality of EPCs”* (2021: 55), and point toward another issue, closer to the core of crossCert interests.

3.3.4.2 Blame on training and accreditation practice(s)?

It is not a coincidence that crossCert WP5 will focus on aspects of training and accreditation. The area regarding the competence of responsible professionals, which obviously relates to areas of training and education, is often regarded as a source of problems, and EPCs are no exception. Here is an illustration by Bančič et al. that characterizes such opinions:

“Diagnosticians (EPC issuers) are often not able to sufficiently explain the purpose and objective of conducting an EPC. Include in their training course a short speech to define and explain the challenges of energy performance. This would allow the user to understand this document”(EPC expert from France; in Bančič 2021: 46).

Backhaus et al. do not explicitly blame the current systems for training and education of EPC issuers as a potentially principal source of the problem. They do, however, highlight that competence of professionals in the associative field of EPB assessment and performance improvement to be problematic, illustrating it with such examples:

“The in-depth interviews found some homeowners to be more knowledgeable than the professionals they sought out for advice and support. Kaja from the Czech Republic, for example, wanted to insulate his house with 16cm of polystyrene (advised by his brother working in Austria), but a lot of construction experts in the Czech Republic felt that this was exaggerated”(Backhaus et al. 2011: 6)

In comparison, Bančič et al. explicitly stressed some aspects of the education and training of EPC issuers (see 2021: 56-57), which they described as *“the important systemic factor that reportedly has a significant influence on the quality of existing EPC schemes”* (2021: 55). These aspects include:

- Criteria for the eligibility of experts that want to get the necessary accreditation for performing EPC assessments,
- Inconsistency of training and continuous education of accredited EPC assessors,
- The question of if and to what extent the EPC assessors should be charged with the role of consultants (e.g. with regard to the building renovation measures).

Ultimately, the issue of training and education of EPC issuers is just another topic easy to think about in theoretical isolation, but hard to work on (i.e. change) in actual real-life contexts. Following is a list of some of the contextual factors one ought to take into account when searching for solutions.

3.3.4.3 Some relevant contextual factors

Poorly designed calculation protocols and practice ● Some EPC issuers complained about practical aspects of the established EPC assessment practice, such as time-consuming use of the calculation software, with references to irrational tasks and requirements. Here is an illustration from a conversation with an EPC issuer in U-CERT research (R stands for researcher, P for the participant):

P: As the assessor, there is a bunch of things that makes you real mad. The poorly defined information systems, since the beginning, and poorly functioning and bureaucratically complicated system.

R: In general?

P: In general, or at the end especially, how to submit your assessment to the state for someone who's going to be controlling to be satisfied. When you make an EPC, you first calculate something, but when you're done with that you still need an hour to submit the form according to the official requirements. Instead of putting a signature and a seal you're wasting an hour.

R: So the issue is in the official protocol for confirmation [official issuing] of the finished EPC assessments?

P: Yes.

R: So this is a completely practical aspect...

P: The application for submission is very unfriendly. You put some data in, searching it for five minutes, then the app shuts down and you have to go back to the start. A piece of data, which should be put in once, you have to put in ten times. Say the property title number. In the old days, you would sign it [the EPC] and have it taken to the post office, you loose 15 min, now you're wasting an hour... "(EPC issuer from Slovenia; Bančič's ethnographic notes, November 2019)

It is important to recognize such bottlenecks in the established issuing process, as they have a significant impact on the price of the certification service.

The financial incentive for EPC assessors ● The question of EPC issuing as a business opportunity, or an element of professional practice, highlights an important level of complexity of EPC schemes across the EU. The point about the design (failures) of professional certification practice indicates how practical details (can) influence the financial rationale that – among other things – defines just how attractive the issuing business is for the (more or less) competent professionals.

In a section titled Cost-benefit balance (2021: 64), Bančič et al. highlight a number of aspects that influences the price-benefit rationale with regard to EPC schemes in general, but they do so in a rather generic, unstructured way. Nonetheless, some of the most relevant points include:

- Relatively low demand and high numbers of EPC assessors reportedly drive assessment prices down, which decreases the incentive for highly competent professionals to participate in the market,
- There are contrasting opinions about the possible effects of rising the assessment price artificially,
- Customers seem to always prefer the cheapest option, disregarding much of the likely diminished utility and quality factors of EPCs,
- The “balance” of costs and benefits for existing EPC schemes in many ways degrades into a “vicious circle” with a negative effect for all actors on the EPC market stage – service providers, customers and ultimately, actors in the service support network who want an effective EPC scheme.

Ultimately, the fact is that financial incentive for EPC assessors has to exist in order to motivate them to do a good and ever-better job. The absence of such incentives creates space for issues that negatively affect several aspects of quality in the complex entirety of existing EPC schemes.

Lack of engagement on the side of the clients ● The argument, that EPC assessors do not engage enough with their clients or recipients of EPCs has a very real and inconvenient counterargument – people's reluctance to engage in the certification process, and to care about or appreciate the end result. Here is an illustration from the U-CERT research:

“And next is the question, how should we present the usefulness of the EPC to the customer. Some time ago we got a call for certification of a pretty large number of public buildings, and we'd suggest to them to come and explain a bit, where they are at and so on. [pause] But they just... 'no no no, it's just that the ministry said we need it...' [imitated with a high-pitched voice]. In short,

they don't see any prospect for use in it. The use they see is only fulfilling what the law requires." (EPC issuer from Slovenia; Bančič's ethnographic notes, November 2019)

Backhaus et al. pointed out several times in their report, that people are not interested as much in energy performance data or energy efficiency. They argued that *"instead of thinking about energy, people care about how to make their home comfortable and 'look nice'"* (2011: 4), and went on to highlight some of the practical aspects their research identified as interesting for people, such as (1) estimates of costs (and savings), (2) clear, simple and actionable information related to their specific interest (e.g. renovating or buying properties), and/or (3) availability of grants, tax rebates, cheap loans etc. EPC concept is – in theory – expected to relate and highlight several of the outlined elements, yet this potential fails to be realized also due to a lack of reciprocity in the interaction between EPC assessors and their customers.

Lack of qualified experts and tradespeople ● All aspects of training should be observed with at least partial consideration of the issue of availability of trained, competent, and motivated professionals, be their collar white, blue, or anything in between. Backhaus et al. noted already in 2011, that *"high quality and continuous training of professionals is needed. EU-level policy-making can help to set up frameworks and networks that support the exchange of knowledge and experience as well as continuous training"* (2011: 6). In 2021, these issues arguably larger than in 2011, and will get increasingly pressing with the anticipated rate of renovations implied by EU policies. As the market for EPC assessment grows, it is important to note that market regulation and quality control will likely get increasingly difficult with the number of individuals involved in the business, the rate (numbers) of certification.

Quality control and regulation enforcement ● Quality control and enforcement repeatedly appear in discussions regarding EPC schemes as one of the key aspects of the system. In 2011, Backhaus et al. pointed out the following observation:

"Many countries have little to no penalty or compliance enforcement for not issuing or showing an EPC at property purchase. This finding supports the adaptation included in the EPBD recast (EC 2010) to make displaying the energy rating of a property in sales advertisements and the introduction of an obligatory penalty for not offering an EPC during building transaction." (Backhaus et al. 2011: 3).

After more than a decade since their observation, things might have improved. Nonetheless, similar observations were noted in the U-CERT project study. The D2.3 report includes a dedicated section on quality control (see Bančič et al. 2021: 57-60), which highlights the following key points of consideration:

- Quality control is deemed equally important as any other aspect of the EPC scheme,
- There is a general lack of quality control within existing EPC schemes across the EU,
- Suggested approaches to quality control include independent third-party controls, internal peer-review protocols, and on-demand quality control service for customers,
- There is a prospect for incentivizing quality assessments with positive reinforcement (rewards) for good certification work.

3.3.5 Promotion and marketing

3.3.5.1 Back to awareness and visibility

Promotion and marketing of EPC products and services is the third and final aspect crossCert WP5 is dedicated to devote special attention. In more general terms, promotion and marketing relate to public visibility of national EPC schemes – the way how they are presented, communicated and actively promoted at the level of the EU member states, either for the general awareness purposes or with a specific commercial agenda in mind.

In section 3.3.2.1 on awareness, perception and impact, we pointed out the relatively high level of public awareness of the EPC schemes reported by IDEAL EPBD project in 2011, but also the relatively low impact they had on people's decision making and action. One of the possible reasons for that, as Backhaus et al. suggested, might be *"that an EPC is often not available or not shown before buyers make a price offer for a building"* (Backhaus et al. 2011: 3). This might have changed significantly with gradual implementation of

especially 2nd EPBD recasts, which included a mandatory requirement for an EPC to be handed over, but also the following amendments to the directive. Even so, Bančič et al. reported several expert opinions, such as the one below, indicating that EPCs even up to 2021 have not been used and have not had impact for such purpose:

"I have not met many people, who would ask 'what is the EPC like?'. It was much the opposite – I arranged for a real-estate to be sold, we paid the advance, now before we sign the contract, it has to have the EPC... yes, you know what... send it to that guy, so that it ads it to the papers. [imitated with a disinterested tone]. Normally he does not even look at it, the buyer. That is to say, he first breaks a deal, and then he has to [make the EPC], to make it all legal. Otherwise, some claim the contract does not legally comply."(EPC issuer and a real-estate agent from Slovenia; 2021: 70)

3.3.5.2 The media

In DG Energy's assessment of the impact EPCs have had on real-estate property market in 2013, Mudgal et al. stated that *"EPCs and the EPBD in general have certainly brought the subject of the energy efficiency of buildings onto political agendas, into building codes and to the attention of citizens"*(Mudgal et.al 2013: 17). Their observation, however, followed a somewhat less positive assessment:

"The full potential of EPCs is not yet being reaped. Member States should be encouraged to continue to focus on quality assurance of the EPC, and improve public trust in and understanding of the label (via communications campaigns). Aside from awareness of the existence of the EPC and its energy rating, it will be important to improve the understanding among buyers and renters of the benefits of a better rating in practice, in particular on their energy bills. As things stand, there is still a certain amount of confusion as to the meaning and derivation of the rating, and the costs and benefits of making improvements."(Mudgal et al. 2013: 15)

Their assessment relates to several points that we have highlighted so far, but at this stage, it is most interesting to note their reference to the public trust and understanding of the label (i.e. EPCs) via communications campaigns. Whether or not it is a coincidence that they noted it alongside quality assurance we can only guess, but certainly they believed it deserves explicit attention.

In the next sub-chapter, we will think about EPCs as social objects – objects with agency in relation to societies and its individuals. As we shall see, objects are not *created* to become social objects, but are *socialized* into becoming one through social processes of everyday life. In that sense, it is easier to understand the statement, that *"it is the mass media in modern societies that play a significant role in constructing a social object by taking up scientific and technological advances"*(Wagner et al. 2018: 138).

Part of our attention in crossCert WP5 shall certainly be dedicated to understanding how the media shaped perceptions of the EPC schemes in the society, and perhaps the other way, how established perceptions shaped media representations, and how they continue to shape them today. In this context it is worth noting that media representations can be both constructive or destructive to any given cause. Wagner et al. point this out on the case of genetic engineering, climate change and similar big public discourses, noting the *"change of open-minded and communal to a narrow and reified discourse"*(Wagner et al. 2018: 138), or more concretely, *"the change from divergent images to converging on a few dominant images in media reports and pictorial illustrations that depict the objectified social object"*(ibid.). In case of EPC schemes, these aspects are yet to be described. Whatever the case is, it is certain that promotion and marketing influence and shape much of our societies' general-knowledge background. In turn, that influences our individual attitudes and opinions, which influence decision-making and action.

3.3.5.3 Active promotion and positive publicity

Bančič et al. dedicated a section in their U-CERT D2.3 report to awareness building, promotion, marketing and positive publicity (see 2021: 85–87), highlighting the following key points:

- Lack of awareness regarding the "usefulness" of EPCs in the general public, particularly with relation to the benefits of building renovation and energy efficiency,

- Lack of positive publicity, marketing and promotion as one of the primary causes of the previous point,
- The long-lasting negative impact that negative publicity can have on people's perception of EPC schemes,
- The network of stakeholders who should jointly work towards building a positive public image of the EPC scheme. These includes financing institutions, real estate brokers, property and facility managers, energy service suppliers, energy distributors, and clearly – the media.

With regard to the latter point, it is important to stress that collaboration between the various actors that shape the media landscape and the public perception of EPCs is very important. Backhaus et al. already in 2011 pointed out that “*estate agents may play down the accuracy of EPCs, especially in case of a low efficiency rating, for obvious reasons*” (Backhaus et al. 2011: 3). Similar reports have been more or less explicitly shared by several research participants in the U-CERT research. In addition, we have already problematized lack of support for the concept among EPC experts and other profiles, who – in poetical terms – should be the guardians of EPC's legitimacy. It is not hard to see how disinterest and disagreements between key stakeholders translate into lack of trust and interest on the side of general public.

crossCert WP5 shall think towards possible solutions to this and other outlined issues in this section. Before we discuss how, we will first zoom-out from practical particularities of existing EPC schemes, and look at the concept from a perspective inspired by social sciences and humanities.

3.4 EPCs as social objects

Through practice of everyday life, people transform objects²⁴ into *things* (Antczak and Beaudry 2019; Ingold 2012), or more expressively, into *social objects* (Nevile et al. 2014; Wagner et al. 2018). Here is Wagner et al.'s comprehensive introduction into the logic of looking at the material world through the lens of social objects theory:

*“Social objects are constituted by social representations in a threefold way: by individual behavior, by collective interaction, and by belief. First, **behavior** links people with the objects of the outside world and substantiates their existence. In fact, social representations always imply a relationship of the person to the object. Second, the relationship between people holding a representation and the social object is also expressed by **collective interaction**; and it is the cooperation of many subscribers to a representation that gives rise to the multitude of nonmaterial constructions in a culture and society, such as gods, justice, and the myriad of ideas that populate modern minds and can be talked about. Third, social objects, their names, and the ways we imagine and talk about them, can be called **mental entities**; these provide the **framework of meanings** that a representation implies and that are attached to its object.”* (Wagner et al. 2018: 136)

EPCs, as the physical end-product of the EPC assessment and certification process(es), are also social objects. The vast majority of individuals and communities (in our case, households are a good example) who make up our societies do not understand EPCs in terms defined in the EPBD policy (or its national level legislative and regulative implementations), neither do they understand them in terms of value and purpose policy makers and EPC experts project upon the EPCs and their conceptual background (see section 3.1). People tend to understand EPCs as they are perceived and experienced through social practice and interaction in their everyday life settings, through public discourses and social networks of meanings.

In the previous section (3.3), we illustrate some of the issues with how policy and expert expectations translate into practice, and how people tend to perceive EPCs. The gap is significant, and why it is so is the difficult question crossCert WP5 wants to tackle. What seems to be true is that **policy makers and**

²⁴ By objects we mean the “elements of the physical world that we can experience sensorially, i.e. that we typically see, hear and touch.” (Nevile et al. 2014: 5)

implementors have so far neglected the aspect of EPCs in social interaction. Based on the existing literature, the issue with EPCs, at least from the people-centred perspective, is that they fail to connect people in a meaningful way. Here is Backhaus et al. with another of their conclusions:

“Currently the EPC is hardly effective in influencing the decision-making processes it targets. An important reason for this is that it is a ‘passive’ document that aims to provide straight-forward, technical and rational information about the energy efficiency of a dwelling and about ways to improve it. Apart from the need to improve the kind of information that is presented and the way it is presented, there is a need to turn the EPC into an active and engaging tool that connects people who can provide or exchange information and support.” (Backhaus et al. 2011: 3).

Why EPCs fail to be “an engaging tool that connects people” is just another variation of its performance-gap question. Perhaps one of the reasons is that past and **existing policy frameworks avoid putting emphasis on connecting people.** Perhaps existing frameworks are putting too much emphasis on trying to create an almighty EPC product, that should do everything and more of what EPCs are supposed to be in methodological and technical terms. Perhaps they are trying to avoid charging people involved in creating EPCs with any of the people-centred responsibilities, pinning what should be their responsibility onto the object as such, and assuming that perhaps people will be rationally motivated to exploit all of the potentials packed into what is today – a couple of sheets of paper that an average person finds difficult to read and understand.

False conceptual assumptions might certainly be one of the issues. As Backhaus et al. rightfully pointed out, with regard to EPCs as energy labels for buildings, *“to assume energy labels alone can stimulate energy efficiency investments implies the following assumptions: (a) Homeowners act rationally, only taking into account possible cost and savings, (b) There are no other barriers to energy efficiency investments than lack of information”* (Backhaus et al. 2011: 39). As we managed to demonstrate so far, that is clearly not the case.

Whatever the truth might be, the fact is that EPCs have not been what the official policy agenda wants them to be. In search for recommendations that might address this issue, **crossCert WP5 will to put a strong emphasis on understanding the interaction between key stakeholders and the role the EPC is supposed to play in this interaction.** We will try and think how EPCs, particularly as products of technology, science and expertise, function as *“social actors, entities that can be active within and influence larger social networks or systems of meaning and practice”* (Neville et al. 2014: 6). We will observe how they function as *“attractor points where mental, discursive, and behavioral expressions of a social representation converge in a system that is probably less chaotic and more resilient than it appears at first sight”* (Wagner et al. 2018: 144). We will also focus on the service-related details in the established certification processes, as *“it is only through the behavior that is part and parcel of the representation, that the object becomes socialized in the first place; the representation is the origin of the social object”* (Wagner et al. 2018: 134). In other words, we are interested in the practice of the existing EPC assessment and certification process, the interaction between various types of experts and EPC users. Exactly *this* is the area where the most obvious source of people-centred value is located, and where most of the yet untapped potential for improvement of existing EPC schemes might be.

Such an approach enables us to think about EPCs somewhat differently from the predominant expert-centric (technical), or policy-centric points of view. It puts EPCs in a perspective that defies the assumption that EPCs are inherently good and useful, and forces us to think how they really function in the society. Simultaneously, it also creates space to think how the observations and conclusions that we produce could be leveraged to support the EPBD policy agenda. As Neville et al. point out, *“a prevalent view across a range of disciplines is that objects should be examined and understood not simply through description of their physical features and functions, or through analysis of their symbolic significance, but as people employ them in particular socio-cultural contexts”* (Neville et al. 2014: 3). Based on the outlined theoretical standpoint, we will now have a quick think about how EPCs exist as social objects in the world of policy making, the expert community, and at the individual level, before finishing off with EPCs in interaction.

3.4.1 EPCs at the EU level

At the EU level, the EPCs can be seen as a reification²⁵ of the European values, enshrined in (or promoted by) the EPBD, such as climate neutrality and fight against climate change, the advancement of technology and digitalization of society, support for economic development etc. Through the ritualized political process of negotiations and making compromises, the European Union does not only give guidelines to its member states with regard to why and how they should implement the EPBD, but also consolidates the European community and its values. Or rather, it tries to do so. In this sense, EPCs do not only (re)present the technical qualities of buildings, but also an element of European values and identity. In other words, for better or for worse, EPCs are also a materialized indication of what it means to be a European citizen. By analogy, the way EPBD is implemented and practiced at the national level could also be seen as indicative to what degree individual member states are serious about following the EU's lead, and to what degree they share and practice the same values and ideals.

3.4.2 EPCs in the expert community

Within the community of experts that helped invent EPCs, as well as those who are helping to reinvent it, EPCs are a social object of its own kind. Here is Wagner et al.'s further characterisation of the concept of social objects, which hints at what we are trying to say.

"In theoretical terms, the social object becomes a discursive truth and a fully objectified representation. It becomes an element of a group's local world, a dominant fiduciary truth that is beyond doubt. In this situation, actors are no longer free to assert whatever they wish because even without any vested interests expressing ignorance or doubt is no longer warranted within one's group and may be socially sanctioned. Often such institutionalized objects play an important role for a group's identity." (Wagner et al. 2018: 137)

Whoever has ever had anything to do with members of the community of EPC experts is likely to agree, that EPCs – at least at the discursive level – are such an object. If we think of all of the EPC assessors within a country, and imagine them as a community, what would unite them if there were no EPBD and no EPCs? Or what would happen if one of them would suggest that EPCs make no sense, and that the policy should be scrapped?

Of course, legitimate answers might exist. Such rhetoric questions are only to make a point, that EPCs exist within society also on the level of community. There is no doubt that the way how expert communities in individual EU member states perceive EPCs varies substantially. EPCs do, however, serve as an instrument or a tool to represent abstract theoretical notions, such as energy performance, or energy efficiency. These notions also, or perhaps even better, represent a discursive social fact within the expert community, which is reified in sensors, counters, computer software, and ultimately labels of various sorts, including EPCs. For members of the expert community, EPCs therefore represent not only the numbers and information that are communicated through them, neither do they necessarily make note of the values and ideals mentioned with regard to the EU level. For experts, EPCs are proxies for much deeper theoretical challenges, perhaps even tensions or disputes within and beyond their community, and reflect the excellence of their collective knowledge, or at least their collective capacity to deliver reliable and meaningful results from the point of view of their expertise.

EPCs – a reification of energy efficiency

Energy efficiency as a notion is firmly part of the contemporary public discourse, so much so that few people find it necessary to dwell upon what it actually means. However, energy efficiency is a rather complex and abstract notion with many facets. Elisabeth Shove, a sociologist of energy, technology and environmental change, describes it as *"hardwired into methodologies and metrics, into the ways in which energy is understood, into future funding programmes, into policies at all scales, and into the terms in which responses to climate change figure on the political stage"* (2018: 787). EPC products and

²⁵ E.i. concretisation, or realisation of meaning through a physical medium, action or process.

services are part of what she describes – they are a particular manifestation of how the notion of energy efficiency is understood and practiced.

In crossCert WP5, we want to pay attention to how EPC schemes and EPCs fit into the social reality of concepts such as energy efficiency – how individuals and societies think about it and practice it. But to do that, we firstly need to recognize that impact of EPC assessment and certification does *not* end with a specification of the abstract potential to improve a building's energy performance (also its quality and value), which is ultimately materialized in a form of EPC as the result of the process. As Tateo explains:

"We still need a better understanding of the processes through which we create abstract concepts from everyday collective experience and then use those cultural artifacts to guide our future conduct. Only in this way can we come to account for those sometimes astonishing phenomena through which nonexisting and intangible ideals (like "nation," "tradition," "love," "freedom," "gods," etc.) can become so "real" to exert an effect on people's real life. (Tateo 2018: 420)

In short, the way how EPC assessment and certification is practiced, materialized and experienced by individuals has important implications for much greater, collective issues, such as the future of the planet and our society. We come back to this point in the section on EPC assessment as a social practice (5.2).

3.4.3 EPCs and individuals

EPCs also carry significance and meanings for individual people. With regard to our interest in crossCert WP5, it is important to distinguish between how EPCs are perceived by their creators and their recipients. **For the creator**, which we can simplify is the EPC assessor, the EPC is a result or "a practical accomplishment" (Nevlie 2014: 14) of their work. Through the certification process, they focus on the way the EPC is created or constituted from various pieces of data, information and actions. These ultimately lead and enable them to produce the material outcome of the certification process, which is the EPC. For the creator, the EPC represents their – the expert's – evaluation of the building's energy performance, as well as their professional interpretation on the possible measures to improve it. They can use the EPC to demonstrate and communicate knowledge, also to teach it to those who are willing to learn. For them it is a tool to demonstrate (as a proof) an interpretation of the energy performance of a building.

For the recipient, EPC is a situated resource (see Nevlie 2014: 14), which means a physical object one can use to "manage interactional demands and relevancies" (ibid.) that define specific social and/or administrative activities, such as selling a house, making decisions regarding building renovations, or making a decision on which property to buy or rent. This might include learning (or claiming) knowledge necessary to initiate a course of action (e.g. to sell a house or renovate it). This learning process also inevitably influences their perception, or view of the world, which through their course of action may affect their immediate surrounding (e.g. a building, once they decide to renovate it). EPC might also enable them to monitor the changing circumstances, for example the effect of their decisions and actions (e.g. how their decision to renovate or buy a better/worse rated building affects their monthly bills and quality of life). In some cases, the use of EPCs is unavoidable, such as when selling a house. In other cases, it is optional, such as when making any of the mentioned decisions (although advisory services are not necessarily related to the EPCs). The extent to which the EPC concept is developed also plays a significant role. For example, digital EPCs would strongly enhance and expand the potential impact in several of the mentioned functions of the recipient. Either way, EPCs influence or even require a specific approach to how people participate in a wider social process.

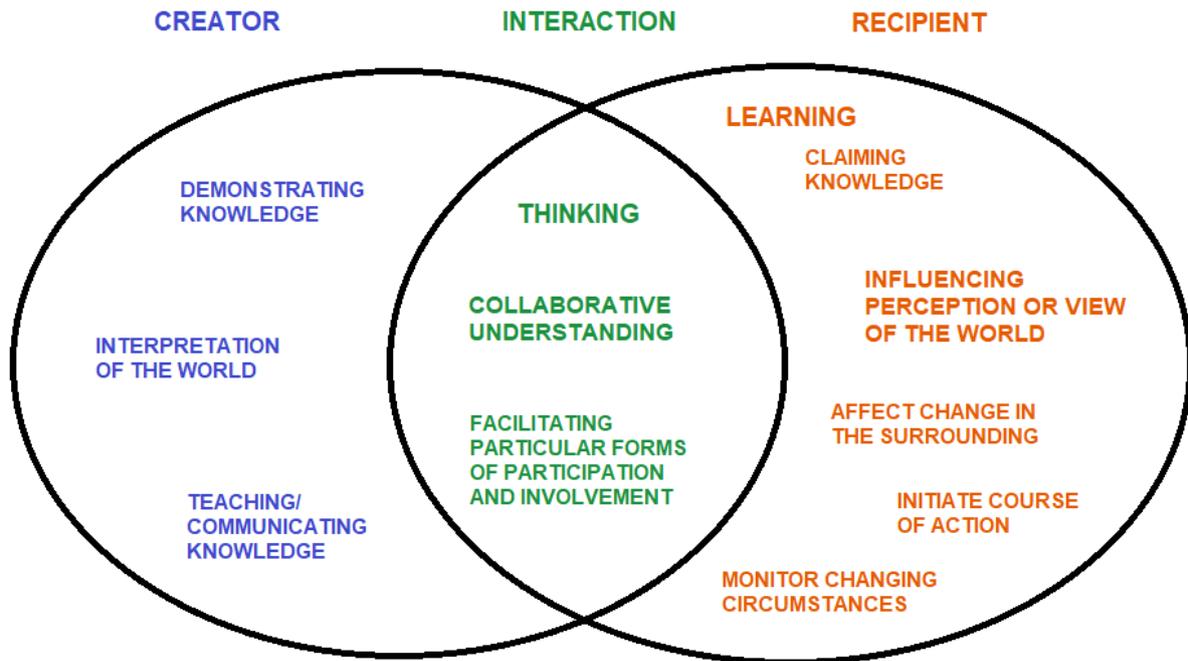


Figure 7: The shifting function of EPCs and actions or processes they facilitate in the relation between their creators and recipients. (comp. Neville et al. 2014: 12-13).

3.4.4 EPCs socialized through interaction

The above descriptions do not explicitly demonstrate the importance or the role of object in social interaction. It is the interaction and the relation(s) implied or established through an object between two persons (or even communities or institutions) that render an object a *social* object. As Neville et al. explain:

"Objects reveal something of how participants, in situ and in the moment, act socially and meaningfully, to construct and interpret both their practical activities and also objects themselves. Through talk and interaction, objects can, for example, be noticed, appreciated, assessed, imagined, created and made sense of, or can be given and received, shared or distributed, shown and demonstrated, described and explained, or disputed. In work and institutional settings, objects can also serve as tools and technologies of various kinds as participants collaborate to organise and perform tasks. Indeed, just what counts as an 'object', and is treated as an object, is something that participants determine together as they interact with one another." (Neville et al. 2014: 7)

By researching EPCs in WP5, we will therefore put a strong emphasis on understanding exactly this **interactional dimension of EPC schemes**. EPCs are the end goal of the certification process and as such enable, or more accurately, require participation of both sides in the certification process. At the same time, they also facilitate the participation of both sides and the interaction between their creators and recipients. As indicated in Figure 7, this is most obvious in the final stages of the certification process, once EPCs are already issued. At that stage they very tangibly support processes of learning/teaching (interactive thinking, if you will) and collaborative understanding.

However, **EPCs also facilitate the interaction before they are actually created** (e.i. issued), in their absence, as both the EPC assessor and the client share the same goal, are competent in (or at least acquainted with) the socio-administrative code that defines what and why EPCs are in a given social environment, and know that they need to collaborate to get to it. As Wagner et al. explain, *"It is this inclusive character of social representations that allows concerted interaction to occur, be it constructive as in the 'dance of the sexes' in courtship or destructive as in violent conflict"* (2018: 133).

The energy performance certification is a rather particular process, one that requires collaboration, participation and involvement on both sides, and one that is *driven* by the goal to create an EPC but at the

same time *facilitated* by the same mean for which it exists in the first place (the EPC). While the most basic policy driven representations of EPCs are already fairly well established in the European societies (mostly due to enforcement through laws and regulations), in WP5 we will try to get to a better understanding of why EPCs also fail to represent other values (i.e. realise the purposes), which are theoretically projected upon them under assumption that EPCs should also be “people-centred”.

In crossCert WP5, we will therefore try to think how EPCs can be a tool that helps generate knowledge, that prompts action, and connects people. We will try to highlight areas and aspects which could be useful in order to create or consolidate common ground for a better and more effective shared understanding of the potential benefits and values that efficient buildings and deep building retrofits and renovations are supposed to bring. Similarly, we will try to highlight areas that could or should be managed differently from how they are (or were) managed in existing EPC schemes, if concluded that the existing practice disturbs the *interaction* that should lead to the anticipated and desired meaningful results that serve the theoretical purposes outlined in 3.1.

4 WP5 research framework

Based on the past two chapters, we should have a better understanding of the purpose of crossCert WP5 and what notion of people-centred EPCs might mean. In this chapter we will focus on the crossCert WP5 research framework. The framework is essentially a set of tables and principles meant to support tasks 5.2, 5.3 and 5.4 in development and execution of their research activities. Their purpose is to offer a basic structure for an applicative approach that leads towards the expected results, which are the recommendations for improvement and development of the existing and future EPC schemes with from the people-centred perspective. These steps include:

1) Define and refine EPC profiles.

- a. Identify the various EPC profiles – both existing and future.
- b. Identify the unique value proposition of EPC products and services for the individual profiles.
- c. Identify the existing and possible future barriers, challenges and other issues that might diminish or block effective realisation of the identified value propositions.

2) Define and refine the EPC journeys.

- a. Outline the different stages of the generalized EPC journey, from its conceptual beginning to its creation and use.
- b. Outline the different stages of the generalized EPC training journey, from the trainee's awareness to the training and work practice.
- c. Define how the journey(s) differ according to the specific use scenarios, each accounting for a specific user and specific purpose of use.
- d. Identify the main actors, tools, materials, competences and meaning that constitute, enable, or otherwise influence the outlined journeys and scenarios.
- e. Identify weak points in the outlined journeys and scenarios – specific moments or elements that make up the described (or imagined) EPC journeys that are the most likely cause of issues.

3) Analyse and interpret the issues identified in both of the previous steps.

- a. Analyse and specify the identified issues according to the different criteria (e.g. design-related, technical, economical, institutional, socio-cultural, or other type of failures or issues).

4) Identify possible solutions to the identified issues and specify recommendations for their implementation.

- a. Based on the above steps and the specific research activities in each of the WP5 tasks, specify recommendations supported and contextualized with relevant evidence and/or analysis.

The outlined framework should be understood as a guideline rather than a requirement, which means that WP5 task leaders can adapt it to the needs of their task and specific interest, or even decide not to use it at all. Ultimately, the only requirement is to produce robust and actionable recommendations. The reasoning for such an open format is also to leave space for adjustments to the direction and substance of WP5 research depending on developments in parallel crossCert WPs.

Due to the expected developments of the EPC concept, and generally the changing nature of the EPC schemes, parts of the research and interpretation in WP5 will be somewhat experimental and speculative. This refers to forecasting possible futures of the EPC scheme development, including possible scenarios, challenges, and opportunities. That also includes tailoring our recommendations to cater those projected futures, based on our existing scope of knowledge, experiences and expectations.

4.1 What are EPC products and services?

Before we look at the listed elements of the framework, here is a working definition of the EPC products and services. When talking about design and experience of EPCs, the immediate associations are its rather visual and tangible – its format, graphical elements, content structure, interactive features and functionalities etc. All these characteristics relate to EPCs as products. However, as hopefully we managed to establish in the earlier chapters, when thinking about design we should think broader than just about the physical EPC, which are only the end result of a certification service. In other words, EPC schemes²⁶ are a combination of products and services implied and practiced in its day-to-day realisation.

If we would list EPC products as they currently exist, there really is only one principal product of the EPC assessment – the EPC, a document that contains all of the information resulting from the EPC service(s). This document, however, can be broken down into several elements, which generally include:

- Information about and graphic representation of energy performance and CO₂ emission,
- Measures to improve building's energy performance,
- The assessor's description/analysis of the building, and
- Meta-information (who, when, where etc.)

Similarly, the EPC service can be treated as a single service that can also be broken down into elements, which include:

- Arranging the assessment (coordination of the service),
- Executing the assessment (field visit),
- Calculating the results (using an accredited/official software),
- Issuing the certificate (using an accredited/official software),
- And delivering the final result, which includes interpretation and explanation for the customer.

It is important to note once more, that EPC schemes differ from country to country, in some cases significantly. The elements listed above might not apply to all of the EU member states' EPC practices. When analysing products and services, especially if our goal is to improve their value for the user and make them more appealing (in order to "sell" more, or in our case, to make them more impactful), it is absolutely essential to put *the people* at the front of the development. Not their theoretical purpose or the methodological and technical details, which are arguably always overstressed in narratives regarding EPCs, but yes – the people.

EPC assessments as such are – from a plainly technical perspective – a rather straightforward process. In contrast, their expected purpose and impact, as outlined in the section 3.1, is far more ambitious and complex. In this regard, the required nuances of the service and product that account for the specific user profile and purpose of use are not negligible. In other words, if we really want people to use and appreciate our product and service, particularly if we want them to use it with a specific purpose, we must consider the details. It makes a difference what the background knowledge of our customer is. It makes a difference why they are ordering the product (purpose). It makes a difference what their financial background is, what their relation is with the building, who they use the property with and for what purpose etc. If we really want people to use and appreciate our product, all of these (and possibly many more) aspects are important and should be considered.

In this regard, we might ask ourselves the following questions regarding **the content** of our products and services for a specific user profile and purpose of use:

- **What is its core substance, the primary content?** → If it is information, which information is really core and for which type of user? Is it comprehensive to the reader/consumer? Are there elements

²⁶ EPC schemes as such are not business plans and should not be understood and/or managed as such. Nonetheless, the applicative nature of WP5 goals requires a level of pragmatic "service and product development" type of analysis.

or options that enable motivated users to upgrade their knowledge to be able to make better use of the information? Are there unnecessary elements? Etc.

- **What are the secondary (auxiliary) contents in the product?** → Are there any? If yes, do they really need to be there? If no, are we missing any? How does this content meaningfully relate to and support the primary content? How can we optimize this relation for individual user profiles? Etc.

Next, we might ask ourselves the following questions regarding **the design** of our products and services for a specific user profile and purpose of use:

- **What is it made from – paper, hardware and software?** → How does its materiality affect the user experience for the specific user and specific purpose? How can people interact with it in their everyday life contexts? How manageable (as a physical product) is it for the specific purpose (storage, sharing, reporting, modelling, etc.)? How manageable is it for the specific demographic or social groups and/or communities (institutional use vs. private use, young vs. senior generations, physically impaired, rural communities, self-build enthusiasts)? Etc.
- **How is it designed visually?** → Which visual elements does it include and why? What is the layout of the information that the product is communicating: where are the information located on the medium, in what sequence, what is the size, what is the density, how is the text formatted, how do these elements communicate each other, what colours are used? Etc.
- **How is it paid for and how much does it cost?** → Can you pay cash, card or otherwise? Do you pay in advance or when the final product is delivered? Are bonuses and discounts possible? Does the price vary depending on the specific customer profile and purpose of use?
- **How is it delivered** → Who is delivering the service? Do they believe in the product and service they deliver? Do they understand the extent of their responsibilities and the added value that their service can create for their clients? Do they understand the approach should be adapted depending on the specific customer profile and purpose of use? Are they trained to do that? Do they deliver the service once only, or is it a periodic task (a continuous service, with updated calculations every five years, a year, a month, a week)? Do they do it personally? Via post? Via email? Is it simply publicly available? Etc.

The list of questions above is not definite or exclusive and serves only as an indication of the scope and relevance of considerations related to service and product design as well as EPC training and education.

4.1.1 EPC journey

To map the practice of EPC assessment, crossCert WP5 will refer to the EPC journey table. Its purpose is to identify the necessary stages and steps/tasks involved in the process of creating an EPC – from awareness of the concept to the issuing of the certificate and its use. The working version of the EPC journey (see ANNEX 2: The EPC journey) lists the following stages of the process:

- Awareness rising
- Motivating and enforcing
- Organizing the assessment
- Doing the assessment
- Processing data and information
- Issuing and delivery of the EPC
- Next steps

Rather than focusing on individual actors involved in the process (i.e. any of the EPC stakeholder profiles), the EPC journey is designed with a focus on its product – the EPC. The reason for that is that not all EPC profiles engage in all of the listed stages of the certification process. The stages listed above are the necessary steps that lead from the seed of awareness of the concept, to the knowledge and consciousness of why an EPC is needed in a specific case, to the practical acts required to perform the assessment and certification, and finally, the actions and steps that apply after the EPC is created.

The table in Annex 2 indicates the listed stages in the middle column. The first column to the right of the stages lists the needs of the customers and EPC users and tasks they need to perform in order to successfully accomplish each step. The second column to the right lists all of the different EPC user-profiles engaged in the process for each stage individually. Similarly, the first column to the left lists the needs and tasks of the EPC service support network for each of the steps, and the second column the different EPC support network profiles involved in each step.

The current version of the table is a working version. This will be refined and adapted to findings and conclusions from research in tasks 5.2, 5.3 and 5.4, before the finalized version will be included in the final deliverable of WP5, D5.5.

4.2 EPC stakeholder groups

National EPC schemes can be understood as theoretical frameworks consisting of laws, regulations, protocols and procedures, that are translated into practice by a network of institutions and individuals, which we refer to as EPC stakeholders. For analytical purposes, stakeholder profiles that take part in this processes, and/or make up the functioning EPC systems and realities, can be grouped in the following stakeholder groups:

- **EPC service support network**, which includes profiles that *develop* the conceptual framework for implementation of the national EPC schemes, as well as stakeholders that *enable* and/or *implement* (enforce or exercise) the official conceptual framework;
- **EPC users (and beneficiaries)**, which – as the title suggests – use and/or (ideally but not necessarily) benefit from the services and products that the EPC system offers or enables. We divide this group into two major sub-groups:
 - **The expert EPC users** and
 - **The general EPC users.**

The outlined analytical framework and categorisation is a theoretical construct. In practice, such an essentialist perspective has its limitations. The fact is that a large number of people, and hence many of our prospective research participants, might be categorized in several of the outlined groups of stakeholder profiles. Nonetheless, such a framework enables us to analyse and interpret the complexity of EPC schemes, systems and cultures established in individual EU member states. We will now look at the outlined stakeholder groups individually as an attempt to specify them in further detail, and perhaps more importantly, to highlight their role and relevance in crossCert WP5.

Beyond individuals

When talking about investments, the decision-makers tend to be adults who are taking conscious and goal-oriented decisions. In the case of an individual or clustered households, these tend to be the oldest members of the micro-communities who are typically also owners of the property. In the case of institutional investments, these tend to be professionals with the necessary background knowledge who carry the responsibility and are given the mandate to make decisions regarding investments into technical maintenance and improvements of buildings, following of course the executive decisions and guidelines of their management.

Both household and institutional investments, however, tend to be based on complex decision-making processes that include more than a single decision maker (e.g. in a typical western single-family household, we can assume the decisions are at least discussed if not conclusively made through a collaborative decision-making process between the two adult partners). Even in cases where the final decision is made by one individual, the decision-makers tend to consider a wide array of animate actors (e.g. children, plants, pets) and non-animate actors (e.g. materials and objects of various sorts, including specific information) that influence their decisions and serve as a baseline reference point in their decision-making process. The complexity of the decision-making process tends to grow with the

number of actors and factors taken into consideration and can rarely (if ever) be deduced to simple sequence of rational arguments that lead to clear-cut conclusions.

This insight has implications firstly for EPC assessors and secondly for future EPC business models, particularly ones that relate EPCs to building renovation and retrofitting. For EPC assessors, as people at the forefront of the EPC assessment and issuing process, this realisation highlights their significance (and responsibility) to how EPCs are perceived and interpreted by clients. For renovation and retrofitting focused business models, such insight indicates that EPCs could have a better impact if the reasoning for investment towards improvement of the building would refer to community benefits (withing the household, the building, or even the neighbourhood).

4.2.1 EPC service support network

The group of stakeholders referred to as EPC service support network are people and institutions who make up the **EPC system**, which we describe as a functional network of stakeholders and institutions that enable, co-create and otherwise support the existence and functioning of the national EPC schemes. These stakeholders drive the system with their activities that translate the implemented national-level EPBD laws and regulations into practice through a set of procedures and protocols. The crossCert WP5 working version of the list of the EPC service support network stakeholders contains the following profiles:

- EPC issuers/assessors
- Public authority representatives
- Accrediting bodies
- Independent controlling bodies
- Developers of EPC software(s)

Representatives of the EPC service support network generally have a good understanding of the certification processes from the systemic point of view, and understand the purpose of the EPCs beyond the individual EPC document (e.g. for the assessment of the housing stock quality in a country or region, or as a tool to analyse and demonstrate the effect of EPBD policy framework with regard to the national or European climate and sustainability goals).

The concerted performance of stakeholders that make up national EPC systems largely defines its quality, and ultimately, the impact of EPBD policies at both the national and European levels. As Mudgal et al. concluded in their 2013 analysis of EPCs on the real-estate market for the EU's DG Energy:

"It can be said that low ambition in implementation [of EPBD directives] leads to certification schemes of poor quality, i.e. not providing sufficient and accurate information or the necessary quality control. /.../ A poorly defined certification scheme and requirements, insufficient enforcement, low public awareness and/or acceptance, low quality personnel carrying out audits, etc. will affect the way the certificate influences the market." (Mudgal et al. 2013: 18)

The table for further specification of the relation between the individual EPC service support network profiles and EPCs as such can be found in the annex (see ANNEX 1: EPC stakeholder profiles). It includes a column for specification of reasons why the individual profiles have an interest in promoting and co-creating the EPC schemes and systems, and a column for specification of challenges and barriers that they deal with in their specific segment of the scheme. Before moving onto the category of EPC users, we will highlight the EPC assessor profile as it is particularly significant for the crossCert WP5 research.

4.2.1.1 The EPC assessors

EPC assessors, also referred to as EPC issuers, are professionals trained and/or accredited at the state/national level to deliver the EPC assessment and certification services. They work either as representatives of businesses, institutions or as individual qualified professionals. Their professional background is usually in the fields of engineering (civil, industrial, machine), energy (consultancy), or architecture. Their key role in the EPC system can be framed in terms of policy implementers, as they are the ones who go physically to the field and do most of the practical work required by the national EPC

schemes. Based on the U-CERT research (Bančič et al. 2020: 55), their key motive to partake in the system is the business opportunity, and their main concern is – at least at the declarative level – to deliver a quality product to their customers, which is the individual case-specific EPC.

Among all of the listed EPC support network profiles, they are arguably the ones who are most actively engaged in the practice (active implementation) of EPC schemes. As the people who deliver the EPC assessment and certification service, they are closest to the customers and users, and therefore offer a valuable insight into practical strengths and weaknesses of existing EPC schemes for users and beneficiaries. In addition, they also have a good understanding of the general public opinion about EPCs, their impact, and understanding (perception) of their practical value for their customers and other prospective users and beneficiaries.

On the other side, EPC assessors use the established national EPC systems and structures that enable the issuing of certificates and thus the transfer of EPBD policy into practice. This includes use of the established national methodology, calculation tools (software), and other elements of the established EPC system. As a result, they have a valuable insight into the specifics and hands-on problems with existing national EPC methodologies, calculation tools, issuing software and other technical aspects of the established national EPC systems.

Within crossCert WP5, experienced EPC issuers will be a valuable source of information for identifying issues and challenges concerning existing EPC schemes, particularly at their national level. In task 5.2, they will be an important source of insights for understanding the EPC journey (see 4.1.1) and the challenges and issues with the existing EPC products and services. In Task 5.3, they will be central to our understanding of the EPC training journey, which we elaborate on in the following section and the challenges and issues with the existing EPC training and education practices. In Task 5.4, they will be an important source of insights to determine which promotion and marketing approaches might work better than others, and to identify examples of good (and bad) practices.

4.2.1.2 EPC training journey

EPC assessors clearly have a pivotal role in the implementation of EPC schemes and the delivery of EPC products and services. As we outlined in section 3.3.4, several aspects related to the quality work of EPC assessors are considered to be important for an effective and impactful implementation of EPC schemes, starting with their training and education. To map the practice of training and education of the EPC assessors, crossCert WP5 will refer to the **EPC training journey** table (see ANNEX 3: The EPC training journey). Its purpose is to identify the key stages and steps/tasks involved in the career of EPC assessors, with training and education being the key focus of our research. That will help us clarify key aspects of the professional career and practice of EPC assessors, and enable us to form recommendations for the benefit of professional EPC assessors. In addition, understanding this aspect of the EPC schemes will enable us to better understand the entire process of EPC assessment and certification, and to produce better recommendations also with regard to the more general EPC journey (see section 4.1.1). The working version of the EPC training journey lists the following stages of an assessor's career:

- Awareness rising
- Motivating
- Applying and organizing
- Learning and training
- Doing the exam/getting the accreditation
- Practicing EPC assessments
- Contributing to the professional EPC community
- Undertaking quality checks
- Periodic upskilling (continuous professional development)

The specific focus of the outlined EPC training journey is on the EPC assessors. The stages listed above are the necessary steps that lead from their awareness of the EPC concept, to the knowledge and consciousness that motivates them to train to become an accredited EPC assessor, to the steps required

to obtain the accreditation, and finally the various key elements of their professional career after they obtain the accreditation. In line with recent anthropological studies of professionalism (Hull 2020), such an approach enables us to highlight ways in which EPC assessor's professional identity and legitimacy are recreated and maintained not only through the processes(es) of training and (continuous) education, but also through practicing their career in everyday life environments. This is to contrast the assumption that this professional identity and legitimacy is a given at the moment of obtaining the title (a certificate, accreditation, or simply – a label) "EPC assessor".

The table in Annex 3 indicates the listed stages in the middle column. The first column to the right of the stages lists the needs of the prospective EPC assessors and tasks they need to perform in order to successfully accomplish each step. The second column to the right can be used to specify professional profiles who train to become accredited EPC assessors. On the left side, the first column lists the needs and tasks of the EPC service support network for each of the steps, and the second column lists the different EPC support network profiles involved in each step.

The current version of the table is a working version. This will be refined and adapted to findings and conclusions from research in tasks 5.2, 5.3 and 5.4, before the finalized version will be included in the final deliverable of WP5, D5.5.

4.2.2 EPC users

When it comes to the question of **usefulness** of EPCs one should always pose the question – which "user" are we interested in? Based on our analysis of the EPC schemes and systems so far, we can argue that the essentialized purposes of EPC schemes, outlined in section 3.1, are pretty much meaningless without a specific **user profile** in mind. The category "user profile", which is another analytical construct decoupled from real life contexts, implies one or several purposes that underpin the rationale that motivates (also requires or anticipates) a course of action(s), which can be referred to as "**the use of EPCs**". Which purposes of use are implied in each specific case of "use" depends on a variety of factors, which – to an extent – can be simplified and associated with the generalized individual user profiles, as we describe them in this sub-chapter (4.2 EPC stakeholder groups).

In its broadest sense, the notion of "user" can refer to a wide range of EPC stakeholder profiles, and can also include profiles identified in the service support network stakeholder group. In terms of **meaningful use of EPCs**, which we understand as employing it as means to pursue one's own interests and/or benefits, almost anyone can be interpreted as a user. For example, from the policy maker's point of view, EPCs are an instrument, a tool to be used for a variety of reasons, which by our definition makes them a user of EPCs. However, the nature of their "use" of EPCs is rather specific. For them, an individual EPC and the acts that lead to its creation – the individual certification journey – is less important and less meaningful than what lies beyond them – a functioning EPC system that serves specific policy-level purposes and interests (e.g. assessment of the housing stock quality in a country or region, or a tool to analyse and demonstrate the effect of EPBD policy framework with regard to the national or European climate and sustainability goals). In other words, they are more concerned with the number of EPCs that feeds into the system rather than the specific (user-centred) qualities of the individual EPCs.

To contrast that with a general user's profile, such as a prospective property buyer who wants to buy their property for personal use²⁷, they are clearly focused more on their individual experience of the EPC journey and/or its end product (the EPC). Representatives of the general user profiles (to a large extent also expert user profiles) primarily think of EPCs in a very pragmatic manner, as to how they affect their everyday lives and work, and how they affect the world they know and care about, typically with reference to a very specific house or another type of real-estate property.

That being said, the division between the support network and user profiles is artificial, and useful only to distinguish between different roles that people – the representatives of profiles – take on at various stages of the EPC journey (see section 4.1.1; Annex 2). The outlined EPC profiles are therefore essentialized

²⁷ This specification is relevant to rule out buying properties primarily as a speculative investment, which today can make a significant difference with regard to motivations and decision-making rationale.

characters people represent, or even attributes people put on (like hats), in the enactment of different stages of the certification process.

Once focusing on users, it is important not only to think about the specifics of the purpose of use, but also their background context. Concerning the nature of EPC schemes outlined in previous chapters, we decided to split users into **expert EPC users**, and **general EPC users** – two large sub-groups defined by their background knowledge relevant to the understanding of the EPC schemes. In our conceptualization, the notion of knowledge also includes skills and experience related to building energy performance, all of which undoubtedly shape the beliefs, opinions, attitudes and perceptions regarding existing (and future) EPCs, the certification scheme, and policy's purpose at large. Rather than assuming a clear-cut segregation of profiles on those that have knowledge and those who do not, we suggest thinking about the proposed user groups as **ranges on a continuous scale between extremes** on between the state-of-the-art expert knowledge and minimal (or basic) knowledge. The intersecting middle section in Figure 8 indicates that some people can be categorized in both the expert and general user groups at the same time.

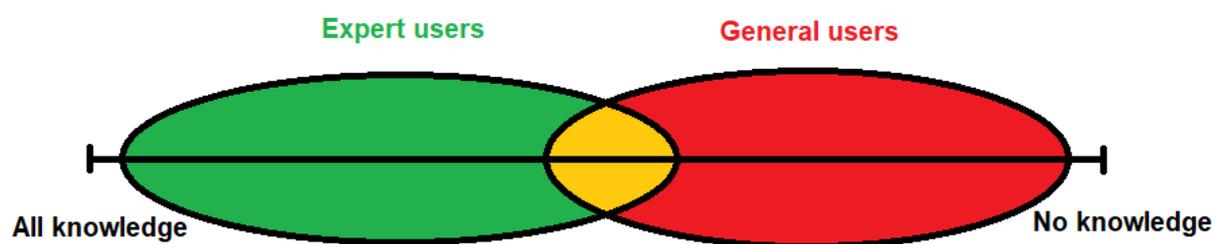


Figure 8: Illustration of the theoretical knowledge continuum.

4.2.2.1 Expert EPC users

Expert users can be understood as knowledgeable (advanced) users of EPCs. In contrast to the less knowledgeable general (basic) users, experts tend to understand and make sense of the existing EPCs differently, and arguably – better. In terms of everyday use of EPCs, this means they are in a better place to make meaningful (i.e. purposeful) use of EPCs, both in the context of their profession and beyond.

In the context of T5.1, we compiled the following working version of the list of expert EPC user profiles:

- Building/facility managers
- Real-estate property brokers/agents
- Real-estate investors
- Craftspeople
- Building designers and architects
- Utility companies
- Product manufacturers and suppliers
- Municipalities and other local governing bodies (public authorities)
- Energy agencies
- ESCOs

The table for specification of the unique value proposition and challenges to its realisation for each individual expert EPC user profile can be found in ANNEX 1: EPC stakeholder profiles). It also includes short characterizations of each stakeholder profile.

4.2.2.2 The general users

With reference to the conceptualization of EPC users as outlined above, general users can be understood as people who possess a lesser extent of relevant EPC-related knowledge than those categorized as expert users. These profiles would typically require some form of guidance and support. Alternatively (or in addition), these profiles need to have a significant level of motivation and cognitive capacity to gather

and/or interpret the relevant EPC-related information, all of which enables them to generate the knowledge, confidence and motivation required to make meaningful use of EPCs.

In the context of T5.1, we compiled the following working version of the list of expert EPC user profiles:

- Existing homeowners
- Prospective homeowners
- New-build investors
- Household tenants
- Business tenants
- Building users

The table for specification of the unique value proposition and challenges to its realisation for each individual general EPC user profile can be found in ANNEX 1: EPC stakeholder profiles. It also includes short characterizations of each stakeholder profile.

4.3 Analysis of identified barriers and challenges

After first identifying the unique value propositions for the individual EPC profiles, and second the barriers and challenges that prevent the realisation of identified value propositions (using Annex 1), further analysis of barriers and challenges can be done to specify the details and characteristics of the identified challenges. For this purpose, based on the reviewed literature, we outlined categories²⁸ to guide the analysis in the table below (the example in italics serves only as an illustration).

We suggest using the categories to specify characteristics of identified challenges. They can also be used more generally, to evaluate specific aspects in which EPC schemes have been less successful than expected (or required) by policy makers and EPC experts. The specification can then be used to derive conclusions and insights that will inform the shaping of specific recommendations.

The challenge: EPCs are expert-biased and thus difficult to understand for the majority of EPC users.

Area/aspect of interest	Reasons for failure of/negative effect on the EPC scheme
Design All things related to the quality and character of the presentation, form and experience of EPC products and services.	<ul style="list-style-type: none"> • <i>The content of the EPC as a document is too dense, there is no clear relation between individual elements, the terminology is difficult to understand, the units are difficult to understand, there are few visual elements, the measures sound generic and some are difficult to understand, the fonts are too small for a senior person to read, ...</i>
Technical All things materials & technology related.	<ul style="list-style-type: none"> • <i>Calculation software does not enable the alternative (simplified) version of EPCs but is only able to produce default format with full technical details.</i> • <i>The design cannot be edited or otherwise adjusted manually by the issuer.</i>
Economic/financial All things money-related.	<ul style="list-style-type: none"> • <i>No funds on the national level for a people-centred update of the software and adaptation of the established EPC schemes.</i>

²⁸ Criteria for assessing proposed innovations will most likely have to be revised according to developments within WP3, particularly with regard to criteria specified in Task 3.5:

- Alignment with reality,
- Accommodation of new/impending technologies,
- Suitability for enforceable action in building regulation/policy,
- Ability to extrapolate at scale, and
- Verifiable quality/representation of required input data.

According to the description of T3.5 in the crossCert research proposal, these criteria “are deemed necessary for a successful, actionable EPC to be delivered”. In comparison to categories proposed in this section of D5.1, considerable overlap is already evident and further harmonisation is to be expected.

	<ul style="list-style-type: none"> • <i>Investment towards designing and implementing more people-friendly EPC products and services does not seem to be economically justifiable, especially given that the existing scheme can be simply enforced through laws and regulations, which is much easier and hence cheaper to do.</i>
Institutional Related to rules, regulations, procedures	<ul style="list-style-type: none"> • <i>Some of the key national stakeholders that design and implement EPC schemes believe EPCs are in fact only meant to be used by experts, effectively blocking potential developments due to their lack of engagement on the matter.</i>
Socio-cultural Aspects related to characterisation of individuals in societal context.	<ul style="list-style-type: none"> • <i>People, including supposed expert EPC users, tend not to problematize this fact as expressing lack of understanding is seen as a weakness, which is effectively experienced as a social stigma. Minimal participation is a norm as long as official (administrative) requirements are fulfilled.</i>
Practical/organisational Other practice-related aspects.	<ul style="list-style-type: none"> • <i>Dealing with this issue requires significant time and effort. Firstly, on the side of software developers (which would not be a significant issue given with granted funds). Secondly, and more importantly, each change to the established certification protocols and procedures requires adaptation of the official training activities and contents, upskilling of already accredited EPC assessors, and actual change in the established (and habituated) practice of EPC certification by the accredited assessors.</i>
Other Noncategorized.	<ul style="list-style-type: none"> • /

5 Towards EPC use scenarios

As background for use of the analytical framework presented in the previous chapter, we now look at how we can frame our understanding of EPC in a more coherent, integrated manner. First, we will look at how theatre as a metaphor can be utilized for simplified and structured experimentation with EPC journeys, either to contextualize the analysis of observed real-life examples, or in designing (imagining) specific scenarios for the EPC assessment and certification. Second, we look at how the theory of social practice (Shove et al. 2014) allows us to grasp the real-life complexity of EPC assessment and certification as a social practice. Finally, we propose a format for developing use scenarios focused on specific goals while keeping specific EPC user profiles in mind. We finish the chapter with some final contextual considerations to inform the work of crossCert WP5 researchers and beyond.

5.1 EPC service as a theatre performance

The categories and profiles outlined in the previous chapter can feel abstract and complex. As an attempt to bring our framework to life, or make it more intuitive to understand, we will try to imagine an EPC journey as a **theatre performance**. The metaphor of a theatre is not arbitrary, but adopted from a Canadian American sociologist **Erving Goffman** who used the “dramaturgical analysis framework” to develop and explain his theory of creation and presentation of self, meaning individual’s identity, in the societal contexts of everyday life (Goffman 1990). It is important to note, however, that we are using his metaphor, not as an explicit reference to his theory or conclusions (although parallels might exist), but simply because it is a useful tool to present the rather complex everyday life practices in a way that is universally relatable and thus easier to understand. We will use the metaphor to indicate how the outlined EPC profiles come together on the stage of everyday life, how they take on roles and perform or enact the specific form of social practice we are interested in, which is the EPC assessment and certification.

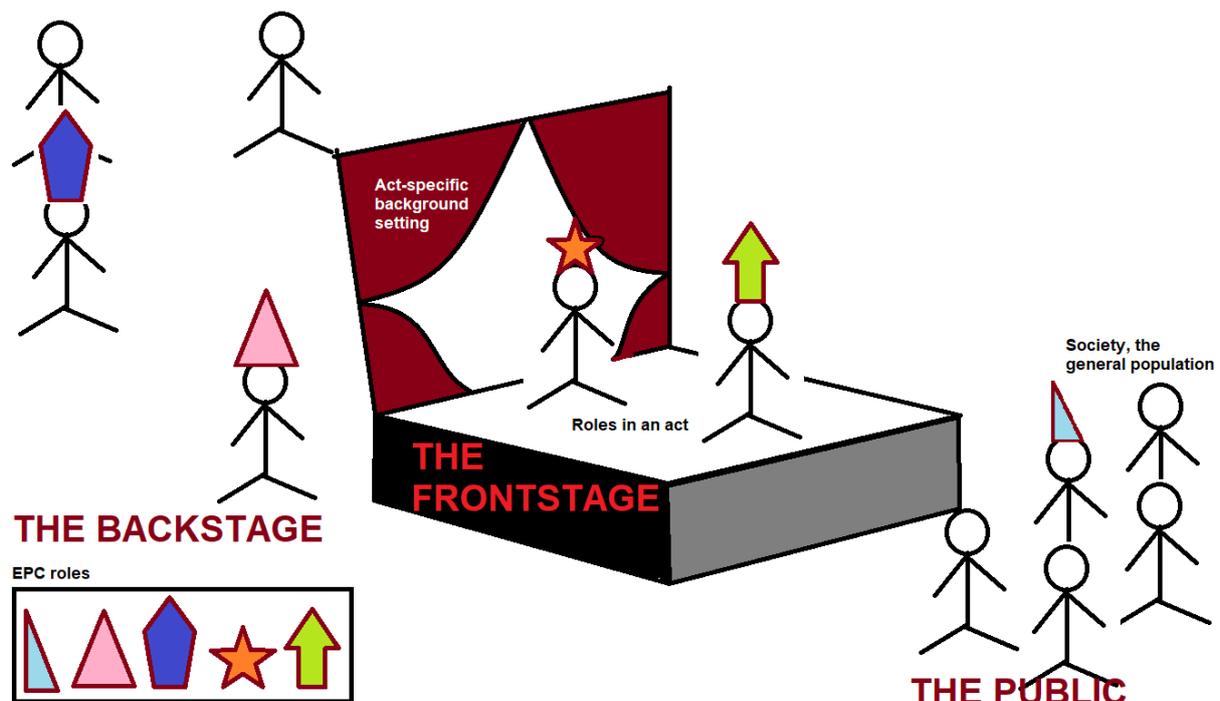


Figure 9: The illustration of an EPC theatre setting.

5.1.1 The dramaturgical elements

To start with, our EPC theatre setting consists of the following elements:

- **The backstage** → The space behind the stage, the area which is generally invisible to (or hidden from) the general public's sight, but is essential in enabling the performance. Generally speaking, this is the space in which – in our case – actors representing the EPC service support network interact and collaborate in order to enable the performance of the scenario (the EPC scheme).
- **The frontstage** → The visible part of the stage, which represents the real-life setting, which implies a concrete place in a concrete moment in time in which actors interact. Part of the frontstage is also **the background setting**, which is all of the elements present in the real-life that give character to the space and time in which individual acts take place.
- **The public** → Members of the society who watch the performance and react to it (emotionally and physically, most explicitly through their reactions) but typically do not get involved. They do, however, take away an impression, an experience of what they saw performed on the stage.

If we take the EPC journey and imagine it in the form of a theatre performance, each stage of the journey (see section 4.1.1) represents a single **theatrical act**. Each act can involve a number of **actors** (people) who take on **specific roles** (EPC stakeholder profiles) and perform a series of actions and interactions implied in the more or less specific act-specific **script** (tasks and actions necessary for a successful conclusion of an individual stage of the journey) to pursue the realisation of the case-specific specific **scenario** (which depends on the overarching purpose of the encounter).

Scripts for individual stages of the journey can be more or less specific, largely correspond to procedures and protocols enshrined in the national EPC scheme, and are defined by both the institutional and socio-cultural codes of conduct. **Clients** who reach out to EPC assessors likely follow the standard socio-cultural code of official and polite conduct – presenting themselves, addressing the assessor politely, asking for clarifications etc. **Assessors**, on the other hand, are trained to do the assessments, and factually follow an assessor's "script" – a somewhat structured procedure to perform an assessment, which they have learned when training to become an accredited assessor. Assessors also lead the clients along to follow the script and help them to execute the assessment as required by the locally established professional standards.

5.1.2 An illustration

To illustrate that, let us take the certification stage *Doing the assessment* and imagine it as a theatrical act. In principle, there are two main roles involved in this act – the EPC assessor and the client who ordered the assessment (the prospective EPC user). We can assume that in the previous act, *Organise the assessment*, the two actors managed to agree on the place and time for the assessment. In order for them to perform the EPC assessment, they might need to pursue the following sequence of actions and activities:

Tina, the EPC assessor, drives to the site of assessment, parks the car, takes the tools and walks to the entrance. She rings the bell and Janez, the customer, lets her enter. They greet each other. Janez offers Tina coffee and cookies and they have a quick polite chat. Tina asks for the relevant information about the property, and Janez answers according to his knowledge. They go on a tour around the building and Tina takes relevant measurements and notes. During and after the tour, Janez asks questions about the building's energy performance, and Tina answers according to her knowledge. At the end of the tour, Tina tells Janez when he can expect the certificate, and thanks him for his participation. Janez again offers cookies, asks final questions, and thanks Tina for the service. Tina leaves the building and drives away.

In this illustration, the assessor Tina and the client Janez succeed to accomplish the **main goal** of their encounter, which was to perform the EPC assessment. However, they also perform a **series of other tasks**, seemingly banal actions such as ring the bell, open the door, say hello, etc. These are either necessary for the practical realisation of the principal goal, or give quality and character to the activity. Tina and Janez

interacted with each other and collaborated according to their socio-cultural roles in the case-specific setting in order to constructively move towards a successful assessment of Janez's property. The plot, however, could have involved a number of unexpected twists, depending on the variety of factors that define each and individual EPC assessment. Here are some possible examples:

- Tina's car breaks down, she cannot come to do the assessment.
- Janez hates the fact that he has to do the EPC assessment. He is uncooperative and hurries Tina through the process.
- Tina can't be bothered to enter the building. She takes a look at the building from the outside, takes the picture of the building and leaves.
- The assessment proceeds normally until just before Tina leaves. At that stage, Janez asks Tina to make sure the building does not get labelled better than G, so that he will be eligible for the local government's refurbishment subsidy. He puts on a big smile and pushes a white envelope between the coffee cup and the cookie jar.

5.1.3 Social representations and lived experiences

The way how the involved actors "enact" the assessment is significant not only in terms of quality, but in terms of the **social representation** of the relevance and importance of the process (how the performance presents itself to the public). If Tina performs poorly, this will provoke some form of reaction by the customer, and possibly by the public as well, and transform into a negative **lived experience**. The same goes the other way around. Every enactment involving negative attitudes, carelessness, or even illegitimate corruptive practices, reinforces the negative **feedback loop** through repetitive negative experiences that render EPCs into something that policy makers do not want it to be. The same goes for positive lived experiences, that through repetition reinforce a positive feedback loop.

To add to the complexity, it is important to note that whatever is happening on stage can be influenced significantly by the **surrounding context**. Here are some more twists that stress the lived experience of the performance, and expand on the scope of complex factors that can influence the on-stage performance and the public perception:

- During the assessment, Tina does not know how to account for a specific heating system integrated into the building. She calls a colleague (in the backstage) to ask him for advice. He gives her the answer and points out she should check the loft to make a better assessment. She does as he suggests. Janez is impressed with the service.
- The neighbour (member of the public) sees that Janez is having his house assessed. They get intrigued and arrange for an assessment themselves.
- The other neighbour does not like what he is seeing, as he believes the assessment is a useless administrative nuisance. He starts booing and shouting at Janez and Tina, throwing apples and shoes at them (onto the stage).
- A member of the service support network sneaks from the backstage into the public and starts clapping and cheering Tina's performance. Other people in the public who at least vaguely sympathise with Tina follow his example, internalizing his (fabricated) enthusiasm for EPC assessments as their own.

5.1.4 Shared goals and complementary purposes

As a final remark, it is worth pointing out the relevance of the **shared goals** at each stage of the EPC journey. The overarching shared goal of the entire EPC journey is the creation of an EPC for a particular building. This goal does not really change as the certification process unfolds. In contrast, the **goals of each individual stage of the journey do change**. These shared goals can be described as consensual social facts – immaterial social objects, or mental entities (Wagner et al. 2018: 136) – shared by the actors (and to a large extent by the backstage and the general public). As such, the goals importantly influence and co-define (shape) the details of the individual performance, which in turn affects the experience of both the individual stages and the journey as a whole.

In addition, it is important to note that while goals – the what’s – are shared by the involved stakeholders, **the purpose** – the why’s – are *not* shared, or at least not necessarily so. If the answer to the question – do we want to do an EPC assessment for a particular building? is positive for all of the involved stakeholders, which means they agree on *what* they want to do. That, however, does not also answer the question of *why* they want to do it. In relation to our ongoing example, we know that Tina and Janez share a goal, which is to do the EPC assessment of Janez’s building. We can assume that Tina wants to do it because EPC assessments are a part of how she makes a living. Janez, on the other hand, might want to do it because he wants to renovate his building, and needs an EPC to apply for a government subsidy (to relate to the ‘white envelope’ twist of the plot). Their goal is shared, yet their purpose is different. Tina and Janez need each other to reach the common goal, but arguably also to fulfil their personal purposes.

Now while the main purpose for participating in the EPC journey might be very different and partial, the key question is – **are there also elements or areas of shared and complementary purpose?** Are there reasons that drive the collaborative participation that are not partial to individual actors, but are shared by several if not all of the involved stakeholders? Or to phrase the same question differently – do the actors involved in the individual stages of the journey do that because they need to, or because they want to? Are they passively present and exert the minimal necessary effort (e.g. being present), or do they actively collaborate in the process? And finally, how does that influence the performance of the script/scenario and its lived experience, both on the level of individuals and collectively? What we can almost certainly assume is that if the shared purpose of participating actors is deduced to “let’s just get it done with because it’s the law”, the performance is not likely going to be remarkable, the audience might leave the premier before the show is even over, and future enactments will struggle to attract any kind of public attention.

At this point, we come back to the EPCs as a social object, and more specifically, EPC service as a bundle of social facts with the EPC as their proxy for their manifestation and social representation. It is the **details and nuances in the quality of participation in the specific form of social interaction**, which in our case is the EPC assessment and certification, that play an *absolutely key role* in shaping the lived experience of the interaction, which influence opinions, attitudes, beliefs and perceptions (of trust, of value, of meaning etc.) that define EPCs as social objects. As Wagner et al. explain, “*through their actions, actors define meaning and social characteristics of the objects with which they are interacting and vice versa, the objects of their actions define particular characteristics of people*” (2018: 133). If we apply this to our generalized interest in crossCert WP5, this means that the EPC service – and people’s participation in it! – influences the perception and impact of, firstly, the accomplished goals at each stage of the EPC journey, and secondly, the EPCs as the final product of the journey. At the same time, the accomplished goals at each stage of the journey (the social facts as they are manifested and experienced through a sequence of actions) and the EPCs as the physical and final products of the service (how they are designed as a product) define (through the process of reproduction and reinforcement) or re-define (through the process of change) the characteristics and quality of the entire process, and arguably the actors involved in the process themselves – their identity, their public image and/or social status etc.

5.1.5 The benefits of a theatrical illusion

The metaphor of theatre is useful in crossCert WP5 for two reasons. One is that it **enables us to visualize various scenarios** that we will be exploring, particularly the interactive relationships and co-dependencies of various elements of the performance (actors, their actions, the objects on stage etc.). The theatre as a universal reference point makes it easier for anyone to discuss and think about the existing and potential future EPC scenarios. The latter is especially relevant as we are likely to also be thinking about aspects of EPC schemes that factually do not even exist to this day, such as functional digital EPCs.

The second reason, yet just as relevant, is to **help us understand the limits of our ambitions**. Although we may be very good at analysing the structure of an EPC journey and defining recommendations for designing perfect scripts and scenarios – ones focused on specific end-user profiles and purposes – the actual transfer of our recommendations into practice (if it might happen at all) will have a life of its own. It is the same as with theatre performances – **the individual performance of a written script is – and will *always***

be – unique. The text does not change, but the actors involved have a certain amount of autonomy and agency to interpret, enact, and intervene as they please, within limits of enforced and/or observed (i.e. practised) rules (e.g. laws, regulations, social norms), and within limits of their own capacity (skills, knowledge, competence, also tools and materials available to them). Such is the nature of real-life contexts. A multitude of factors – be it the backstage, the frontstage, or the public – influence the performance and its experience. This is why such metaphorical analyses are inevitably a generalization and do not necessarily represent a detailed and realistic description of actual existing (or future) EPC practices. That being said, they remain a useful tool for those willing to recognize its value (some might claim the same for EPCs).

The “acceptance” issue no.2

To relate to the point from the introduction, the theatre metaphor offers us a fresh perspective on the problem with searching for widespread acceptance of the EPBD and EPCs. To remind ourselves, such search implies that the communities of policy makers and experts promoting EPBD implicitly already “know” what the “truth” is, namely that EPCs are not only necessary *but also* useful for the people. By searching for the widespread acceptance of this “truth”, they basically require everyone else – most significantly the expert and non-expert users of EPCs – to participate in EU-wide enactment of “the truth”.

To illustrate, there seems to be an overwhelming consensus in the EPBD expertise that policy *enforcement* is necessary in order to “push” the market towards the desired projected change. As BPIE puts it, “*the mandatory labelling is an important step towards informing the market and thus supporting the uptake of investments*” (Arcipowska et al. 2014: 48).

Such conclusions, however legitimate and agreeable they may be from the numerous rational points of view, again indicate that **people-centred value of EPCs is secondary in comparison to the policy- and system-centred values.** In fact, it has arguably been so from the very beginnings of the EPC concept, with policy makers and EPB experts designing EPC schemes in order to serve – first and foremost – the purpose and function of the EPC system, and not the needs and requirements of end-users, or consumers. This reflects on people’s experience of past and existing EPC schemes, as we indicated in section 3.3. Some efforts and funds have been invested to tackle this issue, with crossCert WP5 as an example, yet the foundation is not great.

If we relate this observation to our theatre metaphor – the first acts of the great EPC (his)story were and continue to be poorly performed in several of the EU member states. This has implications on the mood of the public. What will we do with members of the public who have not been impressed, and have expressed their lack of support by booing at the actors on stage, or perhaps even leaving the theatre? Will we force them back in, and onto the stage in the name of law? Or will we stop the show, rewrite the script, and try again? Either way, in the eyes of a large proportion of the public, the damage has already been done, which will have lasting consequences.

5.2 EPC assessment as a social practice

What is perhaps the biggest limitation of the theatre metaphor is that the EPC journeys are intertwined with a number of parallel (or even conflicting) processes. Together they form a dynamic, complex yet organic totality we call everyday life. The act of issuing EPCs, as we outlined it in the theatre thought experiment, is never so explicitly in the centre of people’s lived reality. In fact, it is often experienced as a rather minor or even insignificant event (or series of events), associated with more complex social processes that carry much greater social and cultural significance, such as buying or selling real-estate property, renovating or retrofitting, or simply – using buildings. This realisation helps us understand, that even seemingly perfect theoretic scenarios for use of EPCs might fail to act out as expected, and

particularly so if they are not aligned with the broader contexts that determine the true value, meaning and function of EPC products and services in each specific case.

While the metaphor remains a useful reference point for mental experimentation and theorization, a more robust approach to studying EPC schemes and systems is to observe them as a form of **social practice**. Shove et al. (2014) build their theoretical social practice framework, commonly applied in sociology and anthropology, for the study of various manifestations of socio-cultural patterns revolving around specific sets of **materials, competences and meanings** – the three key elements that define them:

Materials are anything tangible and quantifiable that is used or otherwise influences social practices – objects, technologies, raw materials, software etc.

Competences are knowledge, skills, experiences and capabilities that individuals possess, which enable them to take part (co-create, influence, and reproduce) in a given social practice, and which largely represent the limits (or extent) of an individual's capacity to exercise their agency in the given social practice.

Meanings are the inanimate socially and culturally specific symbolical meanings, ideas, wishes, hopes etc.

(see Shove et al. 2014: 24)

Shove et al. argue that *"practices emerge, persist, shift and disappear when connections between elements of these three types are made, sustained or broken"* (2014: 24–25). Such analytical framework is applicable also in the case of the EPC assessment and certification.

5.2.1 An outline

EPC assessment and certification practice can be understood as a practical enactment of the otherwise paper-bound **EPC scheme**. A simple definition of **a national EPC scheme** is the national-level implementation of the EU-level EPBD policy framework, which was transferred into laws and regulations at the national level in a variety of ways, within the scope of autonomy of the EU-member states. At the national level, the schemes as theoretical frameworks are translated into practice through **EPC systems**, which we refer to as EPC service support network – a functional network of a range of stakeholders and institutions. These networks drive the system with their activities that translate the implemented laws and regulations into practice through a set of procedures and protocols. These procedures and protocols can be generalized as artificial or invented. They needed to be written and accepted through a finite policy-making process (a managed process bound with deadlines). The content needed to be more or less consensually agreed to (among the key stakeholders that enable the very existence of the system) and tested, before it can now live comfortably on paper (until the next round of revision). Through everyday life practice, EPC schemes gradually transform(ed) into functioning, established sets and sequences (or assemblages; Antczak and Beaudry 2019) of practices – **social practices**, adapted to the specific context in which they are practiced. These could even be referred to as particular forms of **EPC cultures**, which can be studied and described in historical terms, specified in practical and systemic terms, and characterized in terms of cultural patterns, codes, and specifics.

The **practice of the EPC assessment and certification** should therefore be imagined dynamically – as the EPC system in action, involving people (also communities, institutions) with a specific set of knowledge, skills, competences, tools (e.g. calculation software) and the capacity (social, cultural, or professional) to translate the theoretical EPC framework into practice through meaningful interactions. What gives them substance and relevance is their enactment in everyday life, which through years and decades of the EPBD policy implementation processes developed into particular **national forms of EPC practice**. These clearly change through time, and are not only a result of the consensus-building process between experts and policy makers (based on standards, abstract concepts and methodologies put together by relevant experts to form the EPC scheme), but are co-created and co-defined by other participating actors, particularly EPC users.

5.2.2 Repetition and reinforcement

Thinking about EPC certification as a practice highlights the temporal, or better, the processual dimension of EPC assessments. For people who make up the EPC systems, **EPC certification is not a single event, but an ongoing process.** EPCs as an output of the assessment procedure are not simply fabricated by the EPC assessors (as a piece of craftwork or artwork), but should be understood as a result of the established and regulated **EPC certification practice.** Actors involved in this process follow rules and procedures, but they also have some agency to tailor them, both according to the objective context of an individual assessment case or event, as well as to their personal preferences. With each repetition, EPC assessors *reproduce* the practice of EPC assessment and certification, and thus co-create it as a lived activity in a social context. What is just as important, however, is that with each repetition they also *reinforce* its lived experience – firstly their own, but also the experience of other people involved in the process. Such a process, through years and decades of reinforcement, created patterns and established modes of doing, which we refer to as the national EPC assessment practices. And what is just as significant, this process shaped and continues to shape people’s attitudes, opinions.

5.2.3 Lived experience

The analytical perspective that we have outlined above is not necessarily consciously experienced in practice, particularly not by individual EPC users. The majority of the latter experience **EPC assessment as an event** – a relatively short, defined and finite process. Their individual experiences, however, accumulate into the collective consciousness of what EPC products and services are. Through the ongoing repetitive certification process, the lived experiences – shared among people in a variety of ways – gradually translate into patterns of **collective perceptions and attitudes.**

The **individual experience** of EPC assessment is clearly still the most relevant reference for people’s judgements about EPC schemes and EPCs, but their **horizon of expectation** – what one anticipates based on what they already know or think they know, based on what they learned from their friends, family, relevant professionals, the internet, the media etc. – pre-defines the attitudes and behaviours of people involved in the EPC assessment, and to a degree influences their experience of the process. What is also relevant in this regard is that based on their experience, people go on and co-create the **public opinion** – either by sharing or not sharing their judgements with others. Some might be more vocal, heard, and influential than others, but in principle, each experience counts, as so does each act of sharing the judgement of an experience.

5.2.4 Performance and its consequence

With repetition and reinforcement, established modes of doing are getting increasingly difficult to change. Practices get increasingly entrenched (embodied and internalized as a way of doing, a tradition), as do perceptions on specific roles and – to a degree – the professional identities of some key actors (particularly on the side of EPC service support network). Partaking in the practice of EPC assessment, be it on the side of the service support network or the users, we co-create the social (and historical) reality of what EPC schemes are in practice. As Tateo points out, “*we internalize the concept by enacting it, and reify it by personifying it through our body*” (2018: 420). In our case, considering the EPC journeys framework, it will therefore be interesting to ask:

- How do concrete actions of involved individuals define the practice of existing EPC schemes?
- How about other elements involved in the process (materials, competences, and meanings)?
- What can our observations tell us about the particular socio-cultural and policy contexts?
- What can our observations tell us about the policy as such?

Answers to such questions will help us define the lived reality of EPC schemes and EPCs. What is also important in our investigation, is understanding that we are actually not observing EPCs as isolated social objects or confined mental entities – how they exist, transform, and influence the surrounding social context. We are also observing them as proxies *for* or particular manifestations *of* other social facts and issues.

“Once represented, the thereby socialized material objects constitute a significant part of our local world. There are, however, a host of objects that we cannot literally trip over, but which are as relevant as the former. This class of objects should better be called ‘social facts’ or even ‘issues,’ because they are not physical in the original sense. They owe their existence to patterns of concerted collective behaviors.” (Wagner et al. 2018: 134)

Most obviously, EPCs as physical social objects represent abstract theoretical concepts, such as **building energy performance**, and **energy efficiency**. We have also already hinted that EPCs are directly related to the **European climate neutrality goals**, and even the **European identity** – what it means to be a citizen of the EU. By participating in the practice of EPC certification, we therefore co-create, reproduce, and reinforce not only the practice itself, but the collective representation, perception, and attitudes towards the indicated social facts, issues and concepts.

Policy making and implementation – a social practice in its own right

In the section on the history of EPBD, we touched upon the challenges related to policy-making and implementation. In this regard, we suggested that a deeper historical investigation into the implementation of the EPBD could bring valuable insights for a better understanding of existing EPC schemes and EPCs. We identified the two most obvious levels of investigation – the EU level, and the national level. At the EU level, we suggested an investigation into historical development of the concept from varied perspectives, including the perspectives of the people who were the visionaries and principal designers of the concept, as well as investigating specific questions, such as the reasons why important technical details of the EPBD implementation are left to individual member states and not actively “harmonized” already at the EU level. At the national level, we proposed looking at how EPBD policy influenced and changed the dynamics of relations (of power) between key EPC stakeholders, particularly those that make up the EPC service support network, but also beyond, the relations between the service support network representatives and various professionals, who are expected to use the EPCs in their work.

Learning about the visions, the key people, key events and challenges facing those responsible for driving the policy-making and implementation process certainly create valuable insights. In addition, this knowledge could be used for analysis similar to the one proposed here, in crossCert WP5 for EPC products and services – mapping the key stakeholders, journey(s), values, challenges, deriving conclusions and finally recommendations. For policy-making and implementation, such analysis is far beyond the crossCert’s scope, but we can certainly argue that it can be conceptualized and studied a social process in its own right. Such study would not only present an opportunity to address the key challenges in future iterations of EPBD policy improvement and implementations, but also serve as a reference for policy initiatives comparable to the EPBD.

5.3 Developing user scenarios

As an addition to the outlined crossCert WP5 research framework, which is designed to put people at the centre of problem-solving, we suggest a format for mapping and developing potential use scenarios for the various user-focused purposes of the EPCs, as outlined in section 3.1. The format includes the following categories:

The goal-based use scenario → What should be the specific goal of the use scenario?

Core assumptions → Who are the users? What are the reasons for pursuing the specific use of EPCs?

Main requirements → What is needed/required for the realization of users’ goals?

Challenges → Which existing and likely issues can be identified?

Recommendations → What are the possible solutions to the outlined challenges?

Such a format takes the generalized theoretical purpose(s) of EPCs and frames them as goals, characterized by specific reasons (the purpose) that might motivate representatives of various user profiles to pursue the goals. The goals, which should be specific, measurable, achievable, realistic and time-bound (SMART), might be framed in the following way:

- **EPCs as a building renovation tool** → Within a year after of issuing, to use EPCs (individual EPC users) to consult (or motivate consultation with) a qualified building professional on the topic of building renovation for the specific certified building, and within up to three years after its issuing, to realize at least three renovation measures specified in the EPC or suggested by the consulted professional.
- **EPCs as a property value benchmark** → To use EPCs at the national level to identify the worst 30% of housing stock in terms of energy performance and IEQ by the year 2025, and prioritize cases identified in the energy-poor households, offering them full financial and organisational support to improve their wellbeing by 2030 at the latest.
- **EPCs as a monitoring tool** → To issue the first digital prototype of EPCs in 20% of newly issued EPCs by 2030, and have 10 % of those actively used (activities noted at least once every six months) as a tool for building monitoring, building system optimization, and maintenance.
- **EPCs as a reference for research and analysis** → To use EPCs as a reference point for analysis of the quality of the housing stock by all EU governments by 2025, and to use the data to inform an EU-wide public monitoring campaign regarding our collective and national-level progress in reaching the 2050 climate neutrality goals (financed and otherwise enabled by the EC, and powered by the active participation of the national governments or their accredited national-level representatives).

After defining the goals, specific target profiles must be defined, including the reasons that might motivate them to pursue those goals, ideally independently or with the support of responsible authorities and institutions. Here is a possible (example) list of potential EPC user profiles for the use of EPCs as a tool for building renovation:

Homeowners

- To improve the indoor environmental quality of their property.
- To make their property healthier and safer.
- To improve energy efficiency and decrease running costs.
- To prolong the lifetime of their property.
- To increase the financial value of their property (for sales or rents).
- To improve the aesthetic appearance of the property.
- To demonstrate their social status and enhance the symbolic capital of the household.

Building/facility managers

- To meet or outperform the minimal standards required by national health and safety regulation.
- To improve energy efficiency and decrease running costs.
- To prolong the lifetime of their property.
- To increase the financial value of their property (for sales or rents).
- To prove their professional excellence and

Real estate investors

- To increase the financial value of their property (for sales or rents).
- To create (and demonstrate) the added value of their business, both symbolically and financially.

Building designers & Architects

- To promote their specialized services related to renovation and retrofitting.
- To co-create (and demonstrate) the added value of their business and professional discipline.

Craftspeople

- To promote their renovation and retrofitting services.
- To pursue a medium to the long-term trend in the sector, which promises constant work (and revenue) flow with added value.

Product manufacturers and suppliers

- To promote their specialized products related to renovation and retrofitting.
- To pursue a medium to the long-term trend in the sector, which promises constant work (and revenue) flow with added value.

Municipalities and other local governing bodies (public authorities)

- To pursue their local-level goals for climate-neutral and sustainable housing stock.
- To promote and support green local and regional-level economies.
- To improve the health and safety quality of the local housing stock.
- To improve the aesthetic appearance of the local housing stock (excluding buildings with specific cultural and architectural value).
- To demonstrate their commitment to collective European values and climate neutrality goals.

Energy agencies

- To address environmental and societal challenges by promoting energy efficiency in buildings.
- To stimulate the retrofitting market.
- To demonstrate (and justify) the purpose of their existence.

The following steps in such goal-driven mapping of potential strategies for enhanced effectiveness and usability of EPCs would require:

- (1) specification of the **main requirements** (means) that enable the pursuit of the outlined goals for a specific EPC user profile (particularly the required materials and skills/competences),
- (2) specification of **existing and likely challenges and barriers** to meeting the outlined goal (based also on the analysis of the EPC journeys and individual EPC stakeholder profiles), and finally
- (3) specifying **recommendations and possible solutions** to the identified challenges (based on analysis of the challenges, qualitative research, and existing examples of good practices).

Successful specification of main requirements depends on a good understanding of both theoretical and practical aspects related to the outlined goal, while the specification of the existing and likely challenges depends predominantly on the understanding of practical aspects and existing experiences related to our ambitions. Shaping of recommendations, as previously indicated, is a rather speculative, future-oriented process, which can reference the existing state of things but offers no real guarantee for success (considering that we do not account for the effect of policy enforcement as an indicator of “successfulness” and “public acceptance”).

All stages of such mapping relate to the research and analysis framework presented in the previous chapter (see WP5 research framework). In contrast to the framework, such a goal-focused approach shifts our attention from the people to the identification of recommendations in favour of the concrete goals, while maintaining the people (who give meaning to the goal) in perspective. Such an approach should enable the production of recommendations for enhanced goal-specific use of EPC products and services, and perhaps even mapping strategies for enabling (passively), supporting (actively), and promoting (proactively) such use. Defining the key individual target profiles associated with the use-specific goals and specifying the reasons that might motivate them to pursue the goals will enable us to shape specific and targeted recommendations that will suggest improvements to the existing practice of EPC assessment and certification and make EPC products and services more people-centred, and thus more meaningful, valuable and effective.

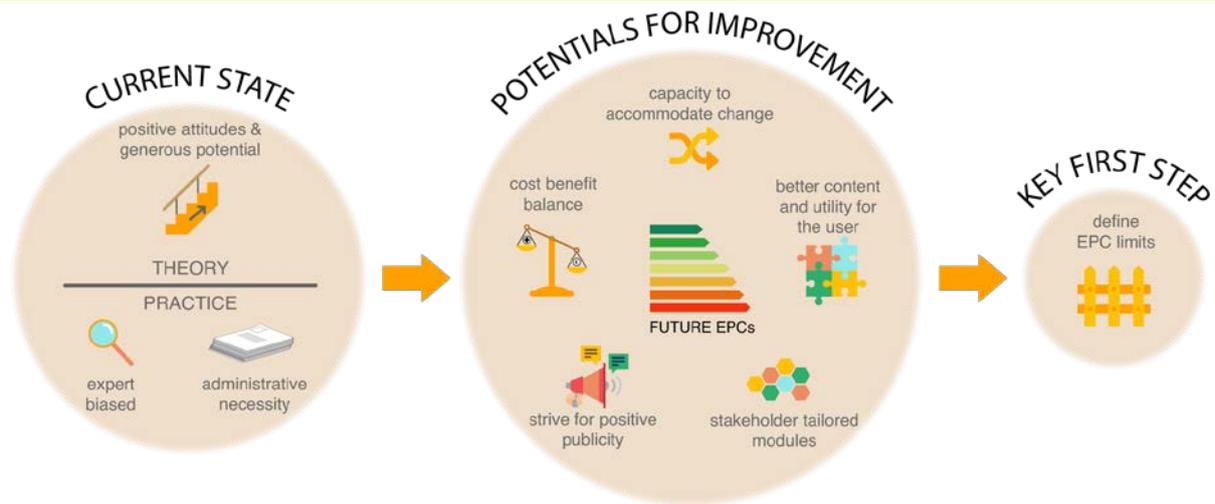


Figure 10: People's perceptions on EPCs based on ethnographically-inspired research and interpretation in the U-CERT project. (Bančič et al. 2021: 16)

5.3.1 The scope (or limits) of ambition

When it comes to discussions about potential use scenarios for EPCs, at least one thing is certain – we are projecting a variety of purposes onto the EPC schemes that go *well beyond* a building performance assessment. In 2011, Backhaus et al. stated the following:

“The assumption that labels alone can help to make significant progress regarding energy efficiency in the residential sector is misleading. Instead, the variety of influential factors calls of instrument bundles, each helping to address current barriers.” (Backhaus et al. 2011: 42).

To add to that, Mudgal et al. in 2013 highlighted a conclusion more or less explicitly promoted by various relevant authors, that there is a *“need to link up different markets to enable improvement in energy performance and situate energy performance certification as an important part of this wider context”* (Mudgal et al. 2013: 29). Bančič et al.'s research for U-CERT similarly indicated, that potentials for improvement and realisation of the various theoretical expectations associated with EPC schemes certainly exists, but that perhaps what is needed most – the first and crucial step in our analysis – is exactly identifying and recognizing the limits of the EPC concept.

The question is, therefore – what is the scope of influence the existing or future EPC products and services are expected to have and are we being realistic or perhaps overly ambitious in our expectations? Although most EPC related existing research does not explicitly state this as a research question, the insights they produced point towards possible conclusions.

What is also worth noting is how the relevant insights are being produced, or to be more specific, what they take as their vantage point for assessing the EPC-related ambitions. Mudgal et al., and many other authors, tend to focus on the concept of **markets**, which can be analysed according to several marketing or economic criteria and KPIs. In contrast, Backhaus et al. (2011) and particularly Bančič et al. (2021) promote qualitative insights shared by people who experience(d) EPC products and services in their everyday-life environments. Such an approach enables the analysis of existing EPC schemes in terms of **social practices** and **social objects**, an analytical approach that puts people – their relations and interaction – in the centre of attention. In crossCert we will tend to stay closer to the latter approach, trying to research EPCs in terms of their existing and potential scope (and limits) of impact, particularly with regard to how they foster meaningful interaction between the key stakeholders involved in various stages of EPC assessment and certification, and more generally in EPC assessment and certification as a social practice.

5.3.2 Existing recommendations

Based on the literature reviewed in the context of Task 5.1, several recommendations were identified and clustered in provisional working categories according to patterns observed in the literature. Both the categories and the recommendations will have to be reviewed and developed further in accordance with the work progress in crossCert and WP5 tasks.

5.3.2.1 To improve accessibility

Provide EPC products and services at an affordable cost ● Although seemingly self-explanatory, the recommendation has to be further specified accounting for what “affordability” means for different stakeholders involved in the process, including the cost-benefit calculations on both sides of the assessor-client relation.

Consider differences in accessibility for different social groups ● Concerning accessibility and some other aspects of EPC scheme, there is a need to account for social groups and contexts, characterized by various demographic or socio-cultural factors that diminish (or relativize) equal access to the assumed benefits of EPC schemes. An example, particularly relevant in the case of digitalizing EPCs, is access to the internet and digital technologies, the questions of digitally literacy, and ultimately, a broader topical field of equal opportunities and social justice.

5.3.2.2 To improve design and experience (understandability and impact)

Improve the existing design of EPC products and services ● Already in 2011, Backhaus et al. called for “attention to how information on the EPC is presented and to how it can be made more understandable and thereby more effective” (2011: 5). This largely relates to the provision of clear information, tailored to the knowledge profile of the user. To illustrate, here are some concrete examples and recommendations from existing literature:

- **Obligatory use of a distinct energy efficiency rating scale:** In 2011, Backhaus et al. stressed that “distinct label categories” appear to be more understandable than a continuous scale (2011: 5).
- **Dual-energy rating:** Killip (2011) shares an example of a dual-energy rating indicator from the UK (Figure 11) to substantiate his thesis, that EPCs are really a link between markets (see section 3.1). While Killip in his analysis is rather critical of the current UK EPC system, his example provides a compelling case that the rather slippery notion of “potential improvements” can be presented in a comprehensive visualized manner, and more, that the refurbishment cycle plays a crucial role in the context of transforming property markets (Mudgal et al. 2013: 23-24).
- **Provide a key/legend or a guide on how to read, understand, and use the EPCs:** U-CERT pointed out the absence of contextual information and clarification with regard to the content of EPCs as problematic, suggesting to include optional key or orientation manual for a comprehensive use of EPCs (to explain the elements of EPCs; to explain the specific language and concepts used, including units and suggested measures; to explain how individual elements of the EPC relate to each other etc.). This, however, should be complemented with access to expert support and guidance.
- **Enhance visual representation:** U-CERT highlighted visual elements of EPCs as one of their existing strong points and suggested enhancing this in future EPCs. Some examples or potentials for improvement might include graphs, infographics, colour-segmentation of the document etc. Finally, an aspect that relates to the following point, U-CERT suggests visualisation could be used to comprehensively demonstrate links between user behaviour and building performance or to explain or educate (e.g. visualizing energy/power and IEQ implications).
- **Improve elements of EPC user experience:** U-CERT suggested prioritizing certain information depending on specific user profiles, particularly with the order in which elements are presented in the EPCs. In addition, they recommend reducing the quantity and density of information whenever possible, an aspect that relates to the point on visual representation, which would be made possible especially (but not exclusively!) with the digitalization of EPCs that would enable hiding

certain elements of EPCs (meta information) deemed less important for specific user profiles. Digitalization would also enable a more interactive interface (gamification) to enhance the user experience.

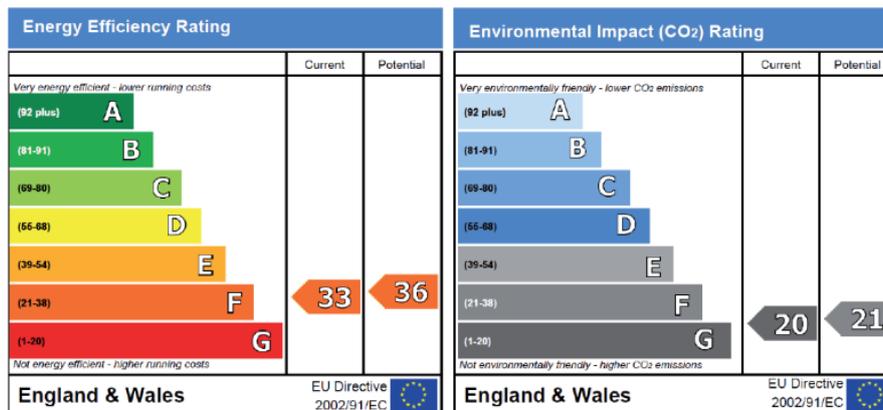


Figure 11: A graphic example of dual rating from the UK. (in Killip 2011: 1187)

Relate energy performance ratings with aspects that specific users find meaningful ● Backhaus et al. argue that while increasing the visibility and availability of the EPCs is important, that “does not mean that people will pay more attention to it, take it more into consideration and that it therefore will have more impact. For this to happen, the EPC needs to provide the kind of information that is most meaningful and relevant to people” (2011: 2).

- **Highlight correlation between energy efficiency and comfort, health, safety, aesthetics and other relevant qualitative aspects:** Backhaus et al. report that “the main motivation to carry out home improvements is to increase comfort. 60% of the survey respondents ticked this answering option as a motivating factor. During interviews, homeowners explained that comfort, for them, relates to warmth, space, light and noise. ‘Making the property more energy efficient’ was cited as driving force by 40% of the survey respondents” (Backhaus et al. 2011: 4).
- **Provide forecasts of potential financial benefits:** See section To improve feasibility 5.3.2.5 with suggestions to improve the perceived feasibility of EPC use.
- **Demonstrate the qualitative value created by building renovation/retrofitting for specific target groups (e.g. a household):** Besides forecasts of potential financial benefits, provide a clear indication on how and why EPCs generate and/or represent a value *within* the household, such as expected improvements in the quality of life (immediate, medium-term, long-term) related to the aesthetic experience of the property, safety, health, comfort etc. For the long-term aspect, consider highlighting the relation between building renovation and responsible household management, the light of maintenance of the building for future generations (within the family or other type of community).
- **Demonstrate the qualitative value that building renovation/retrofitting creates beyond your target group – for the local community, professional community, society etc.:** Indicate how building renovation generates value for your specific target group (e.g. a household) as members of a wider social and cultural context. Sense of belonging and identity should not be underestimated in building motivation and improvement of user experience. Leverage the potential of communities for both EPC experts and non-experts, and make EPCs an integral part of a social norm with regard to responsible and respectful homeownership, business (and facility) management.

Provide relevant information at the appropriate time, depending on the specific user profile ●

- **Enable EPCs with various levels of complexity for different user profiles:** Backhaus et al. report that “a more effective EPC should provide the information people are most interested in at a

glance" (2011: 3). Bančić et al. went on to suggest several levels of complexity (basic, intermediate, advanced), depending on the user's needs, expectations, knowledge and interests, or even a modular design that enables users to tailor EPC information and data to their specific interest (2021: 41).

Make the EPC concept future-proof ● Revised reports suggest that EPC schemes should be designed as a framework that can be changed according to the seemingly inevitable and ever-faster technological and scientific advancements and innovations, which are certainly also going to have an impact on the construction sector.

- **Enable a flexible rating scale:** *"Considering that an effective EPBD and EPC gradually leads to a more energy-efficient building stock across Europe, it is important to consider how the energy rating of buildings can become flexible, have "spare" categories for highly efficient building or can be adjusted over time in order to avoid confusing categories, such as A+, A++, as in the case of energy labels for appliances"* (Backhaus et al. 2011: 5).
- **Digitalize EPCs:** In 2011, EPC experts consulted in the IDEAL EPBD project pointed out that *"the inclusion of web-links in the EPC to direct homeowners to further information on the Internet is risky considering the long lifetime of buildings and the usually much shorter lifetime of websites. In addition, there needs to be sufficient off-line information and support for it to be accessible to all"* (Backhaus et al. 2011: 36). This note clearly relates to the fact that EPCs were – and continue to be – a paper document, which cannot be edited. Perhaps unsurprisingly, today there is growing support for the idea of making EPCs at least partially digital, which is not a new proposition. In 2011, Backhaus et al. reported: *"the idea to provide additional information about possible saving measures, associated cost and pay-back time available online"* (2011: 37). At that time, the idea was already being tested in the Netherlands and the UK, but with a very low rate of success (in the UK, less than 1% of homeowners receiving the EPC visited the site). More than 10 years later, investigating digitalization of EPCs is a reality in several Next-generation EPC projects, driven by the likes of Bančić et al. conclusions that *"if we are to secure the desired widespread (public) support and improve their positive impact, EPC schemes and EPCs must be understood and developed as a conglomerate of products and services that serve in the best interest of everyone in the value chain, and work hand in hand with other building digitalization related initiatives"* (2021: 19).
- **Make EPCs into a "building passport":** Arcipowska et al. suggested that *"EPCs have the potential to become 'building passports' accompanying a building through its life cycle and include improvement proposals and energy renovation activities. Indeed, in order to become really useful in individual buildings' improvement plans, EPCs should evolve towards more comprehensive, dynamic tools accompanying a building over its lifetime"* (2014: 47). Their suggestion relates to the point on digitalization, but also suggest the expansion of the EPC concept.

5.3.2.3 To improve support

Provide (or signpost towards) quality information sources ● Backhaus et al. pointed out EPCs should offer *"help in finding additional information and advice"* (2011: 3). With regard to issues of lack of trust and difficulties in assessing neutrality of advice, the source of information should come from an independent source, such as a public body or an independent expert, in order to enhance objective and perceived reliability, trustworthiness and high-quality of the source (Bančić et al. 2021: 88).

- **Prioritize simplicity, clarity, transparency, and legitimacy of the recommended information sources:** Backhaus et al. warn that *"EPC should not turn into the Yellow Pages for energy advice to cater for these needs. It can, however, provide the most relevant or interesting information at a glance and refer people to service centres and online information for further information"* (2011: 4).

Provide support for all profiles of EPC users, including expert users ●

- **Recognize that also professionals need support:** Bančič et al. (2021: 34) report that professionals who might be categorized as expert EPC users do not necessarily understand EPCs sufficiently for effective use.
- **Provide support proactively:** Professionalism as a socio-cultural sphere is burdened with assumptions and expectations regarding knowledge, which can have a negative effect on the active search for support and upskilling. Besides recognition of the need for support for professional use of EPCs, make the support proactive – reach out to prospective expert users instead of waiting for them to reach out to you.

Enable customer feedback ●

- **Create a platform that fosters an EPC community of experts and users:** Create space (physical, as periodic gatherings, or digital, as an online platform) for people to share their EPCs, EPC-related experiences, discuss and develop constructive criticism of the recommendations etc.

Recognize regional and local socio-cultural specifics ●

- **Region and/or culture-specific housing typologies.**
- **Self-build (DIY) cultures:** Self-build culture is strongly culturally rooted in many parts of the EU, which can present a problem in terms of “acceptance” of increasing building regulations. Policy makers and enforcers should recognize such patterns and instead of criminalizing them through policy intervention and enforcement, seek to foster support and guidance on quality DIY construction practices, possibly through specialized education or on-site coaching services (powered by private or public business models) that would highlight common errors, best practices, and areas requiring expert interventions.

5.3.2.4 To improve quality

There were many quality-related recommendations in the reviewed literature, particularly with specific regard to policy measures (see recommendations by BPIE in Arcipowska et al. 2014: 52-55). However, we only highlight some which are more or less directly related to people-centred aspects.

Provide transparency of data and information ●

- **Transparent calculation method:** Backhaus et al. recommend “*making the calculation method that is used to arrive at an energy efficiency rating of a building and all factors considered more transparent to people can help to increase trust*” (2011: 5). Concerning people-centred aspects, the simplicity of information communicated by EPCs should be prioritized, and such method-specific functionalities should be considered as an option offered to advanced (expert) users, or accessible on user’s demand.
- **Provide functional (and possibly user-friendly) EPC databases:** Arcipowska et al. reported already in 2014 that “*the interest in a potential usage of the EPC database for the business purposed is growing*” (2014: 49). They suggested that an “*EPC register should provide the basis for renovation strategies and programmes, and allow for monitoring of improvements*” (2014: 48), which led them to conclude that “*there is a high expectation among the real-estate industry for the EPC data to provide evidence for investments in energy efficiency in buildings across the European Union*” (2014: 49). Importantly, this point also refers to the accessibility and overall impact of EPCs.

Ensure reliability of information ●

- **Develop EPC protocols and requirements that demand frequent updates to existing EPCs:** Backhaus et al. pointed out that “*only an EPC that is up-to-date can be of actual use*” (Backhaus et al. 2011: 4), and suggested the existing system of EPC expiration and renewal would need to be revised accordingly. Bančič et al. reported similar opinions in their 2021 research. This point has important implications for the design of EPC schemes and the training of EPC issuers.

Improve the certification user-experience also for EPC assessors ● Experienced EPC issuers should be included in the process of designing a meaningful practice that will relate to their existing modes of work and enable them to do what they need to do as effortless as possible, rather than present an additional burden and a strain on their work processes. As much as this point relates to the aspect of EPC quality, it also relates to efforts to make EPCs more feasible (section 5.3.2.5), as streamlining the certification process should effectively increase the value of certifier's work by decreasing the amount of time spent on certification procedures (particularly administrative).

5.3.2.5 To improve feasibility

Provide better financial and IEQ modelling for buildings ● Bančić et al. reported a belief expressed by many of their research participants, that everybody can relate to and understand costs.

- **Demonstrate relation between energy use and running costs:** Energy-related factors are most effective in influencing decision-making if related to the financial costs of running the building. Backhaus et al. reported, "*it could be useful to include information about current energy cost overall and per square meter on the EPC alongside an indication how much recommended saving measures should help to reduce cost*" (Backhaus et al. 2011: 36). For home buyers they pointed out are interested in (1) information about the heating system and expected utility cost, (2) ways to reduce their energy cost, (3) estimating how much such home improvements would cost and (4) in how long pay-back times are (2011: 3).
- **Forecast the financial and IEQ benefits for various renovation/retrofitting scenarios:** U-CERT suggest displaying annual energy costs of energy sources (natural gas, electricity, district heating, wood, pellet, ...) would be useful for many EPC users, and perhaps more importantly, to use cost forecasts to demonstrate potential energy saving of proposed measures.
- **Forecast the cost (and effect) of the absence of investment:** To add to the point above, a cost forecast of the absence of investment might be just as much or more effective.

Provide realistic and robust investment recommendations ●

- **Account for case specifics:** Temporary homeowners/tenants will think differently about investments into building energy efficiency than those who are determined to be a permanent homeowners/tenants. The initial cost, ROI and other aspects (e.g. disruption, aesthetics etc.) are all perceived differently.
- **Develop strategies to minimize and justify (relativize) the initial investment costs.**
- **Provide solutions to address the split incentives (principal-agent problem).**
- **Develop risk aversion strategies.**

Address the wider, systemic problems in the construction and renovation sector ●

- **Uncertainty of energy savings.**
- **Skills shortages.**
- **Lack of institutional support:** Pascual Pascuas et al. suggest financial incentives, raising awareness campaigns and appropriate legal conditions are essential to ensure the EPC scheme will have an impact on building renovation rates (2017: 113). In this regard, Backhaus et al. suggested EPCs could "*play a more important and thereby more effective role in stimulating energy efficiency renovations by giving homeowners an overview of available support schemes and pointing them to further information about where and how to apply for them. This kind of information can become even more practicable if it is linked to the different recommendations provided on the EPC*" (2011: 6).

Build arguments on existing evidence and examples of good practices ●

- **Health and safety:** Arcipowska et al. reported that "*example evidence exists for the increased productivity potentials brought by energy efficient buildings in terms of mental function and*

memory, call processing, fewer sick leaves and so on" (Arcipowska et al. 2014: 48). BPIE speculates that "these facts will eventually inform investment decisions" (Arcipowska et al. 2014: 48).

5.3.2.6 To improve knowledge and awareness

Continue with awareness rising activities ●

- **Promote EPCs in relation to building renovation/retrofitting and its potential benefits:** Calls for increased and/or continued efforts to raise awareness about EPCs and the benefits of building renovations among both experts and the general population have been voiced in virtually all of the reviewed studies and reports with explicit references to EPCs and EPC schemes (Backhaus et al. 2011; Mudgal et al. 2013; particular focus on NZEB buildings in Pascual Pascuas et al. 2017; Bančič et al. 2021).

Recognize that people do not know everything necessary to understand and act ●

- **Provide support and/or education concerning the management of buildings for both homeowners and professional housing/facility managers:** To improve the performance of the buildings, Pascual Pascuas et al. recommend "the tenants should receive support in the use, the management and the regulation of the building technologies" (2017: 113). Although their recommendation refers particularly to rented properties, we can generalize this suggestion to all forms and levels of building management.
- **Address the "fear of the unknown":** Bančič et al. reported that "people do find existing EPCs difficult to understand. What is more, people also find it hard to understand the long-term benefits of EPCs. As reported by several research contributors, people do not understand concepts such as life-cycle cost analysis. They also have a hard time imagining what to expect from renovation investments, which often present a significant financial burden, which can result in a sense of 'fear of the unknown', passiveness, apathy and ignorance" (2021: 35).

Do not assume existing professionals should know everything related to EPCs and building renovations ●

- **Train and educate key players in the building renovation and retrofitting market:** To make energy efficiency a priority and to improve its attractiveness on the real-estate property market, Pascual Pascuas et al. suggest as fundamental to design a "specific training /.../ for different [market] players such as builders, certifiers, real estate agents, tenants, designers, etc" (2017: 113). Although they referred specifically to the market of NZEB buildings, which we can generalize as a deep retrofitting market, such training contents should be seen as beneficial for stimulation of all forms and scales of building renovation and retrofitting.
- **Target financial experts as they are one of the key players:** Such conclusion should not be a surprise, yet is important to highlight it, as EPCs are expected to be a factor in financing investments, including loan making for construction or renovation (Arcipowska et al. 2014: 16).

Educate buyers and tenants concerning responsible maintenance of property ●

- **Provide educational content for buyers and tenants:** Mudgal et al. suggested that "aside from awareness of the existence of the EPC and its energy rating, it will be important to improve the understanding among buyers and renters of the benefits of a better rating in practice, in particular on their energy bills. As things stand, there is still a certain amount of confusion as to the meaning and derivation of the rating, and the costs and benefits of making improvements" (2013: 15).
- **Enable contact between EPC assessors and prospective homeowners and tenants:** In 2011, Backhaus et al. promoted a conclusion that the "effectiveness of labels may be increased through direct contact between the person issuing a label and the (future) owner of a house" (Laustsen and Loretzen in Backhaus et al. 2011: 42).

5.3.2.7 To improve the overall impact of the EPCs

Develop or enhance interactive features in the design of EPC products and services ●

- **Develop EPCs into “an interactive device”:** Backhaus et al. suggest that in order “to realise the large energy-saving potential in European housing stock, the EPC needs to become an active and engaging tool, rather than a passive information ‘device’”. (2011: 3) Such a conclusion is explicitly or implicitly supported by several other more recent reports (Arcipowska et al. 2014; Mudgal et al. 2013; Bančić et al. 2021).

Target specific user-profiles and tailor EPC products and services to match their specific interests and purpose of use ●

- **Define strategies with well-defined goals to realise generalized ambitions:** Specificity and rigour are needed to enhance the possibility of success in the development of strategies that pursue the realisation of the goals-specific purpose of EPCs. For example, Pascual Pascuas et al. point out that in assessing the impact of EPCs on the value of properties in the real-estate market, “a distinction between the rental and selling market is required” (2017: 113). We suggest focusing on specific, measurable, achievable, realistic and time-bound goals – ones that involve specific means that enable the realisation of the set goals, and engage relevant stakeholders whose interests and motivations will drive the realisation.
- **Provide tailored, case-specific information and advice:** Backhaus et al. called for “more tailored information and advice, as opposed to the currently included, often rather generic recommendations”(2011: 3). Similar calls were voiced in the 2021 U-CERT study by Bančić et al. (see 2021: 38)
- **Provide recommendations for performance optimizations for all buildings, also ones that are labelled as highly efficient:** Backhaus et al. point out that “only EPCs with recommendations can have an effect. One recommendation is therefore to always issue EPCs with recommendations. People who own buildings with a very high energy efficiency rating can still save energy and profit from useful advice on how to reduce consumption and cost” (2011: 4). This relates to the point that the quest for energy efficiency should not be focused only on materials and technologies, but even more importantly, address excessive energy-intensive lifestyles, behavioural patterns and habits (see Shove 2018).

Leverage existing social networks ● Several authors (Backhaus et al. 2011; Bančić et al. 2021) reported trust as one of the central notions with regard to people’s perceptions of existing EPCs. Trust, influence, and power are largely domains of established social networks, and our prospective target profiles are part of (family, friends, business partners, trusted institutions, ...).

- **Open house events, a public showcase of best practices etc.:** Backhaus et al. reported a suggestion by EPC experts, saying that “the finding how influential acquaintances and family members are calls for local EPBD implementation measures, including open house events or similar, that support exchange of information and experience among interested homeowners. Showcasing ‘best practice houses’ also support the creation of ‘cultural values’ around energy efficiency” (Backhaus et al. 2011: 36).

Develop new EPC business models to scale up the rate of certification ●

- **Certification events in targeted communities:** Developing alternative business models and approaches to certification, such as organizing certification events in villages and/or neighbourhoods, has the prospect of reducing time and effort spent on issuing EPCs. This could have a positive effect on many of the aspects outlined above, including the accessibility of EPC products and services, its price, and knowledge (and awareness) raising. Going beyond the closed interaction between the EPC assessor and individual property owners, such an approach could foster community-focused educational activities, where meaningful information is shared more

effectively to a larger number of people, and positively impact social representation and recognition of EPCs through collective experience (of the event), shared understanding, and community-powered impact.

Be realistic and proactive ● Realistic largely refers to the pursuit of effective use and increased impact of EPCs for the purpose of building renovation (or another type of market transformation) and proactive refers to neutralizing the challenges to the set goals.

- **Do not underestimate the challenge:** With regard to goals to reduce carbon emissions through the renovation of the building sector, Mudgal et al. pointed out that we must not underestimate the challenges, which include (1) not accounting for the failures and errors in the installation of energy efficiency technology and materials, (2) inappropriate use of new technologies and renovated buildings, and (3) failure to change energy wasteful behaviours, habits, and building management practices. *"All of this jeopardises the potential savings from buildings, whether based on a purely technical assessment, cost-optimality or cost-effectiveness."* (2013: 24)
- **Account for conservative nature of (innovation in) the construction sector:** Both Killip (2011) and Mudgal et al. (2013) highlight, that the construction sector is conservative, and that the nature of innovation in the construction sector is not the same as innovation in technology, particularly in the fact that *"construction is as much about the process of putting new materials together as it is about the materials themselves"* (Mudgal et al. 2013: 24). Mudgal et al. also reported that (1) innovation in construction is highly non-linear (it derives from evolving working practices, project collaborations and problem-solving), (2) that it is driven by regulations, client demand and skills supply, and (3) that it takes place between construction companies, consultants and clients, not in the R&D lab (Harris and Halkett in Mudgal et al. 2013: 24).

Upon ensuring EPC schemes and associated policy areas are people-centred, high-quality, and socially just, expand the list of cases where EPCs are mandatory ●

- **Mandatory EPCs in cases of extensive building renovations:** In 2011 Backhaus et al. suggested that *"EPCs could, for example, be made obligatory not only at the change of occupant but also when homeowners consider a home renovation and apply for fiscal or other public support schemes"* (2011: 4).
- **Mandatory EPCs for individual housing units (e.g. in apartment buildings):** Backhaus et al. suggest that *"Energy Performance Certificates for apartments could provide information about energy saving measures individual tenants or owner and measures all tenants or owners could implement collectively"* (2011: 4).
- **Make EPCs gradually obligatory "for all buildings at all times":** Backhaus et al. suggest the expansion of mandatory EPCs would be a positive development that would eventually result in EPCs becoming "obligatory for all buildings at all times" (2011: 4). Such recommendation, however, is ethically justifiable only if the quality of EPC schemes concerning points listed above is guaranteed.

5.3.2.8 To improve promoting and marketing of EPC products and services

Target profiles and channels of communication ● Focus on specific user profiles (accounting for what might make EPC meaningful for them) and promote goal-specific use through specific communication channels. That might include professional users of EPCs.

- **Real-estate agents:** Backhaus et al. suggest that another way to promote EPCs is *"to stimulate estate agents to play a more profound role in the promotion and consideration of EPCs in home purchase and renovation decisions"* (Backhaus et al. 2011: 3). *"Real estate agents and other people in the building sector that are in contact with homeowners about building purchase or renovation could be stimulated to raise awareness of the recommendations and give advice on how to realise them"* (Backhaus et al. 2011: 5).

- **Independent energy/building experts:** Backhaus et al. also suggest that “*potential buyers should be encouraged to consult an independent energy expert before placing a bid on a property. The EPC can play a more supportive and influential role by directing future homeowners to further sources of information and advice*” (ibid.). Their conclusions are generally agreeable, only to add that it could (or should?) be the EPC service that directs the homeowners to search for further sources of information, not necessarily the EPC as such. In addition, there is potential in promoting the use of EPCs with specific professional user profiles, who might *use* EPCs as a tool in communication with their clients and customers, thus effectively becoming a channel for promotion and marketing of EPCs.

Diversify the national communication strategy ● “*Countries need to identify ways to communicate to homeowners about energy efficiency in more than one way, i.e. not only through the EPC. Furthermore, direct communication with homeowners cannot be left to the market alone. Instead, there may be other communication channels, e.g. social workers or advice centres, who can play an important role in raising awareness for energy efficiency and providing important support*” (Backhaus et al. 2011: 36).

Ensure buyers are presented with and informed about the implication of the EPC content ● In 2011, Backhaus et al. pointed out that many home buyers were not aware of the EPCs, also because the people who were presented with them were the ones who have had the EPCs made in order to sell the property. Continuous effort should therefore be made to not only present but actively communicate EPCs to home buyers, and also to enforce the regulations that requires EPCs to be made in the first place.

Make EPCs publicly available – within legal and ethical limits ● While the conviction that publicly available EPCs might benefit the concept and public in many ways, there is also a counter-argument related to privacy concerns and reservations of some EU member states. In this regard, Backhaus et al. in reported an expert opinion saying “an ‘opt out’ option needs to be given to homeowners or the option to enter the energy rating of their home into a database voluntarily” (Backhaus et al. 2011: 36). Moreover, they highlighted a relevant point that affects the calls for making EPC schemes as a gateway to information required for further action, saying that “homeowners should be given control whether or not to be contacted by professionals regarding energy efficiency issues” (ibid.).

Presentation of information makes a difference ● In this particular category, this is perhaps stating the obvious, and certainly repeating much of what we have already pointed out. Nonetheless, here is an (other) illustration by Backhaus et al. of what differences in the presentation might mean:

“Homeowners do not necessarily make a strict distinction between energy-related renovations and other ones. Instead of thinking about energy, people care about how to make their home comfortable and ‘look nice’. However, measures to increase comfort can involve energy efficiency measures, such as double-glazing or loft insulation. It is important to note that such energy efficiency measures do not necessarily entail energy savings. People may insulate their roofs in order to have more living space, or better insulation may result in increased indoor temperature rather than a lowered thermostat. These findings show that it is not only important what kind of information the EPC provides, but also how it is presented. It is important to link up to those issues that are meaningful to people and that they are concerned with, for example, comfort and cost” (Backhaus et al. 2011: 3).

As much as that relates to the design of EPCs as products of the EPC service, it also informs the ways how they should be marketed and communicated to the general public.

5.3.2.9 To improve training and education of EPC assessors (and beyond)

Recognize that improved education and training of EPC issuers is not only integral but a promising approach to general improvement EPC schemes ● Backhaus et al. argued already in 2011 that an approach to tackle the issue of quality and accuracy of EPCs is “*better educated and accredited EPC issuers and independent spot tests*” (Backhaus et al. 2011: 3). Similar opinions have been recorded also ten years later, in the U-CERT D2.3 report by Bančič et al, which produced the following recommendations:

- **Raise standards for eligibility:** Some experts stated that type and level of education should be considered as part of the eligibility criteria for training for EPC issuers. Some pointed out that

qualification courses should (continue to) be expanded and closely integrated into existing educational contents, including related university curricula.

- **Establish a continuous education system:** As above, the education system should be continuous, not as a single event of training and acquiring the qualification.
- **Capitalize on the pool of existing knowledge and experiences:** Research participants highlighted, that there is a large body of knowledge and experiences from the past years of certification which should be prioritized (capitalized) in pursuit of improving the existing EPCs.
- **Improvement in this area must be parallel to other actions:** As argued by Hungarian contributors, improvement in the area of education of EPC issuers will not help if EPCs as products do not offer reliable fact-based value for the user.

(all Bančić et al. 2021: 57)

Improve the certification user-experience also for EPC assessors ● With regard to EPC databases, BPIE pointed out that the difficulties with existing EPC databases are *“the main differences ... related to the type of data collected, format of data acquisition and storage and data management, including upload and sharing”* (Arcipowska et al. 2014: 51) → To which extent this has implications for the outlined training journey is a question that would require some research.

- **Simplify the calculation method:** *“Make the energy label calculation method more transparent and easier to use to also make label issuing less costly”* (Backhaus et al. 2011: 36).
- **Incentivize quality work, and address patterns in the lack of quality:** The opinion, that quality of EPC assessment is a crucial predisposition for a legitimate, trustworthy and impactful EPC scheme is widely shared among both expert and policy communities. Calls for strict enforcement and penalties are often, however, some arguments incentivising quality work might be a better approach. One way or another, compliance with basic standards of EPC assessment must be ensured. However, in terms of measures to make assessors' work (and particularly quality work) more attractive and satisfying, incentives will certainly apply better.

Develop training and education modules on key aspects of the projected purpose and value of EPCs ● Backhaus et al. suggested that *“one of the main barriers to energy efficiency renovations is the lack of knowledgeable professionals, especially in rural areas”* (Backhaus et al. 2011: 5). They then go on to point out several ideas on how to tackle this, including:

- To establish knowledge and training centres for professionals and *“making attendance obligatory, at least for EPC issuers,”* and
- To provide information and advice in a form of (potentially mobile) centres that aim to support people locally.

(Backhaus et al. 2011: 5)

Moreover, a recommendation promoted by EPC experts in one of the IDEAL EPBD workshops included a suggestion to *“develop structures and train professionals to be able to provide homeowners with better, more tailored and more direct advice regarding possible saving measures and available support schemes”* (Backhaus et al. 2011: 36). Today, ten years after the IDEAL EPBD project, such knowledge centres are likely easier to find, and such recommendation can be both recommended and applied more broadly.

Ensure physical presence of assessors on site ● In 2014, BPIE pointed out that *“not all Member States require the physical presence of the certifier on-site to gather the technical information to issue the EPC (for existing buildings). The on-site inspection supports better reliability of the EPC issued and allows for more effective tailor-made recommendations, which is not the case for the EPC issued based on information provided by the building's owner; while issuing an EPC in the latter manner can be cheaper”* (Arcipowska et al. 2014: 51). Physical presence of assessors on site is sometimes not enough, as we have also already noted (see section 3.3.4.1). Nonetheless, as a first step, the minimal requirement of physical presence should be effectively implemented.

5.4 Final points of considerations

To conclude, here are some final considerations that relate to the challenges outlined in the introductory chapter of this report.

5.4.1 The national implementation

Implementation and practice of EPC schemes differ significantly between different European states. Mudgal et al. reported, *"it is difficult to quantify their [EPCs'] full impact at European level because of the highly disaggregated nature of the sector, the complementarity of energy improvements to other policy objectives, uneven transposition and lack of proper monitoring"* (2013: 18). BPIE noted similarly, saying that *"the level of implementation at MS level of the EPBD varies from country to country and depends to a large extent on the starting point, the political and legal contexts, available capacities to support the implementation, as well as the characteristics of the property market"* (Arcipowska et al. 2014: 50). Pascual Pascuas et al. commented that, *"unfortunately, each country has developed a different EPC's methodology; therefore, cross-countries comparison is difficult and should be made with caution"* (2017: 103). Unsurprisingly, research of existing EPC schemes is at least a very challenging task, particularly with the intention to produce recommendations for improvement which are expected to be universally meaningful and applicable.

Opinions concerning how the EPBD and the specific EPC-related policies should be managed and implemented differ. Backhaus et al., for example, support the existing EU's approach, leaving the details of policy implementation to its members:

"It is of key importance to consider country-specific differences in policy making, at national and European level. This implies the need to collect, improve and disseminate good ideas and to support Member States in finding their own ideal set of solutions, rather than to prescribe too much at the EU level. The actual implementation of the EPBD needs to happen at the most local level, i.e. any given individual household in the European Union. The kind of information and support each household needs to decide for and carry out energy efficiency improvements varies, both within and between countries." (Backhaus et al. 2011: 2)

Bančić et al. reported a number of similar views and opinions by U-CERT research participants, particularly in the chapter on the comparability of EPCs at the EU level (2021: 89-98), but also noted some suggestions where consolidation of approaches could be more actively pursued. Among others, these included the calculation methodology and software, the design (format, indicators included etc.) of EPCs, and common requirements for accredited EPC assessors.

One way or the other, the **quality of the implementation** in practice is primarily a responsibility of the local-level actors. As Jenkins et al. point out, *"EPC systems at the MS level have to be properly implemented and endorsed, supported by well-functioning management, control and monitoring mechanisms. Only in this way will the EPCs increase the market value of energy efficiency in buildings and effectively support the transition of the real-estate sector towards low-energy build"* (2017: 480).

Many believe the quality of EPCs depends just as much on the baseline methods, theories and calculation approaches, as it does on **quality control and enforcement**. Concerning the latter, Arcipowska et al. stated that *"lack of enforcement of the penalty system may considerably dilute the quality, credibility and usefulness of the EPC schemes"* (2014: 51). **Such opinions put the** work of EPC issuers in the centre of attention, although some more explicitly than others. But what *exactly* in the assessment work is the source of the issue – the integrity and professional practice of the assessors? The poor methods and tools that make quality work difficult? The failed EPC "business model" that leads more or less all parties involved to cut corners and simplify their lives? Despite the undoubtedly central role of EPC assessors, it would be arguably unethical and certainly counterproductive to charge those who do the work with the entire burden of responsibility for quality.

The process of **quality control and verification** is another area that could be investigated as an independent practice, as is the actual EPC assessment and certification, training and education to become an EPC assessor, and the practice of policy implementation. Mudgal et al. point out *“low ambition in implementation” as something that leads to certification schemes of poor quality, highlighting particularly “sufficient and accurate information or the necessary quality control”* (2013: 17). Their remark again shows that responsibility is shared between stakeholders that procure the information (EPC assessors), and those who are supposed to control the entire process (independent quality control institutions or individuals, or the public institutions who should enable and enforce such service). Quality control and verification are partially intertwined but for the most part parallel to the ongoing certification practice. This means a separate EPC journey could be developed and analysed for stakeholder profiles responsible to do this job, which would produce a separate set of targeted recommendations. Although an interesting venue for research, this is not planned in crossCert and can be regarded as work beyond the scope of WP5.

To conclude, despite the outlined difficulties in analysing EPC schemes at the European level, crossCert WP5 will try to produce conclusions that will meaningfully inform national-level policy implementations, particularly with the aim to motivate harmonisation and consolidation of approaches. Particularly, we intend to promote recognition that EPBD policies and tools should not be regarded as simple market or policy instruments, but as what they are in practice – social processes and objects that influence the interaction between people.

5.4.2 Existing networks of trust, influence and power

To build on the conclusion, that EPC schemes should – also! – be considered in terms of how they influence interaction between people, it is again worth stressing that EPCs are an intervention in already existing social networks. This is particularly relevant to have a better understanding of how perceptions, opinions, attitudes, motivations and other forms of both individual and collective psychological, cognitive, socio-cultural relations to and associations with the concept are formed. Here is Backhaus et al. with their observation of how social networks influence people’s decision making:

“Many actors, especially family and friends, and factors play a role in home purchasing and home improvements. The interviews and survey with homeowners in ten European countries gave insight into the many actors and factors that play a role in people’s decision-making when considering buying a home or renovating it. Friends, acquaintances, colleagues and family, energy professionals, estate agents and installers are some of the main actors who influence decision-making. Friends and family in particular play a key role. Often professionals are among them, but even if this is not the case, they influence decisions by sharing information, based on their own or other people’s experience, supporting the actual renovation works, or helping to find professionals. Many such examples have been found in in-depth interviews with homeowners” (Backhaus et al. 2011: 7)

As we point out in the list of existing recommendations, these networks could be leveraged to enhance trust and catalyse interest in propositions implied in the EPCs. However, Backhaus et al. also warn of potential negative effects. *“Apart from a supporting role, they [family, friends etc.] may also play a hampering role by being opposed to or playing down the usefulness of planned energy efficiency improvements”* (Backhaus et al. 2011: 7). Either way, these observations stress the need for attention to how EPCs influence the existing social networks and structures in order to manage them effectively and make decisions regarding the design and function of the EPC schemes and systems.

5.4.3 On the “value” of EPCs

It is evident, that EPCs have a very different purpose and value depending on the specific viewpoint we take – institutional (policy makers), expert (professionals), or user’s viewpoint (Bančić et al. 2021: 6). In the introduction, we pointed out the differences in the measuring of “value” as a challenge (see 2.2). We also indicated that the predominant discourse concerning the value of EPC schemes and EPCs revolves around financial and material values – measurable, quantifiable indicators, such as funds, quantities of things saved, spent, or produced (e.g. fuel, electricity, emissions etc.). Lack of financial resources, lack of

financial incentives, and long payback periods are just some of the ways used to frame (and relativise) the value of EPCs.

Somewhat different yet closely related perception is one of understanding EPC schemes as labelling schemes. Mudgal et al. point out that implementation of EPC policies can be understood as a market-intervention strategy aimed at creating conditions for (traded) real-estate properties to gradually move towards greater energy efficiency (see Mudgal et al. 2013: 22). This indicates that the rationale on which EPC schemes are founded is strongly rooted in the pragmatic yet abstract logic of the economics, essentializing buildings – first and foremost – as products with a market value.

In anthropology and many other social-science disciplines, the notion of value is observed from a considerably more qualitative perspective, in terms of social and cultural meanings that define and characterize what is perceived as “good and desirable in life” (Robbins and Sommerschuch 2016: 8-9). That is not to say that such aspects are necessarily contested or completely disregarded elsewhere. Here is Arcipowska et al.:

“The EPC price reflects the cost of a certificate, but the value attributed to it is equally important. The value of EPCs is linked to their usefulness, reliability, public acceptance and thus their impact on market decisions. Essentially the criterion for successful market incorporation is for EPCs to be regarded as having a higher value than the cost of acquisition. Higher value is attributed to EPCs when they manage to indeed bring benefits, such as cost-saving renovations with short payback periods, or an increase in the selling value of a property and thereby be effective as a market transformation tool that is evidently in the interest of the person who acquires it.”(2014: 47).

crossCert aims to keep all of the outlined aspects of value in sight. Importantly, in WP5 we want to do this through qualitative insights co-produced through interaction with real people in real-life settings. This will enable us to get a deeper understanding of the value that EPC schemes and EPCs might present to people in real life. This is particularly relevant with regard to crossCert’s ambition to promote widespread building renovation. A better understanding of the perceived and lived (experienced) value of EPCs will enable us to put in context the idea that EPCs are simply tools “to help consumers make informed choices at the point of sale; rewards and incentives for innovation at the best-performing end of the market; and mandatory minimum standards for performance to remove the worst performing products” (Hinnells and Boardman in Mudgal et al. 2013: 22). However much this might be true (in theoretical or practical terms), such conceptions largely disregard – or at least obscure – the fact that, for the vast majority of the population, houses (and other forms of dwellings) are *much more* than just material assets. With regard to how people and societies understand and experience buildings, they can be described as a complex socio-cultural phenomenon. As such, and particularly with regard to understanding meanings and values attached to EPC schemes and EPCs by individuals, communities, or societies at large, buildings are entities worthy of attention in their own right.

5.4.4 Buildings – little social universes

Buildings are not simply produced or consumed, as implied in the perspective that promotes understanding EPCs as energy labels. Buildings are imagined, designed, re-designed to fit a preferred imagined ideal, planned, constructed, fitted and equipped with a large number of objects that make it a liveable space (systems, furniture, personal items etc.), inhabited, adjusted to likes and needs of its “users”, and most importantly – used for a variety of purposes through a considerable period of time. Buildings are therefore not simply produced, they are *created*. Moreover, through processes of social reproduction and transformation, buildings as physical entities are – in time – transformed into spaces of meaning, into social institutions defined by their associated norms, symbolic values, and activities (see Samanani and Lenhard 2019). In that sense, it is almost better to think of buildings in terms of a process rather than as physical entities. After all, experiencing buildings implies a temporal dimension, and not a one-off “meter reading” or “assessment”. One can study buildings like homes, workplaces, places of worship, and a wide array of other ways buildings can be analysed and conceptualized in relation to their meaningful use in communities and societies. Then again, as with other objects, people do tend to establish ties of emotion

and affection with buildings, and importantly, with very particular qualities of buildings – how they look like (aesthetic), or how they function in their everyday life – in often complex ways that defy the materialistic logic. With time, we could say they become a reference of an individual’s “history-based identities” (Wagner et al. 2018: 140), and these identities alone are indeed very “powerful social objects” (ibid.).

With regard to the concept of social objects, we must stress that a building should be understood as much more than a single social object – they are their own little universes of social objects, practices, and meanings. They are spaces of belonging and/or purpose. They are spaces of meaningful activities and experiences (services, if you will), which might include safety, comfort, proximity to something (location), aesthetic appeal, symbolic appeal, and a whole range of other potentials that built environment and its physical characteristics might enable (working, cooking). Considering all that, it is perhaps slightly too optimistic to expect national EPC schemes alone to have a considerable impact on people’s motivation to renovate buildings, or their perception of the value of buildings, simply by providing indicators and recommendations. Concerning the outlined perspective, expecting people to renovate their buildings is somewhat like expecting them to “renovate” or change themselves. Perhaps unsurprisingly, some people like to be who they are, and essentially there is nothing wrong with that. One might even argue that is a good thing.

Despite the plenty available well-founded arguments as to why EPCs or building renovation makes sense, it is now perhaps easier to understand the real scale of the challenge. Motivating people to see and think of their buildings differently from how they do intuitively is not an easy job. And let us not forget other difficulties. Even without considerations of such socio-cultural factors, Killip (2011) argues that real-estate property markets are considerably more complex than most other energy-labelled product markets (e.g. for electrical appliances), and particularly so the market of existing residential properties. As Mudgal et al. summarize the issue, “*existing buildings are in terms of scale more important and in terms of complexity more difficult to get right than new build*” (Mudgal et al. 2013).

A concise analysis of *building renovation* as a social practice is out of the scope of crossCert. Nonetheless, if we hope to produce recommendations to render EPCs into a useful tool in the pursuit of meaningful goals, the complexity of the building renovation as a social practice should be recognized and taken into account. Concerning testing implications from this section in practice, we can perhaps expect to see how true (or false) they are whence – and if – EPCs are made obligatory for the entire housing stock. As Wagner et al. point out, the power of history-based identities “is particularly visible at times where there are changes in social dominance and subordination. It is during such periods of change that people engage in collective memory work, reinterpretations of the past and present, and it is here that new narratives are constructed to support one’s self-image and identity” (2018: 140). If such change will be enforced through policy, and especially if done so abruptly, we can expect that it will not be received light-heartedly.

5.4.5 Social justice in the EPB policy?

In the end, let us think about EPC schemes and social justice. Social Sciences and Humanities forum agreeably argues on the case of Green deal policies that **social justice** needs to be integrated from the earliest decisions and across the whole lifetime of policy initiatives (Robison and Foulds 2021: 2). Given that the Green deal in many ways relates to EPBD policies and regulations, such a conclusion applies likewise. In this regard, the following questions might come to mind:

- Will EPCs have an impact on social justice, either at the local (national or regional) or European level (Western vs. Northern, or Western vs. Eastern Europe)?
- Will EPCs help mitigate or aggravate social inequality? Will they help to decrease the social inequality gap between individuals and communities in financially privileged social positions on the one hand, and individuals and social groups who cannot (or barely) afford healthy and safe housing (as defined by the minimal norms and standards of their society) on the other?
- Could EPCs function as a policy tool to empower representatives of underprivileged groups who find themselves in unequal social positions (again, energy-poor households, housewives)?

Such questions are particularly relevant in the light of increasing EPBD policy enforcement – the tendency to expand the scope of cases in which EPCs would be a mandatory requirement, and the prospect of mandatory building renovation in case of energy rating below a minimum requirement. One should ask – **what does all this mean in practice, particularly for the underprivileged parts of our societies?** Here is how Backhaus et al. frame the issue:

“On the one hand, it[finances] can motivate people to invest in improved energy efficiency to save on energy cost in the long term or to increase the value of their property. Increasing energy efficiency and reducing energy bills are important factors according to about 40% of the survey respondents. On the other hand, finance can pose a big hampering factor if the necessary money to invest in home renovation is lacking. Two women in Belgium and Portugal were concerned about subsidies that should “normally [be] accessible to everyone”, but are (also) used by “people [who] do not have a particular need for incentives”(Backhaus et al. 2011: 4).

The issue that Backhaus et al. strike with their comment is not particularly easy to crack. On the one side, we have the privileged, who “do not have a particular need for incentives,” which implies people who can afford to invest in renovation even without subsidies. On the other side, we have the “everyone” which – most significantly – implies the underprivileged, who either find it hard to consider an investment or outright cannot afford it due to the lack of funds or other circumstances.

Who gets subsidies and incentives is not necessarily a big problem from the EPBD’s or EPC system’s point of view if the goal is simply – more energy-efficient buildings as fast as possible. If subsidies and incentives mean that people are motivated to invest in energy renovation, a big part of the purpose of EPBD is being realised. However, if such policies (which implies incentives and subsidies) are disproportionately more effective with the people at the privileged end of the spectrum, the social gap is only going to get wider – the privileged will get wealthier and the underprivileged poorer, in both relative and likely absolute terms.

In such a case, not only will the asset of the privileged get a bonus, accounting for the increased (or sustained) value of their property. In the long run, the privileged will pay relatively less money for their energy expenses as they would not have had invested in the renovation. To be exact, they *might* be paying less for their energy expenses, under the assumption that their total energy consumption should ideally decrease (under the assumption that they pursue a lifestyle with a comparison to the one before the renovation, which includes comfort and energy-related consumption of household services, predominantly electrical appliances) or at least not increase. This is not a given since if these are the people who can afford to invest in building renovation independently, they are likely also the people who can afford to live a more energy wasteful lifestyle – because they can afford to.

On the other hand, the underprivileged, the energy-poor households, who for a variety of reasons might not be able to invest in building renovation, would get increasingly poor. In case they own a property, the value of their property would decrease not only in relative terms (as the energy-efficient buildings get better market value) but possibly also in real terms (as the building deteriorates due to lack of maintenance). They would also not be saving on energy, if we assume that their energy stays constant with time. This means that their energy expense would grow – again, both in relative terms (in comparison to price and efficiency of a unit of energy spent by the privileged) and absolute terms (with the likely rise of energy prices). If we now take into account the possible increased enforcement of EPBD policy, and particularly one that would assume renovation of the worst segment of housing stock to be renovated as a mandatory requirement, a segment of our society would not only be on the trajectory to become increasingly poorer, they might even be liable for legally induced punishment for, quite frankly – being poor, meaning because they cannot afford otherwise.

Despite noting that subsidies are often exploited by people who “do not particularly need them,” Backhaus et al. point out that “*lower-income households profit from support schemes that facilitate access to loans and are (at least partially) amortised through realised energy savings*” (2011: 6). Bančić et al. (2021) similarly reported that systematic (public) financial support and incentives are seen as necessary to render EPCs useful. In addition, they highlighted another element that adds to the complexity of the issue – if the financial incentive to renovate is taken away (for example by not offering subsidies, by some form of tax

cuts, or perhaps as a most obvious option, by imposing real-estate tax that would be directly related to the value of the property), fewer people will decide for renovation. That effectively means failure of EPBD's purpose.

Finding a solution to the outlined challenge is – most likely, and unfortunately – beyond crossCert's scope. Nonetheless, it is important to have the issue in mind, already from the viewpoint of ethical integrity of the project, but importantly also in recognition of our mission in WP5 – to search for people-centred solutions, which is different from policy-centred, method and theory-centred, market and capital-centred etc. In this regard, it is not only our ethical duty as individuals that make up the project consortium, but also our professional duty to highlight and dispute aspects of EPBD and EPC schemes that conflict with key principles of social justice, such as equity, inclusion and participation, access to resources, diversity, and human rights.

6 Conclusions

This report has a dual purpose. Firstly, it outlines (or at least indicates towards) the complex landscape of meanings hidden within the notion of ‘people-centred EPCs’. It builds on theories from social sciences and humanities to highlight many different aspects. These serve as grounds for understanding EPC schemes and systems from a people-centred perspective and as a reference point for assessing the scope of ambition that crossCert researchers face when trying to identify universally applicable recommendations for the development of new generations of people-centred products and services. Secondly, the report provides researchers with simple analytical tools, such as the tables for mapping the EPC journey, EPC training journey, and identification and specification of EPC stakeholder profiles. These are designed to guide researchers to identify and specify areas where EPC schemes are failing to deliver the expected or wanted results, and to identify and specify recommendations for making feasible, concrete and creative interventions that could lead to improvements of EPC products and services.

With regard to **understanding the notion of people-centred EPCs**, this deliverable suggests that *theory* and *practice* are two largely separated perspectives on understanding the existing EPBD policies and EPC schemes. It outlines a set of theoretical functions and purposes projected on the EPCs in the predominant literature, including their role in promoting and supporting building renovation, influence on the real estate property markets, and their use in research and analysis of the housing stock. It then provides a short (histographic) overview of the development of the EPC concept, highlighting the long-lasting focus on technical and policy aspects and then contrasting it by pointing out that people-centred aspects are, and seem to have always been, virtually absent in the EPBD and EPC related fields. This is followed by observations from practice, highlighting several qualitative aspects, such as perceptions, trust, user experience, blame, responsibility, and many others clustered in subsections corresponding to the key focus of crossCert WP5 (design and experience of EPCs, training and education of EPC assessors, and promotion and marketing of EPCs). Many provided examples point towards issues with EPC systems that seem to be consistent over the past decade or more, and that the real-life experiences with EPC assessment and certification do not align with the (theoretical) value projected onto the EPCs (or promoted) by the predominant literature. Such approach does not intend to negate the hypothetical value associated with EPC schemes and EPCs, but stresses the need for methodological diversity in the research and development of future EPC schemes. The authors argue that such approach allows building a more realistic picture of strengths and weaknesses in the existing EPC systems. This supports the definition of targeted improvements in areas that are otherwise obscured by the predominantly quantitative methods of research, and are thus difficult to address.

With regard to the **WP5 research framework**, this deliverable instrumentalizes (and consolidates) the approach to understand EPC assessment and certification as a bundle of (marketable) products and services. In this regard, it provides tools that allow mapping (to categorize and visualize) and understanding the practice of EPC assessment and certification from an analytical perspective of social practice (through specific forms and patterns of interaction between people and objects in everyday-life contexts). The tools promoted by the deliverable lead researchers to identify actions and tasks that make up individual stages of a journey (a structured and categorized process), as well as the stakeholder profiles involved in the process. The tools also provide a good reference for defining different elements of practice that are involved in the process – the purpose (meanings) that drive the process, materials and tools needed, and the knowledge and skills required to successfully realize the individual stages. This is useful when focusing on specific elements within this people-centred EPC landscape (e.g. in specific goal-oriented activities both within and beyond crossCert WP5) and working towards relevant, manageable insights and recommendations that will create value for people that make up the EPC systems at both the national and the EU levels. In relation to the goal of WP5, which is to produce recommendations on how to develop future generations of EPCs to be more people-centred, the report also includes a chapter with a categorized collection of existing recommendations for improvement of EPCs and EPC schemes from the digested literature, which is intended to inspire and inform the production of recommendations and solutions within crossCert.

In conclusion, D5.1 provides theoretical background and practical tools that give crossCert an opportunity to explore and evaluate existing EPCs and EPC schemes from a people-centred perspective – an approach tailored to the goals of the project, stressing the relevance of qualitative insights for understanding everyday interactions between people (the carriers of the various EPC-related stakeholder roles) and objects (the EPCs, the calculation software, but also the intangible objects, such as theoretical concepts and data points) that make up the existing national EPC systems. The notion ‘people-centred’ is intentionally not reduced to a simplistic, functional definition that would lead to fast and overly simplified conclusions. In contrast, D5.1 highlights numerous aspects, most of which are actually beyond the scope of crossCert WP5 research. The abundance of highlighted aspects illustrates just how complex the field of “people-centred” research is, even in research on a topic as specific as the EPCs, and defies the illusion that complex real-life challenges can be solved by reductionistic solutions. At the same time, the theory is complemented with tools that enable mapping of the outlined complexity, which enables researchers to locate the focus of their research activities within the complex EPC landscape, and to better specify their insights and recommendations – with regard to which stage of the process they refer to, which are the EPC profiles they refer to (or are involved in the specific moment or action in the process that they refer to), which are the elements of practice (materials, knowledge, meanings) they refer to, etc.

Beyond the specific goal-driven purpose of this deliverable, authors highlighted venues for discussion and research on important aspects beyond the scope of crossCert WP5, perhaps most importantly the policy development, policy implementation, quality assurance, and other important processes that could in fact be studied separately, as social practices in their own right. They argue that the theoretical value of EPCs, although undeniable, will not translate (through practice) into positive perceptions, attitudes, motivation and impact simply by policy enforcement. They show that varied pathways should be pursued to bridge the persisting gap between the theoretical value of the EPCs and the value experienced by the EPC users (and the general public). Authors also stress the realization that some ambitions projected onto EPCs cannot be realized only by the EPCs as such, point out the challenge of diversity in national-level EPBD implementation, promote the idea that buildings should not be considered only as structured physical materials but also as complex (assemblages) of social objects and meanings, and finally, that EPB policy *must* consider the aspects of ethics and social justice, particularly if the policymakers wish to label it as people-centred.

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Annexes

A list of Annexes

- 1) EPC stakeholder profiles
- 2) The EPC journey
- 3) The EPC training journey
- 4) Informed consent form

ANNEX 1: EPC stakeholder profiles

Profile	Why use EPCs?	Issues identified
General users		
<p>Existing homeowners</p> <p>Individual or clustered households (multi-generational buildings) who own and manage their own property.</p>	<p>To fulfil the administrative requirement.</p> <ul style="list-style-type: none"> ● When selling a property, renting it out for a prolonged period of time, asking for subsidies etc. (to a degree it depends on country-specific legislative requirements). <p>To use it as a source of reliable data and information in pursuit of building-related actions and activities.</p> <ul style="list-style-type: none"> ● To know and understand the energy performance of their property. ● To generate (or contribute to) the necessary awareness, knowledge and motivation to invest in the improvement of the building’s energy efficiency (with management of consumption, investment in material improvement of 	<ul style="list-style-type: none"> ● EPCs present users with poor or limited value, and are seen only as a means to fulfil administrative necessity in certain processes (selling, subsidy...) ● Poor visual representation of data and information included in the EPCs. ● Lack of interactivity of EPCs and EPC services. ● Do not understand technical data and language (terminology) used. ● Do not have the necessary finances to invest in building renovation. ● People do not trust in the reliability of EPCs and a significant amount of EPCs might actually be unreliable.

	<p>buildings, or ideally, both).</p> <ul style="list-style-type: none"> To determine what measures or combination of measures have the greatest potential in savings/simple payback periods. 	
<p>Prospective homeowners Individual or clustered households who are looking to buy a property.</p>	<p>To assess the property they are about to buy with regard to the energy and systems of qualities.</p> <ul style="list-style-type: none"> To understand the implication these aspects have for the value of their investment (e.g. in comparison to other similar properties, with regard to the necessary investment into building renovation) <p>To get info regarding objective value(s) of an investment.</p> <ul style="list-style-type: none"> Indication/guidance on when and under which conditions (assumptions) it is worth paying more for a specific real estate due to better energy performance. Indication 	<ul style="list-style-type: none"> People do not prioritise energy efficiency when buying real-estate properties (factors such as location, practical properties, and others tend to play a significantly more important role than aspects highlighted here). Existing EPCs do not offer useful or reliable energy performance indicators. EPCs do not present a benchmark reference for quality of real-estate properties. Indicators do not communicate how better quality of the built environment might reflect in actual energy costs, comfort etc.
<p>New-build investors Individual or clustered households planning to build a property.</p>	<ul style="list-style-type: none"> To project a specific dimension of quality of the property they are about to build. Marketing purposes (in prospective selling the property) 	<ul style="list-style-type: none"> No perceived added value; only a legislative demand. Existing EPCs in practice play a negligible role in decision-making for building purchases.

<p>Household tenants</p> <p>Individual or clustered households who rent properties for extended periods (months or years).</p>	<p>To assess the property they are about to rent with regard to the energy and systems of qualities.</p> <ul style="list-style-type: none"> ● To understand the implication these aspects have with regard to monthly energy costs, comfort of living in the property etc. (in comparison to other similar properties). 	<ul style="list-style-type: none"> ● Different renting models (costs included or excluded) obscure the prospective impact EPCs can have on tenants. ● There are loopholes in the existing legislation that enable landlords to avoid ordering EPCs. ● EPCs do not include data regarding operational costs and IEQ.
<p>Business tenants</p> <p>Individual or clustered households who rent properties for extended periods (months or years).</p>	<p>To assess the property they are about to rent with regard to the energy and systems of qualities (in comparison to other similar properties available on the market).</p> <ul style="list-style-type: none"> ● To understand the implications for monthly energy costs. ● To understand properties of the building that concern the specific work processes in the business. ● To understand implications related to e.g. productivity, sick leave (absenteeism) etc. 	<ul style="list-style-type: none"> ● Besides challenges highlighted for household tenants, EPCs do not include data that would indicate relations to e.g. productivity, sick leave (absenteeism) etc.
<p>Building users</p> <p>People who use buildings for non-residential purposes, such as work, education, transport, leisure activities etc. (e.g. offices, educational buildings, hotels).</p>	<p>To get data about energy use and implications that conscious energy-efficient use (behaviour) can have on the building's energy use.</p> <ul style="list-style-type: none"> ● Decreasing energy use by turning off lights, closing windows and/or radiators, ... 	<ul style="list-style-type: none"> ● Behaviour and patterns of building use are not the main focus of EPCs, nor are they the main focus of the current EU energy efficiency agenda.

	<ul style="list-style-type: none"> Developing lifestyles and work processes that demand less energy use. <p>To get information about IEQ and corresponding well being implications.</p> <ul style="list-style-type: none"> Health implications Well being Risks to which they are exposed when entering (airborne pathogens such as Covid) 	
More? TBD		

Profile	Why use EPCs?	Issues identified
Expert user		
<p>Building/facility managers</p> <p>Professionals (both individuals or appointed bodies) with the necessary background knowledge, responsibilities and mandate to make decisions regarding investments into technical maintenance and improvements of buildings.</p> <p>This includes housing companies, housing associations, offices for maintenance and investments at large institutions etc.</p>	<ul style="list-style-type: none"> To determine which measures to improve or optimise energy performance have the greatest potential. To assess the budget for the implementation of the measures. To assess the potential impact of the investment on energy performance and other aspects of quality, such as IEQ, comfort, etc. 	<ul style="list-style-type: none"> There is little practical value recognised in existing EPCs - they do not provide reliable guidance on investments. Budgets and impacts are difficult to assess due to a number of factors, such as the variability of performance and prices of products available on the market, investments can produce is a problematic task, which EPC issuers and EPC authorities avoid
<p>Real estate brokers/agents</p> <p>Individuals and businesses involved in negotiating sales arrangements (buying and selling) of properties as</p>	<ul style="list-style-type: none"> To be able to assign different market value to seemingly same properties that differ in energy properties and 	<ul style="list-style-type: none"> They put no attention to EPCs beside legally binding ones.

<p>well as managing the real estate transactions.</p>	<p>resulting operational costs and comfort.</p>	
<p>Real estate investors</p> <p>Businesses and institutions involved in investing in buildings (building, buying, and renovating) for the purpose of commercial renting and/or selling.</p>	<ul style="list-style-type: none"> To get info for preliminary screening. 	<ul style="list-style-type: none"> Lack of trust in the quality of issued EPCs.
<p>Craftspeople</p> <p>Individuals and businesses who execute planned renovation and adaptation measures for improvement of building energy performance.</p>	<ul style="list-style-type: none"> To identify customers in need of their services. Provide service to increase the rating of individual premises. 	<ul style="list-style-type: none"> No need or recognition of the usefulness of EPCs in the context of their core business, which in turn means no interest in use of EPCs and low perceived value in daily business.
<p>Building designers & Architects</p> <p>People who design and plan the construction and renovation/retrofitting of buildings, such as HVAC designers and architects.</p>	<ul style="list-style-type: none"> EPCs as a source of preliminary data to prepare an offer for renovation planning. 	<ul style="list-style-type: none"> As with craftspeople, no or low perceived value.
<p>Utility companies</p> <p>Companies that provide basic household services and resources, such as water, electricity, natural gas, etc.</p>	<ul style="list-style-type: none"> Identifying possible flexibility services to be offered to the electrical grid. Assessment of heat grid feasibility (district heating and cooling). Assessment of energy vectors linking the building. 	<ul style="list-style-type: none"> No useful data for them with existing EPC schemes.
<p>Product manufacturers and suppliers</p> <p>Representatives of industries motivated to sell and promote investments in improvements of building energy efficiency for commercial benefits.</p>	<ul style="list-style-type: none"> Assess market potential for their products based on aggregated data 	<ul style="list-style-type: none"> No such tool available yet.

<p>Municipalities and other local governing bodies (public authorities)</p> <p>Local authorities that influence trends in household EE investments and behaviours on the local level.</p>	<ul style="list-style-type: none"> • To determine which buildings have the greatest potential (both in terms of renovation and energy management) • To define targeted measures for achieving savings goals. • To carry out big data analysis to optimise the building renovation strategies. 	<ul style="list-style-type: none"> • They do not see EPCs as a relevant data source, also due to low market penetration (only a relatively small segment of the building stock currently has an EPC).
<p>Energy agencies</p> <p>Energy agencies contribute to the implementation of sustainable energy policies by working closely with public authorities and with small and medium-sized enterprises (SME's) and citizens at regional and local levels.</p>	<ul style="list-style-type: none"> • Retrofit market stimulation. 	<ul style="list-style-type: none"> • Similarly to the municipalities, they do not see EPCs as a relevant data source.
<p>ESCOs</p> <p>Companies that offer energy services, such as design, retrofit and implementation of energy efficiency projects after identifying energy saving opportunities through energy audits of existing facilities.</p>	<ul style="list-style-type: none"> • To know better the current status of buildings and the technical needs and investment required to carry out building energy renovations. 	<ul style="list-style-type: none"> • Lack of trust in the quality of issued EPCs.
<p>More? TBD</p>		

Profile	Why promote EPCs?	Issues identified
EPC service delivery network		
<p>EPC issuers/assessors</p> <p>Professionals trained and/or accredited to provide the EPC services, such as organisation of the assessment, execution of the assessment, issuing of official EPCs, and delivering the knowledge and</p>	<ul style="list-style-type: none"> • To issue more EPCs (more work). • To market services and products that are informed by the EPCs. 	<ul style="list-style-type: none"> • Overlapping interests (objectivity of assessment vs. interest in selling products and services beyond EPCs) might have a negative impact on people's trust

<p>products coming from the completed service.</p>		<p>in the service, and also on the objective quality of EPCs.</p> <ul style="list-style-type: none"> • The cost-benefit balance is not financially feasible for many current professionals (the process is time intensive, and the financial benefit for assessors is relatively low). • In Slovenia, the licences for EPC assessors are currently unconditioned, meaning that once someone finishes a training, he has the licence permanently. • There is a certain level of lack of interest and engagement on the side of the customers/EPC users.
<p>Public authority representatives Policy makers, implementers and enforcers of EPBD related policies.</p>	<ul style="list-style-type: none"> • To increase the rate of EPB assessment. • Obtain data about actual energy performance of building stock. 	<ul style="list-style-type: none"> • Production of low quality (unreliable) EPCs. • Established (negative) public perception of EPC schemes.
<p>EPC scheme and guideline developers Universities and expert institutions working with the authorities responsible for EPBD implementation on the contents and methodologies that make-up the theory and practice of EPC schemes.</p>	<ul style="list-style-type: none"> • It is part of their business (as contractors of public authorities). • The area of EPBD is their field of excellence and they have a personal and professional affinity for it. 	<ul style="list-style-type: none"> • Other non energy benefits not addressed • No data about € • The implementation of EPBD at the national level is a political process, which means expertise is not the ultimate
<p>Accrediting bodies Entities with the mandate to train and officially certify EPC assessors and issuers.</p>	<ul style="list-style-type: none"> • It is either part of or the core of their business (as contractors of public authorities). 	<ul style="list-style-type: none"> • It is a strongly administratively driven process. • Not able (or willing?) to provide training beyond

	<ul style="list-style-type: none"> The area of EPBD is their field of excellence and they have a personal and professional affinity for it. 	<p>technical contents (do not discuss aspects of service).</p>
<p>Independent controlling bodies</p> <p>Entities responsible for control over effective implementation of national EPC schemes, quality of issued EPCs, and compliance with the relevant laws and regulations by all actors involved.</p>	<ul style="list-style-type: none"> It is either part of or the core of their business (as contractors of public authorities). To enhance trust in the national EPC system. 	<ul style="list-style-type: none"> In many countries there is no (functional) quality control. Trust in the EPC system is low.
<p>Developers of EPC software(s)</p> <p>Individuals, businesses and institutions who develop officially recognized/accredited EPC calculation software.</p>	<ul style="list-style-type: none"> It is either part of or the core of their business (as contractors of public authorities). 	<ul style="list-style-type: none"> TBD
<p>More? TBD</p>		

ANNEX 2: The EPC journey

Purpose: To identify the necessary stages and steps/tasks needed for an EPC to be issued and used.

EPC service support network: Profiles that enable and deliver the EPC services/perform the necessary actions for the EPC journey to happen.

EPC users: Profiles at the receiving end of the journey that use and benefit from EPC products and services.

EPC service support network	Tasks/needs – EPC supporting network	Stages of the EPC Journey	Tasks/needs – EPC users	EPC users
<p>Responsible public authorities (or associated actors hired, or authorised by the responsible institutions for this purpose);</p> <p>Private businesses with the interest to promote EPC products and services (EPC assessment businesses, professional EPC users);</p> <p>Other actors with the interest to promote EPC products and services (e.g.</p>	<ul style="list-style-type: none"> ● To identify key target groups for targeted communication and marketing campaigns. ● To tailor (design) the communication and marketing campaigns to the identified target groups (according to their characteristics - needs, interests, knowledge background, ...). ● To plan the campaigns (practical/organisational aspects, finances etc.). ● To execute the campaigns, raising awareness on the following topics (contents): <ul style="list-style-type: none"> ○ EPCs as products of the service, 	<p style="text-align: center;">Awareness rising</p> <p style="text-align: center;">Rising awareness and building general knowledge about EPCs.</p>	<ul style="list-style-type: none"> ● To know about (and understand) the purpose – the conceptual value – of EPCs and the supporting services (e.g. to pursue the carbon neutrality goals). ● To understand the aims – the functional value – of the EPCs and the supporting services (e.g. to assess/measure and monitor the quality of housing stock). ● To understand the usability – the practical value – of the EPC and the supporting services (e.g. to suggest renovation measures). 	<p>The general public (targeted via positive publicity campaigns);</p> <p>Expert users (targeted to raise awareness EPCs can bring in their professional practice, as well as how EPCs can create value for their business and recruit them as active promoters of EPC products and services to their clients)</p> <p>General users (not to be regarded simply as a subsection of the general public, targeted campaigns should use specific channels and approaches to target</p>

<p>consumers organisations);</p> <p><i>TBD</i> → Which other actors are (or should be) included in this stage on the side of the service support network.</p>	<ul style="list-style-type: none"> ○ the general value EPC products and services create for the specific target group, ○ the specific usability they have for the specific target group (e.g. recommendations for building renovations, applying for subsidies), ○ Cases in which EPCs are a legal requirement, ○ who to contact regarding the assessment service, or ○ where to find more information on the matter. <ul style="list-style-type: none"> ● <i>TBD</i> → Are there business (market-driven) opportunities for promotion of EPCs (e.g. for commercial use of EPCs by the profiles categorised as Expert EPC users)? 			<p>either prospective buyers and renters of properties, or owners and managers of properties).</p> <p><i>TBD</i> → Which specific groups for targeted campaigns and promotion activities can we identify?</p>
<p>As above, but primarily the public authority rep's.</p>	<ul style="list-style-type: none"> ● To identify individuals, businesses or institutions that are obliged by law to get an EPC for one or more of their properties (e.g. selling a real-estate property). ● To identify individuals, businesses or institutions that are not obliged 	<p>Motivating and enforcing</p> <p>Providing individualised case-specific reasons and requirements for ordering an EPC.</p>	<ul style="list-style-type: none"> ● To know specifically why/what for one needs or wants an EPC. ● To have the basic knowledge and understanding of basic principles related to EPCs, which will guide and streamline decision-making. 	<p>Same as above, but particularly stakeholder profiles obliged to have a certification made.</p>

	<p>by law but might benefit significantly by:</p> <ul style="list-style-type: none"> ○ An EPC as such (information that it delivers), or ○ Actions and options an EPC enables (e.g. applying for subsidies). <ul style="list-style-type: none"> ● To reach out to the identified profiles and present them with: <ul style="list-style-type: none"> ○ Facts and clear value proposition implied in EPC products and services, ○ the necessary knowledge necessary to understand the implications of EPC products and services - or - guide them to a source that will provide such knowledge. ● <i>TBD → Are there proactive campaigns dedicated to motivating people to voluntarily order EPC assessments for their properties?</i> 			
<p>The EPC assessor (or other provider of the EPC assessment and certification service)</p>	<ul style="list-style-type: none"> ● To lead an organised schedule of professional services. 	<p style="text-align: center;">Order/organise</p> <p style="text-align: center;">Plan and organise technical and practical details necessary to issue the EPC.</p>	<ul style="list-style-type: none"> ● To know where and how to order an EPC/book an EPC assessment service. 	<p>Prospective EPC users (at this stage, customers of the service provider; can</p>

	<ul style="list-style-type: none"> ● To be accessible and available (listed contacts - phone, email or otherwise - in the public register of certified EPC issuers or otherwise findable and reachable by the members of the public). ● To answer inquiries (via email phone or otherwise; first contact with prospective customers), including: <ul style="list-style-type: none"> ○ The practical details regarding the service, ○ The pricing, ○ Other general inquiries related to the service and EPCs. ● To ask questions regarding the specific building, including: <ul style="list-style-type: none"> ○ <i>TBD → Are there questions asked, and which are they?</i> ● To identify the specific characteristics of the assessment case: <ul style="list-style-type: none"> ○ Which user profiles is the client (professional, general, ...), 		<ul style="list-style-type: none"> ● To call/reach out to the prospective service provider (via email, phone or otherwise). ● To ask questions regarding the service. ● To answer questions regarding their specific interests, needs, and the property that needs to be certified. ● To identify and block the best time slot for performing the EPC assessment (in order to be present at the assessment and that the process will be undisturbed). ● To prepare for the assessment. 	<p>be either professionals, such as facility managers, or non-professionals, such as homeowners).</p>
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	<ul style="list-style-type: none"> ○ What is the prospective level of motivation for active cooperation, ○ What is the prospective level of motivation to renovate the building that is being certified, ● To promote the service, stressing the value and utility of EPCs for their specific case/user profile (explaining how the service will make their life better and/or easier). ● To guide the client through the process of identification of the best time slot for performing the EPC assessment (in order to be present at the assessment and that the process will be undisturbed). ● To note the arranged time and location of the assessment according to their established system. ● To obtain data and information about the building from existing available resources (online or others) before going to the field. 			
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<p>The EPC assessor.</p>	<ul style="list-style-type: none"> ● To go to the site with all of the necessary tools and information needed for the assessment. ● To interact and communicate with the customer in a meaningful way (or the person representing the customer). This includes aspects of: <ul style="list-style-type: none"> ○ Professional and polite communication, ○ Building trust and confidence in the client with regard to the EPC concept, their personal professional skill, and the overall quality of the service (and product), ○ To take the initiative and guide the client through the assessment process (the client does not know what it involves). ○ Positive and proactive attitude concerning overarching purposes and goals of the EPC concept, which are in fact beyond the scope of the assessment and certification service. ● To ask questions regarding the specific building and its elements. 	<p>Do the EPB assessment</p> <p>Realise actions/activities necessary to assess the energy performance of a property according to the established national protocol.</p>	<ul style="list-style-type: none"> ● To meet the assessor/EPC issuer at the property. ● To provide the assessor with the relevant/necessary information that informs the quality of service and certification outcome. ● To learn about the benefits that the EPC can have for their specific building/property. ● To ask relevant questions to the EPC issuer. ● To learn (and trust!) the information and advice provided by the assessor, such as: <ul style="list-style-type: none"> ○ A quick professional assessment of the condition of the building, ○ Possible actions and measures (related either to investments or to the building use) to be taken in order to improve the building's energy performance. ● To show interest in the topics and show appreciation of the service. 	<p>Prospective EPC users (as above)</p>
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	<ul style="list-style-type: none"> ● To answer questions and generally provide information regarding relevant aspects of the building's energy performance. <ul style="list-style-type: none"> ○ e.g. condition of the building (in comparison to similar cases and based on their professional experiences), ○ possible actions to be taken to improve the energy performance, etc. ● To promote practical benefits of EPCs for the specific assessment case (e.g. IEQ improvements, energy savings, available subsidies). ● To provide information regarding the further steps in the certification process (when the customer can expect the EPC, and other potential details). ● <i>TBD → Practical aspects of how EPCs are actually issued in individual countries and point towards the commonalities and best practices.</i> 			
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<p>The EPC assessor (or other provider of the EPC assessment and certification service)</p> <p><i>TBD → is there division of workload in the certification process, or does it all rely on one single person? What implications does that have on the quality of the service?</i></p>	<ul style="list-style-type: none"> ● Process the gathered data with a certified method/software (different for an asset or performance rating; our focus is firstly on the latter). ● Produce required outcomes (basic EPCs by the legal requirements). ● <i>TBD → Produce other useful outcomes</i> (EPC products and/or services beyond the basic legal requirements). 	<p>Process data and information</p> <p>Analyse and interpret the gathered data information to produce useful results.</p>	<ul style="list-style-type: none"> ● <i>TBD → are customers required to do anything between the certification event and having the EPC issued? If not, this might be an opportunity to offer (educational and/or promotional) content tailored to the specific user profile (defined by the EPC assessor).</i> 	<p><i>TBD</i></p>
<p>The EPC assessor (or other provider of the EPC assessment and certification service)</p>	<ul style="list-style-type: none"> ● Deliver the EPC to the customer or its representative. <ul style="list-style-type: none"> ○ To explain the EPC and its implications. ○ To suggest next steps (related to use of EPCs) and provide the necessary information and support for customers to take them. ○ <i>TBD → How exactly is this done in practice at the moment?</i> ● Deliver additional products and services (advice, guidance, 	<p>Issue & deliver</p> <p>Deliver the EPC → the main outcome/product of the service.</p>	<ul style="list-style-type: none"> ● To receive and read the EPC. ● To understand the EPC <ul style="list-style-type: none"> ○ To ask questions to the EPC assessor. ○ To search for complementary information that enhance their understanding and improve the usability perception of EPCs. ● To pay for the service. ● To evaluate the service. <ul style="list-style-type: none"> ○ <i>TBD → Do existing EPC systems enable</i> 	<p>EPC users (either professionals, such as facility managers, or non-professionals, such as homeowners).</p>

	<p>indicators, renovation roadmaps etc.).</p> <ul style="list-style-type: none"> ○ <i>TBD</i> → Are there already practices? The U-CERT project is certainly working on these topics. 		<p><i>customers to evaluate the service they receive?</i></p>	
<p>Responsible public authorities (or associated actors hired, or authorised by the responsible institutions for this purpose);</p> <p>Private businesses with the interest to promote EPC products and services (EPC assessment businesses, professional EPC users);</p> <p>Other actors with the interest to promote EPC products and services (consumers organisations, <i>TBD</i>);</p> <p>The EPC assessor (or other provider of the</p>	<ul style="list-style-type: none"> ● Guide homeowners, building managers, and other decision making profiles to a starting point (and possibly through the first phase) of a new EPC-related process or the use of the EPC for: <ul style="list-style-type: none"> ○ Building renovation planning; ○ Implementation of energy efficiency optimisation measures; ○ Implementation of IEQ related measures. ● Guiding representatives of national authorities, researchers and other relevant profiles to use EPCs for: <ul style="list-style-type: none"> ○ Research (analysis and interpretation) related to the quality of housing stock, ○ Policy planning and implementation, 	<p>Next steps</p> <p>EPC as a gateway to actions following certification.</p>	<ul style="list-style-type: none"> ● To recognize the useful value of EPCs for their specific case. <ul style="list-style-type: none"> ○ <i>TBD</i> → What can be done to increase the recognition for specific profiles? How do we enhance trust, usability, the sense of responsibility etc.? ● The recent customers, to follow up on their existing knowledge and advice received by the EPC certification service and pursue specific goals. <ul style="list-style-type: none"> ○ To learn and pursue a specific goal ● To provide feedback on how EPCs have (or have not) been helpful in pursuit of the specific goals. 	<p>EPC users (all types).</p>

<p>EPC assessment and certification service)</p>	<ul style="list-style-type: none"> ○ Development of business models and market solutions, ○ Etc. ● <i>TBD</i> → other types of use cases. 		<ul style="list-style-type: none"> ○ <i>TBD</i> → Has there been anything done in this area already? 	
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ANNEX 3: The EPC training journey

Purpose: To identify the necessary stages and steps/tasks needed to become (and practice the job of) a certified EPC issuer/assessor.

Training support network: Profiles that provide services and perform actions necessary for the certification training for EPC issuers/assessors to happen.

EPC trainees: Profiles at the receiving end of EPC training; prospective EPC issuers/assessors.

Training support network	Tasks/needs – EPC supporting network	Stages of the training journey	Tasks/needs – trainees for certified EPB assessments	EPC trainees
<p>Responsible public authorities (or associated actors hired, or authorised by the responsible institutions for this purpose);</p> <p><i>TBD → Which are the profiles responsible for communication and promotion of EPC training activities? Can it even be considered as being promoted?</i></p>	<ul style="list-style-type: none"> ● To identify key target groups for targeted communication and marketing campaigns. <ul style="list-style-type: none"> ○ <i>TBD → can we consider EPC training as a marketable product? For whom, under which conditions?</i> ● To tailor (design) the communication and marketing campaigns to the identified target groups (according to their characteristics - needs, interests, knowledge background, ...). 	<p>Awareness rising</p> <p>Rising awareness and building general knowledge about EPCs, requirements for EPC issuers, and possibilities about training to become a certified EPC issuer.</p>	<ul style="list-style-type: none"> ● To understand the conceptual, functional, and practical value of EPCs and the supporting services. ● To know about possibilities and requirements for training to become an EPC issuer. 	<p><i>TBD → Besides the prospective EPC issuers, which are the profiles that need to take one or more of the stages in the outlined training journey?</i></p>

<p>The accrediting bodies <i>TBD</i> → Are there other actors involved in this stage?</p>	<ul style="list-style-type: none"> ● To reach out to the identified profiles and present them with: <ul style="list-style-type: none"> ○ Facts and clear value proposition implied in becoming an accredited EPC assessor. ○ The necessary knowledge necessary to understand the implications of undergoing the training - or - guide them to a source that will provide such knowledge. ● <i>TBD</i> → Is there existing practice in this regard? 	<p>Motivating Learning and internalising individualised reasons (and requirements) for training to become a certified EPC issuer.</p>	<ul style="list-style-type: none"> ● To learn in detail what EPB assessment work includes. ● To know specifically why one needs or why they want to train to become a certified EPC issuer. ● <i>TBD</i> → What motivates prospective EPC assessors to take the training? 	
<p>The accrediting bodies</p>	<ul style="list-style-type: none"> ● To lead an organised schedule of professional services. ● To be accessible and available (listed contacts - phone, email or otherwise - in the public register of certified EPC issuers or otherwise findable and reachable by the members of the public). ● To answer inquiries (via email phone or otherwise; first contact with prospective customers), including: <ul style="list-style-type: none"> ○ The practical details regarding the service, ○ The pricing, 	<p>Apply & organise Plan and organise technical and practical details related to the training.</p>	<ul style="list-style-type: none"> ● To know where and how to apply for the training. ● To learn about the associated costs and time commitments. 	

	<ul style="list-style-type: none"> Other general inquiries related to the service and EPCs. 			
The accrediting bodies	<ul style="list-style-type: none"> Educate and train (through activities). Provide training materials. <i>TBD</i> 	<p>Learn & train Realise training and learning activities provided and guided by the responsible accrediting body.</p>	<ul style="list-style-type: none"> Learn about the EPBD and the national EPC scheme. <i>TBD</i> → <i>What does the learning process consist of?</i> 	
The accrediting bodies	<ul style="list-style-type: none"> Provide a qualification test. <i>TBD</i> 	<p>Do the exam/Get the certification Pass the tests and do the activities necessary to get officially certified.</p>	<ul style="list-style-type: none"> Take the test. <ul style="list-style-type: none"> <i>TBD</i> → <i>What does it look like?</i> 	
Customers and clients of EPC services; <i>TBD</i> → <i>Are there other actors involved in this stage?</i>	<ul style="list-style-type: none"> SEE THE EPC JOURNEY TABLE 	<p>Practice EPC assessment Provide the EPB certification services to the market.</p>	<ul style="list-style-type: none"> SEE THE EPC JOURNEY TABLE 	
All profiles of the EPC service support network; Prospective new EPC assessors; Professional EPC users.	<ul style="list-style-type: none"> To provide a platform/space/protocol for sharing information and experience between the EPC support network community. <ul style="list-style-type: none"> <i>TBD</i> → <i>What are the existing practices in this regard?</i> 	<p>Contribute to the EPC community Share practice-based knowledge and experiences with the rest of the EPC service delivery network stakeholders.</p>	<ul style="list-style-type: none"> To learn from peers, To exchange the latest information on new developments (of the methodology etc.). To share their experience and practice-based knowledge regarding various aspects of the national EPC schemes. 	

<p>Independent controlling bodies <i>TBD</i> → Are there other actors involved in this stage?</p>	<ul style="list-style-type: none"> ● To enforce quality control with consequences (penalties) for poorly performing EPC assessors. <ul style="list-style-type: none"> ○ <i>TBD</i> → What are the existing practices in this regard? ● To recognise and possibly reward good performance. <ul style="list-style-type: none"> ○ <i>TBD</i> → Are there existing practices in this regard? 	<p>Perform quality checks Periodic testing of the standards and quality of work done by the issuers.</p>	<ul style="list-style-type: none"> ● To collaborate in the quality assurance process. ● To ensure high quality of service: <ul style="list-style-type: none"> ○ Preventively, by continuous upskilling and searching for services to improve the quality of their work (e.g. the supporting services). ● To appropriately respond to the negative results of quality check protocols. 	
<p>The accrediting bodies <i>TBD</i> → Are there other actors involved in this stage?</p>	<ul style="list-style-type: none"> ● To provide certified training on developments in the EPC scheme tailored to the needs of EPC assessors. <ul style="list-style-type: none"> ○ <i>TBD</i> → Are there existing practices in this regard? 	<p>Upskill (continuous professional development) Periodic upskilling in the area of EPB assessment and issuing of EPCs.</p>	<ul style="list-style-type: none"> ● To participate in periodic upskilling activities. 	

ANNEX 4: Informed consent form

You are invited to participate in crossCert – a project dedicated to reliable, practical, and people-centred European energy performance certification of buildings. Before you consent to participate, it is important that you understand the purpose, nature, and content of our research. Please read the following information carefully. In case you find any information unclear, or if you would like more details, please do not hesitate to ask one of our project representatives for clarifications; contact details are provided below.

Purpose, aims and goals

crossCert is an EU – Horizon 2020 funded project, performing a cross-assessment of energy performance certificates (EPCs) in Austria, Bulgaria, Croatia, Denmark, Germany, Greece, Malta, Poland, Slovenia, Spain, and the UK. Our main goal is to develop a product testing methodology for the new EPCs for buildings, but also to support knowledge exchange between key stakeholders working in the area of EPC assessment and certification. Our work is dedicated to producing recommendations for the development of high-quality certification methods and procedures, and importantly, to suggest a model for homogenisation of EPC assessment and certification at the European level.

The purpose of crossCert **[define the research and its purpose; e.g. *ethnographic research is to provide an insight into the practice of EPC assessment and certification. We aim towards a better understanding of the everyday work-life processes of local EPC assessors and their clients, as well as other existing and prospective EPC users. This knowledge will inform the analysis and specification of challenges in the existing EPC market, and enable the development of practice-based recommendations for improvement of existing and future models of certification. The research will also inform the analysis of the established training procedures, and promotion and marketing of EPC products and services*]**.

The methods

The crossCert **[define the research method(s); e.g. ethnographic research uses interviews and participant observation activities (field visits) to engage with representatives of key EPC stakeholder profiles. With your consent, and when appropriate, we will take photos and videos during the research activities. Collected visual materials will be used for research and promotional purposes in the context of crossCert. Any personal data gathered as part of this research will be treated in accordance with the EU's General Data Protection Regulation (GDPR). Details of how to exercise your rights under GDPR are available at <https://gdpr-info.eu/>]**.

Voluntary participation

Participation in crossCert research is entirely voluntary. You can decide whether and to what extent you want to participate. If you agree, you will be asked to sign this consent form. You can withdraw from participation in the project at any time during the project duration without providing a reason. You can do so by contacting one of the project representatives listed below. In that case, any information and data you have shared with crossCert researchers will be excluded from the study and all records will be securely destroyed.

Project representatives at **[insert institution]**:

YYYY name YYYY

YYYY name YYYY

Email: xxx@yyyy.zzz

Email: xxx@yyyy.zzz

Tel.: 010 2030 40506

Tel.: 010 2030 40506

Thank you for considering being part of crossCert.

Kind regards!

XXX insert institutions XXX

PARTICIPANT CONSENT FORM**Name**

Please tick the box(es) to confirm the following statements.

I agree to take part in crossCert [define activity]. I confirm that I have read and understood the crossCert [define activity] information sheet. I understand that my participation is voluntary and that I am free to withdraw from participating in the project at any time for the duration of the project without giving any reason. I consent to the interview being recorded. YES NOI understand that the data collected from the crossCert [define activity] may be used by the researcher for this project.

I consent to quotations from the research activities being used (select preference):

- A) With reference to my true identity and the identity of the organisation/institution I represent.
- B) Strictly anonymously.

I consent that images or videos taken during the research can be used in project reports and for dissemination purposes. -----
Name of Participant-----
Signature-----
Date

To be filled in by the responsible crossCert researcher.

I, _____, declare that the research participant signed above has been adequately informed about the study.

Signature-----
Date