Key findings & policy recommendations to improve effectiveness of Energy Performance Certificates & the Energy Performance of Buildings Directive

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Project:	**Improving Dwellings by Enhancing Actions on Labelling for the EPBD**
Acronym:	**IDEAL EPBD**
Home page:	http://www.ideal-epbd.eu
Agreement:	**IEE/07/600/SI2 499426**
Co-ordinator:	**Energy research Centre of the Netherlands (ECN)**

Supported by Intelligent Energy Europe.

Summary of IDEAL EPBD research findings and policy recommendations

The IDEAL EPBD research project was a three-year programme (2008-2011) that combined a variety of scientific disciplines and methods to get insight into factors that influence homeowners' decision-making with respect to home purchase and home renovations. The project's findings and policy recommendations presented in this report are based on:

- an extensive literature research,
- interviews with stakeholders involved in the implementation of the Energy Performance of Buildings Directive (EPBD) on national level,
- in-depth interviews with homeowners in ten EU countries (five interviews in Denmark, Finland, Germany, the Netherlands, and the United Kingdom; and 23-24 interviews in Belgium, Bulgaria, Czech Republic, Latvia and Portugal),
- a survey among homeowners in five EU countries (Denmark, Finland, Germany, the Netherlands, and the United Kingdom),
- expert workshops on national and international levels.[1]

Key conclusions

More than one hundred in-depth interviews and a large-scale survey among more than 3000 homeowners revealed how little impact the Energy Performance Certificate (EPC) currently has on home owners' decision-making.

> *"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 2011: 20)

Many reasons for this lack of impact have been identified, for example lack of availability, lack of awareness, and lack of understanding. One approach to tackle these issues is, of course, to increase the visibility and availability of the EPC. However, this 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. Even though several interviews done in Wallonia and Portugal indicate that the energy assessment appears useful to raise attention to unknown insulation possibilities, especially for the external walls, the floor and/or the cellar ceiling, they also show a reluctance and hesitations to admit this influence, such as in 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 2011: 19-20)

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 EU level. The actual implementation of the EPBD needs to happen at the most local level, i.e. any given

[1] Detailed reports with national findings and recommendations for national policy makers in Belgium, Bulgaria, Czech Republic, Denmark, Finland, Germany, Latvia, the Netherlands, Portugal and the United Kingdom: http://ideal-epbd.eu/index.php?option=com_content&view=article&id=12&Itemid=14&lang=en.

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.

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". 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.

General findings and EU-level policy recommendations

The current impact of EPCs during home purchasing is low, but it can be increased by making the EPC better available and providing more useful and meaningful information.

The large-scale survey showed that the EPC currently has very little effect on people's decision-making when considering to buy a home. Other factors, such as property price, location and availability of outdoor space, play a much more influential role. However, expected utility costs were mentioned as important by 60% of the survey respondents and type of heating system by 40%. In fact, expected utility costs rank 9th among factors that play a role. In other words, energy-related factors do play a role in decision-making, implying that the EPC could also play a bigger role than it does today.

To increase the impact of EPCs on people's home purchase-related decision-making, the energy label needs to provide information that is interesting, useful and meaningful to people. Although this sounds straight-forward and obvious, it is not an easy task to communicate complex information in a way that is easy to understand and meaningful to all. Potential differences between countries and people need to be taken into account.

IDEAL EPBD findings indicate that, apart from information about the heating system and expected utility cost, home buyers are interested in ways to reduce their energy cost, in estimates how much such home improvements would cost and in how long pay-back times are. This calls for more tailored information and advice, as opposed to the currently included, often rather generic recommendations. A more effective EPC should provide the information people are most interested in at a glance and additionally help in finding additional information and advice. Further research can help to develop research- and practice-based guidelines regarding what kind of information should be included and how to best present it.

Apart from improving the type of information shown on the EPC, its availability, visibility and quality need to improve to increase its effect on home purchasing decisions. The survey has shown that an EPC is often not available or not shown before buyers make a price offer for a building. 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.

It is important to consider the role of real estate agents in this context. They play a key role in presenting the EPC to prospective buyers and will continue to do so in the future when property energy ratings have to be published through their communication channels as well. IDEAL EPBD findings show that estate agents may play down the accuracy of EPCs, especially in case of a low efficiency rating, for obvious reasons.

One way to tackle this issue is to improve label quality and accuracy. This can be achieved through better educated and accredited EPC issuers and independent spot tests. Another way to deal with this is to stimulate estate agents to play a more profound role in the promotion and consideration of EPCs in home purchase and renovation decisions. In addition, 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.

The current impact of EPCs during home improvements is low, but it can be increased by making the EPC better available and providing improved and trustworthy information.

Survey and interview findings show that the EPC plays only a minor – if any – role in homeowners' decision-making regarding home improvements. The most important factors influencing people's considerations are the age and condition of their dwelling, comfort and financial issues. Finance plays a dual role: on the one hand, it 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 in Portugal were concerned about subsidies that should "normally [be] accessible to everyone", but are (also) used by "people [who] do not have particular need for incentives" (Bartiaux 2011: 17).

During interviews it became clear that the EPC is sometimes used as reference on what kind of (additional) renovation works could help to (further) improve the energy efficiency of a building. In few cases, informants expressed that EPCs can be useful to inform about possible efficiency measures that were not known or considered before.

In the survey and in interviews respondents indicated that the main motivation to carry out home improvements is to increase comfort. 60% of the survey respondents ticked this answering option as 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.

Generally, people would appreciate information about renovation cost and where to go for further advice, such as specialised professionals or a public body. This stresses the need for the EPC to provide the information homeowners are interested in to be more effective. The IDEAL EPBD delivered a first indication of what kind of information this may be, e.g. about potential renovation cost, potential energy and related cost savings, and where to go and whom to consult for further information and advice. Of course, the 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.

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 roof 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.

The survey showed that if homeowners are aware of the recommendations included on their EPC they are also more likely to have implemented energy saving measures. This finding cannot give insight in causality. Homeowners may pay attention to the recommendations provided and make the decision to invest in energy saving measures based on those recommendations. Homeowners may also already be interested in home improvements and when looking for information take a close look at the EPC recommendations. Either way, this finding shows 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.

Across Europe, EPCs are often only obligatory at change of owner or tenant. Therefore, it can take decades until a building is finally labelled. This finding calls for more stringent and frequent issuing. An EPC could, for example, be made obligatory not only at change of occupant, but also when homeowners consider a home renovation and apply for fiscal or other public support schemes. Eventually, an EPC could become obligatory for all buildings at all times. Considering that only an

EPC that is up-to-date can be of actual use, a system of EPC expiration and renewal would need to be devised.

In many Central and Eastern European countries, where the share of multi-apartment buildings of the overall building stock is high, EPCs are often only obligatory for entire buildings and not for individual apartments. It may be worth to consider making labels obligatory for individual apartments, too. 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.

An energy efficiency rating with distinct categories (e.g. A-G scale) is more effective in communicating energy efficiency information than a continuous scale.

The survey among over 3000 EU homeowners showed that there is a significant difference in the comprehensibility of EPCs. In particular, German respondents reported having trouble understanding the energy efficiency rating of their home as shown on the EPC, while on average much fewer respondents in other countries shared similar problems. Of all five countries included in the survey, Germany was the only one with a continuous scale that indicates the energy rating of a building, while all other countries had labels with distinct label categories, from A-G.

This clearly shows that distinct label categories appear to be more understandable. An important recommendation is to make the use of a distinct energy efficiency rating scale obligatory. In general, this finding puts further emphasis on the need to pay attention to how information on the EPC is presented and to how it can be made more understandable and thereby more effective. Further research to identify best practices in EPC design and rating systems in the EU-27 can help to develop guidelines for national policymakers.

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.

The inclusion of practical recommendations and tailored advice increases people’s trust in and perceived usefulness of the EPC.

The survey among over 3000 homeowners in five European countries showed that trust in the EPC increases with the availability of recommendations on the EPC, homeowners’ awareness of these recommendations, homeowners’ understanding of the EPC, and trust in the person issuing and presenting the EPC.

One way to increase the usefulness and effectiveness of EPCs would be to make the inclusion of recommendations obligatory. In addition, 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. Furthermore, 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. Finally, an accreditation system for EPC issuers can help to ensure higher and more consistent quality.

The survey also showed that the inclusion of practical recommendations increases perceived usefulness of the EPC. Ideally, the recommendations would provide information about different energy efficiency measures and associated cost and about where to go and whom to consult for further information and advice, as this is what the majority of homeowners indicated as being most useful. More elaborate information and tailored, practical advice should be provided on the EPC itself, via a link to the internet or reference to a public information centre (see following recommendations for details).

The EPC can provide important support for homeowners by helping them find competent and knowledgeable professionals.

The survey and interviews with homeowners and workshops with experts proved there is agreement that one of the main barriers to energy efficiency renovations is the lack of knowledgeable professionals, especially in rural areas. An important recommendation therefore is to establish knowledge and training centres for professionals. Denmark is trying to tackle this problem by setting up a *Knowledge Centre for Energy Renovation of Buildings* and is a pioneer in that respect. Countries could consider making attendance obligatory, at least for EPC issuers.

Belgium aims to address the problem of the lack of expert knowledge and advice in rural areas by means of (mobile) information and advice centres that aim to support people locally. The EPC can play a more important and effective role in supporting homeowners' decision-making by providing information about where and how to find competent professionals and independent advice.

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 (Bartiaux 2011: 98).

High quality and continuous training of professionals is needed. EU-level policy making can help to set up frameworks and networks that support exchange of knowledge and experience as well as continuous training.

The EPC can provide important support for homeowners by providing information about available financial support schemes.

Interviews with stakeholders involved in the national implementation of the EPBD in all ten countries participating in this research showed that the lack of finance is one of the main barriers to energy efficiency improvements. All countries included have one or several financial support schemes in place. However, during interviews and through the survey it became clear that homeowners consider getting financial support to be very difficult and time consuming. Many homeowners criticised that it was not easy to get information about what kind of support schemes there are and how to apply for them. In some countries, some informants were concerned about the fact that support schemes favour "the rich" households as they require the complete payment of energy efficiency renovation costs upfront, before subsidies are paid or fiscal incentives pay off.

Support and incentive schemes need to be available and accessible to all in order to effectively stimulate energy efficiency renovations. The EPC can 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. Lower-income households profit from support schemes that facilitate access to loans and are (at least partially) amortised through realised energy savings.

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, acquaintance, 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, support the actual renovation works, or help to find professionals. Many such examples have been found in in-depth interviews with homeowners. The following comes from Latvia:

> *"(…) the boss of the company PAROC [a well-known manufacturer of heat insulation materials in Latvia] is my relative. I simply called him and he gave*

> *me a 3 hour lesson [on] how and what I had to do (…) and why I have to choose PAROC. So there was no other option".* (Andrejs, Latvia, man) (Bartiaux 2011: 65).

Apart from a supporting role, they may also play a hampering role by being opposed to or playing down the usefulness of planned energy efficiency improvements.

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.

Further research

The IDEAL EPBD project findings delivered first indications of what kind of information this could be and how it might be presented. However, since the main focus of the IDEAL EPBD project was on EPC effectiveness, findings regarding EPC information and its presentation are only indicative. Further science- and practice-based research can help to develop guidelines for more meaningful and understandable calculation methods for the EPC and for the kind of information and its format to be presented on the EPC to increase its usefulness. Such research should depart from the finding of this study that the EPC is hardly effective in its current form, but could become more effective if it helps homeowners answer the questions they have when wanting to buy or renovate a building – or if it signposts where answers can be found.

Further research could also seek to provide better information about the role different actors in the influence energy-related decision-making would want the EPC to play and on how the EPC could do so most effectively. One approach is to facilitate contact and mutual support among people encountering similar problems and questions, for example through open house programmes to showcase successful home renovations, answer questions and provide practical advice.

An approach to make the EPC more "active" that has been introduced in Denmark is making the energy rating of a building publicly available. It enables local professionals to find homeowners who may be interested in home renovation. It also allows interested homeowners to see if similar buildings nearby have a better rating and approach their neighbours to learn more about how they went about renovating their home. This approach triggered a discussion on privacy among experts at the international IDEAL EPBD workshop. The conclusion was that it much depends on the culture and history of public debates on similar issues (e.g. Google Street View) of a country whether or not such approach may be appropriate. In any case, an "opt out" solution needs to be available.

Contents

1. Introduction to the IDEAL EPBD project

Across Europe, there are large energy efficiency potentials in the existing housing stock. The Energy Performance of Buildings Directive (EPBD) aims to tap into these potentials through the Energy Performance Certificates (EPCs) that inform homeowners about the energy consumption of their home and often include recommendations to increase energy efficiency.

The European Commission's Energy Action Plan 2011-2020[2] acknowledges that current policy measures do not suffice to meet its 2020 target of 20% energy consumption reduction and that more stringent policy implementation as well as innovative policy actions are needed.

The Improving Dwellings by Enhancing Actions on Labelling for the EPBD (IDEAL EPBD) project, supported by the EC's Intelligent Energy Europe programme, studied energy labels and other drivers and barriers to energy efficiency renovations of single-family houses. Based on research in 10 EU Member States, policy recommendations have been developed. These recommendations focus on more effective implementation of the EPBD as well as on ways to increase the effectiveness of the EPC and the support for energy efficiency renovations.

The IDEAL EPBD project, running from October 2008 to September 2011, is a joint undertaking of 10 European partners from Belgium, Bulgaria, Czech Republic, Denmark, Finland, Germany, Latvia, the Netherlands, Portugal and the United Kingdom and it made use of the following methodology to arrive at its findings and policy recommendations.[3]

2 http://ec.europa.eu/energy/efficiency/action_plan/action_plan_en.htm.

3 For more information about the approach and methods of the IDEAL EPBD project, visit www.ideal-epbd.eu

2. Overview of the IDEAL EPBD project

Research findings presented in this report are based on a number of individual research steps that aimed to get insight into the reasons for limited EPC effectiveness, carried out in the years 2008-2010.

First, project partners interviewed local stakeholders in all 10 countries about the barriers to effective EPBD implementation they see in their respective country. The informants included actors from policy, housing agencies, and construction companies and associations. The foci during interviews were existing regulation, financing, market structures, principal-agent issues (i.e. division of cost and benefits between involved parties, such as landlords and tenants) and information. In addition, an inventory of implemented policy instruments per country and the barriers to home renovation they address was developed.

- The detailed report on savings potentials and general barriers to home renovations as perceived by a number of stakeholders from policy and the housing sector is available on the IDEAL EPBD project website: http://ideal-epbd.eu/download/country_specific_factors.pdf.

Second, five interviews in each of the ten participating countries of the consortium were carried out. These helped to develop a survey in the five countries with a longer history of EPBD implementation (Denmark, Finland, Germany, the Netherlands, United Kingdom) and to prepare a second wave of over 20 interviews in each of the five countries where the EPBD has been implemented more recently (Belgium, Bulgaria, Czech Republic, Latvia, Portugal). These nearly 100 in-depth interviews with homeowners in five countries among whom most had carried out some home improvements, focused on the factors influencing homeowners' decision-making with respect to energy-related home renovations.

- The detailed report, with a synthesis of main findings from the in-depth interviews and country-specific, detailed reports of interview findings in each of the five countries, is available on the IDEAL EPBD project website: http://ideal-epbd.eu/download/in_depth_interviews.pdf.

Third, a survey based on a literature research and the above-mentioned five interviews in all ten countries was distributed among homeowners who did have – or according to regulation should have – an EPC. The survey asked questions regarding homeowners' awareness and understanding of the EPC and the role it played or plays in people's decision-making regarding home purchase and home renovation. In addition, it addressed the role of available incentives in implementing energy efficiency measures, the information sources people consult and trust and perceived barriers to home renovation.

- The detailed report of the survey outcomes is available on the IDEAL EPBD project website: http://ideal-epbd.eu/download/homeowners_questionnaire_wa.pdf.

The report at hand brings together the main findings of all previous research steps and, based on this synthesis, provides recommendations for EU-level policy makers on how to increase EPC effectiveness. The appendix includes one main recommendation for national policymakers in each of the ten countries.

- Individual country reports of findings and recommendations are available at http://ideal-epbd.eu/index.php?option=com_content&view=article&id=12&Itemid=14&lang=en.

3. Market barriers to effective EPBD implementation

Recommendations

Effective implementation of the EPBD and strategic support for energy efficiency requires well-designed, long-term policy programmes. These need to strategically combine a number of measures targeting the various stakeholders involved:

- Regulatory requirements can prescribe efficiency standards for building materials and construction or renovation measures.
- Better information, training and education for professionals helps to make energy efficiency an integral part of building construction and renovation planning and implementation and also helps to improve information, advice and support for homeowners.
- Homeowners benefit from objective information that helps to decide on energy efficiency measures and appropriate financing.
- Subsidies and other financial support measures need to be accessible for all homeowners.
- Homeowners need support with decision-making. In particular, residents in multi-apartment buildings need information and coordination of decision-making processes in order to reach agreement on the type of measures and financing method. Particular attention for this group of homeowners is needed.

Findings

Interviews with policy makers and energy professionals in the ten countries involved in this study (Belgium, Bulgaria, Czech Republic, Denmark, Finland, Germany, Finland, Latvia, the Netherlands, Portugal, United Kingdom) aimed to indentify market barriers to energy efficiency improvements[4]. Reported barriers varied across countries. However, variation is not necessarily based on country-specific differences only. Variation can also stem from the type of stakeholders interviewed in each country or be based on the aspects that were touched upon during the interviews. Therefore, the findings from the stakeholder interviews provide general insight into common problems across countries and help to identify potential starting points for more effective EPBD implementation.

With respect to regulation, stakeholders criticised insufficient enforcement of existing regulation and unclear regulation due to frequent changes. Other frequently mentioned barriers were insufficient or ineffective incentives. Table 1 provides an overview of interview findings regarding regulation.

Table 1 *Barriers related to regulation reported by the stakeholders in the 10 Member States*

Barrier	BE*	BG	CZ	DE	DK	FI	LV	NL	PT	UK*
Insufficient or lax regulation			x		x		x	x	x	x
Incentives not working properly		x		x			x	x	x	
Frequent changes in regulation	x	x	x	x				x		
Insufficient subsidies		x	x			x	x	x		
Unclear regulations on labelling		x		x			x	x		
Price of labelling					x			x	x	
Lack of supervision & enforcement	x	x			x					
Visibility of labelling					x					x

* *For Belgium data are from the Walloon Region and for the United Kingdom for England only. Source: Tuominen & Klobut, 2009.*

[4] For a detailed report on interview findings visit: http://ideal-epbd.eu/index.php?option=com_content&view=article&id=12&Itemid=14&lang=en.

With respect to financing, stakeholders mentioned several barriers to energy efficiency renovations. Often cited was the issue that energy efficiency has no effect on the property price or rent of a dwelling. Instead, other factors such as location or general condition determine the price. Other barriers mentioned were lack of appropriate or affordable financing and low energy prices due to insufficiently internalised externalities.

Stakeholders also reported barriers with respect to decision-making, in particular in multi-apartment buildings where a quorum of residents is needed to guarantee the implementation of energy efficiency measures. It appears to be hard to convince a majority to support renovation plans. Stakeholders reported that information and coordination that allows residents to reach common agreement is often lacking.

According to the informants, a lack of knowledge and information generally appears to make decision-making difficult for homeowners. Being poorly informed may be one reason why they hardly prioritise energy efficiency in their decision making. Stakeholders in several countries reported that knowledge about different energy efficiency measures appears to be low and that it is difficult for homeowners to receive neutral information and advice. Another important finding is that professionals in the renovation and construction sector seem to lack specialised skills and training that could increase attention to energy efficiency issues.

Interviewed policy makers and energy efficiency professionals were also asked about policy measures that aim to stimulate energy efficiency in their country. The most frequent measures reported include information, subsidies and regulatory demands. Despite the attention energy efficiency receives on EU and national levels, informants in few countries elaborated on strategic planning and implementation of long-term policy programmes. Instead, various separate measures and programmes were mentioned.

Based on stakeholder interviews, several general policy recommendations to increase EPBD effectiveness can be given. They are listed below but will be revisited and elaborated upon in the remainder of this report, based on findings from interviews and a survey among homeowners.

4. The Energy Performance Certificate (EPC)

One of the key elements in the EPBD directive and the main focus of the IDEAL EPBD project is the Energy Performance Certificate (EPC). The EPC was introduced to become an important information source on energy efficiency for building owners.

To be successful some preconditions with regard to the EPCs should be fulfilled. Homeowners should:

- be aware of its existence,
- understand the information on it,
- trust the information on it,
- find the information useful.[5]

In the IDEAL EPBD project we asked homeowners about their experiences, their opinion and the use of the EPC by means of questionnaires and interviews.

4.1. Room to improve awareness of EPC

Recommendations

The EPCs are introduced to provide building owners with information on energy efficiency. Because of the above-mentioned implementation issues, the EPBD has not yet reached its full potential. To expand the scope of the EPBD we recommend to:

- **Consider the pros and cons in making EPCs obligatory for individual apartments, too.** This could have a positive effect on the scope of the EPBD, but it involves quite complicated technical changes in the calculation methods used. For example, dwellings on the top floor of an apartment building should be handled differently than the ones in the middle.
- **Stimulate issuing EPCs on more occasions than sale or change of tenant in order to reach more owners of existing buildings.** Although in principle the obligation could simply be extended to all buildings, non-mandatory incentives are probably more feasible. Linking (financial) incentives to the EPC could make it attractive for all building owners to apply for an EPC for their property.
- **Introduce a penalty for not offering an EPC at transaction of buildings. (This is already covered in the recast EPBD.)** If the EC wants the EPC to become available for buildings faster, a proper penalty system should be implemented to raise levels of compliance.

Findings

The empirical research within the IDEAL EPBD project was not intended to be conclusive on the homeowners' awareness of the EPCs existence. Since the project intended to study the experiences with the EPC, mostly people that should have already been confronted with an EPC were included in the sample. The levels of awareness found can therefore be expected to be higher in our sample than in the population in general. Nevertheless, some interesting findings came out of the survey and the interviews.

Two types of awareness were tested: general and personal. Survey respondents were first asked whether they had already heard about the EPC. In the following, several questions aimed to find out whether respondents were aware of having received an EPC themselves and whether or not it included recommendations for home improvements.

[5] See Chapter 8 for a review of recent studies and publications on the effectiveness and usefulness of energy labels.

Figure 1 *General awareness of the existence of EPCs (Denmark N=741; Germany N=1141; the Netherlands N=564; England N=623; Source: Adjei, Hamilton & Roys, 2011)*

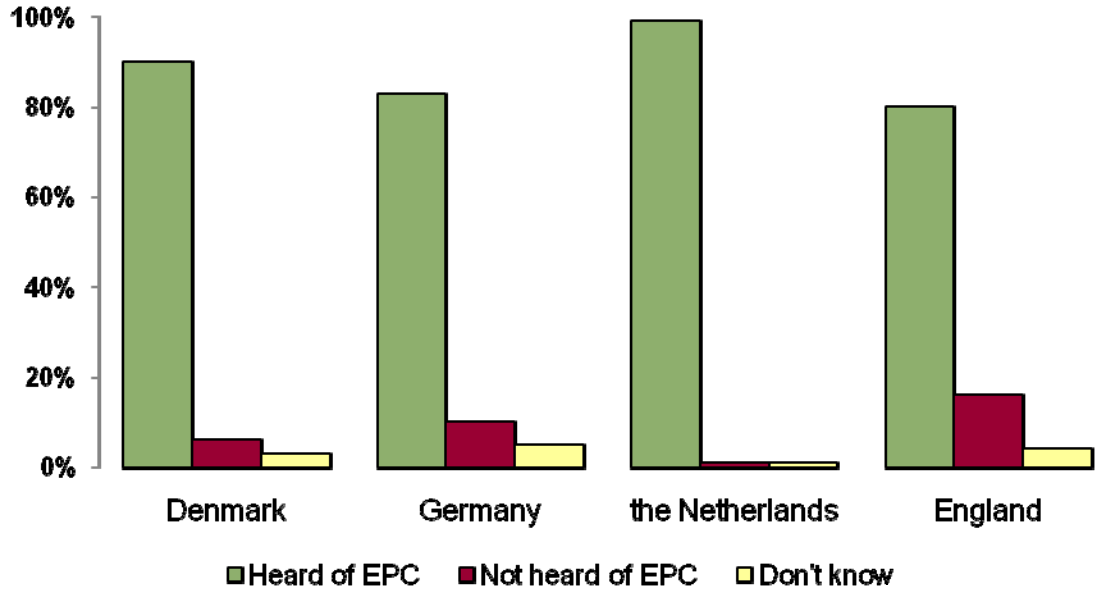
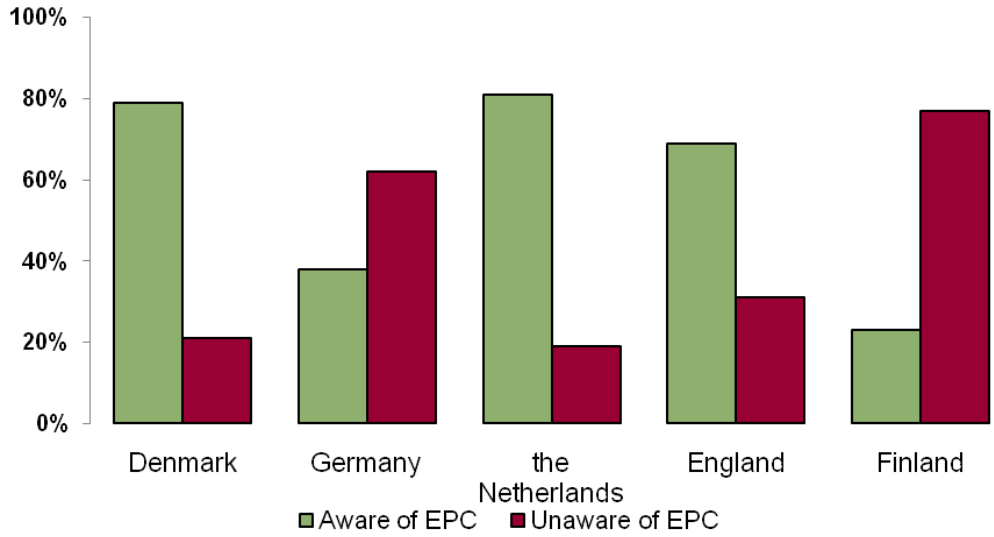


Figure 2 *Personal awareness of having received an EPC (Denmark N=579; Germany N=427; the Netherlands N=455; England N=425; Finland N= 109; Source: Adjei, Hamilton & Roys, 2011)*



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.

These differences can partially be explained by the samples included in the survey. In Denmark and the Netherlands, the sample was drawn from a database of addresses that were known to have received an EPC. In England and Germany, the sample was drawn from a database of people who

had recently bought a home and therefore should have received an EPC. In Finland, EPC recipients and recent homebuyers could not be identified and the survey was open to everyone.

Although the Dutch and Danish samples only consisted of homeowners that were known to have an EPC around 20% of the respondents in these countries stated that they did not have an EPC. This is an indication that these homeowners are not aware of the EPC that should have been handed to them when they bought the property.

In Germany and England people who should have an EPC according to regulation were included in the survey. Here, around 60% and 35%, respectively, stated that they did not have an EPC. This means that these respondents may not received an EPC at all, or it may have stayed with their lawyer or notary, or they are not aware of having an EPC – either reason deserves attention when aiming to improve EPC effectiveness, of course.

In multi-apartment buildings in Bulgaria, Latvia and the Czech Republic, EPCs are not issued to single apartments but only for the building as a whole and only if the building as a whole is sold or rented out. In the Czech Republic[6] and Latvia, EPCs are only mandatory for new buildings and in case of large renovations in existing ones. This means that, even if an EPC exists for a building, the individual homeowners may not have seen the certificates themselves and no EPC is issued when dwellings are sold or rented out to a new tenant. This was confirmed in the interviews in which only few interviewees were aware of the existence of EPCs. In these countries, multi-family buildings constitute a large share of the building stock, and many informants lived in one themselves.

Moreover, the decision-making processes in multi-apartment buildings are seen as an important obstacle to effective EPBD implementation. An example is Bulgaria, where until recently there were serious obstacles to forming homeowner associations. These obstacles are gradually being eliminated through legal measures.

The extent to which the EPC reaches its target group is not only a problem in 'new' Member States. All 10 countries studied lacked an effective penalty system for addressing failure to issue an EPC during a purchase. Either there is no penalty at all or there is no proper enforcement. Because of this, many homeowners who should have an EPC, in fact never received it. The recast EPBD will mandate Member States to implement a proper penalty system for noncompliance.

A more general issue is that EPCs are only obligatory at times of sale and change of tenants. How often houses change owners is very culture dependent. In some countries people live in several houses during their lifetime, meaning that houses will be 'on the market' relatively often. In other countries people live in a single dwelling for almost a lifetime. In this situation it takes a long time for EPCs to become available for large proportions of the building stock.

4.2. The EPC rating system seems to be crucial for understanding

Recommendations

- **Conduct further research to identify the best practices on label rating system of EPC in the EU-27 and use that as a guideline.** Our study only shows a difference in understanding. To fully understand these findings, further research should be done to identify all factors influencing understanding.
- **Consider making the use of A-G scale obligatory.** Since the A-G scale seems to be easier to understand, making this obligatory for all countries should be considered. If countries decide to introduce new label rating systems, they should be aware of this finding.
- **Use scale in which there is room for energy efficiency gains beyond the currently ordinary (e.g. NZEB).** The EC is striving for further steps to come to maximal energy efficiency gains in

[6] The current Energy Management Act in the Czech Republic will be amended to overcome this gap in EPBD implementation. This is in process right now at the Ministry of Industry and Trade.

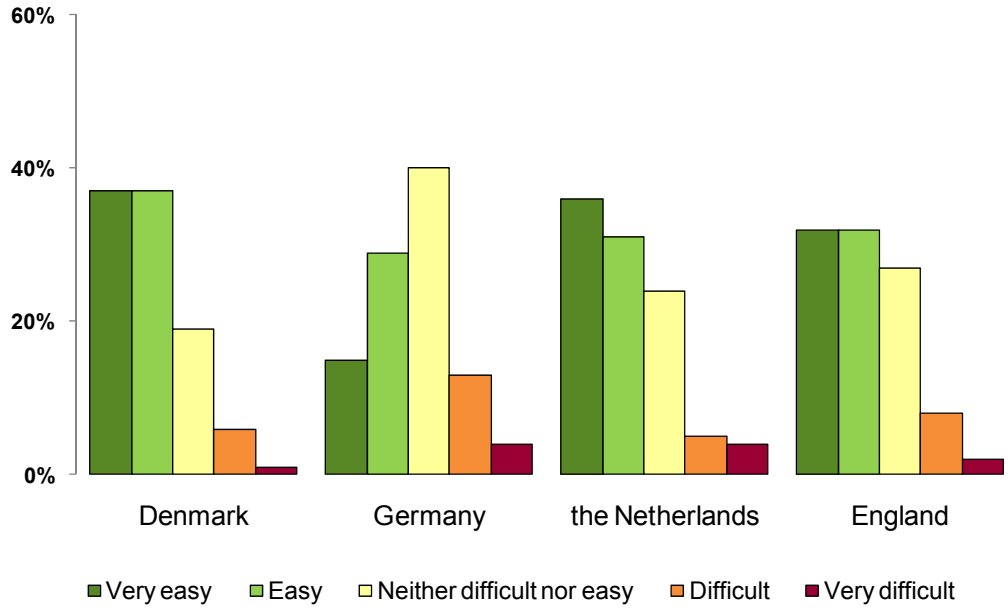
buildings in the future. The recast EPBD states that all newly built buildings as of 2020 should be Nearly Zero Energy Buildings. The rating system on the EPC should be set in a way that it remains suitable for these buildings.

Findings

The survey showed some differences in the level of understanding of the EPCs in different countries.

Figure 3 shows that in England, Denmark and the Netherlands the majority of respondents considered it easy or very easy to understand the EPC. In Germany, fewer respondents agreed.

Figure 3 *Homeowners' level of understanding of the Energy Performance Certificate (Denmark N=579; Germany N=427; the Netherlands N=455; England N=425; Source: Adjei, Hamilton & Roys, 2011)*

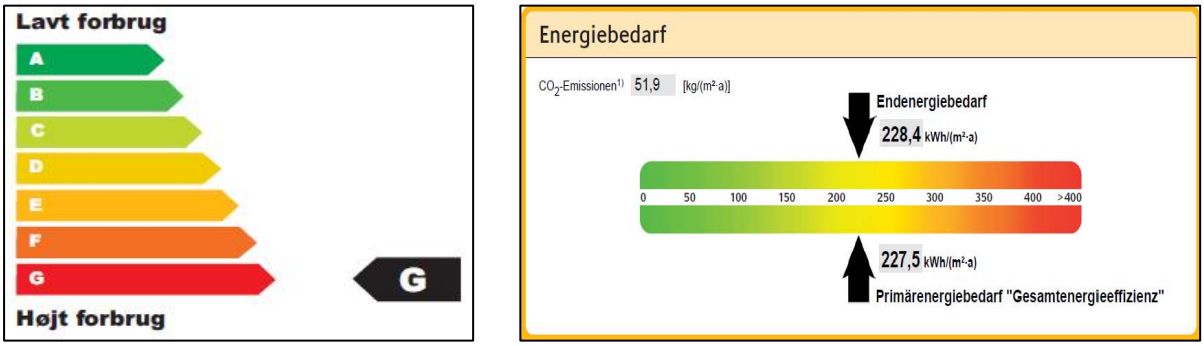


One explanation could be that the energy performance rating in Germany is not based on the most commonly used A to G scale, but on a continuous scale. The differences are shown in

Figure 3. Not only the label rating system is different; the German EPC also diverges because it includes two values on energy consumption, one based on primary energy and one on final energy consumption.

This may explain why only less than 40% of the respondents with an EPC in Germany could recall their own ratings in contrast with 77% in Denmark and 86% in the Netherlands.

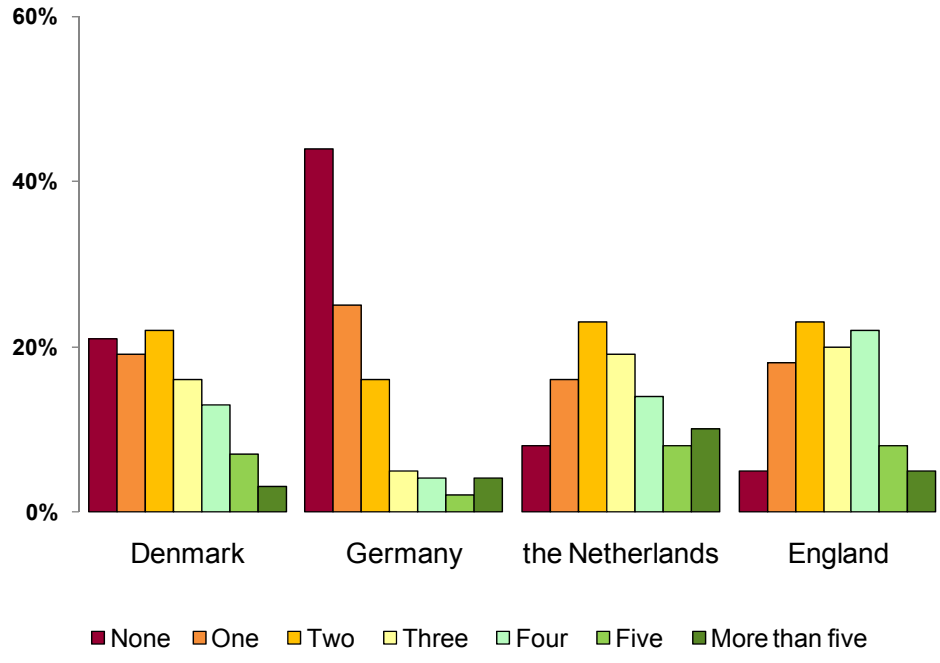
Figure 4 *Difference in energy performance rating in Denmark (Left) and Germany (Right)*



The rating system appears to be not the only problem of the German EPC. There is also an indication that the recommendations may be less clear. Every EPC should contain recommendations for energy efficiency improvements.

Figure 5 shows that the number of recommendations that could be recalled is lower in Germany in comparison to other countries.

Figure 5 *Number of recommendations stated/recalled (Denmark N= 743, Germany N=123, the Netherlands N=249, England N=174; Source: Adjei, Hamilton & Roys, 2011)*



Considering that it is unknown for the samples in several countries how many respondents had actually received an EPC, and if so, whether recommendations were included, this finding can at best be interpreted as an indication. It cannot be used as basis for general conclusions about the availability of EPCs with recommendations in all individual countries. The level of understanding is not the only factor influencing these differences; the number of recommendations also differs per country and some households may not have received any because their houses are already very efficient.

4.3. Trust in the EPC is relatively high, but there is room for improvement

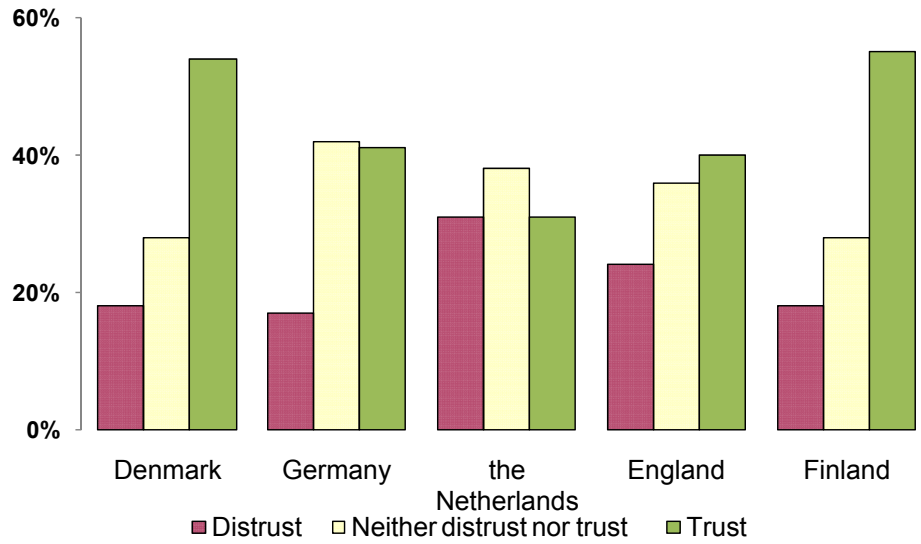
Recommendations
Trust in the EPC can be improved by increasing the transparency of the calculation method employed for the label and by increasing the trust in those who issue EPCs, e.g. by means of an EPC expert certification scheme. Therefore we recommend to:

- **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 basics requirements for developing trust in the EPC.
- **Provide background information for people to better understand the methodology.** Either include this information on the EPC itself or provide a link to background information on the internet
- **Consider making inclusion of useful recommendations on EPC obligatory.** If recommendations on the EPC are specific and linked to the actual dwelling, this will increase trust levels.

Findings
About 30-50% of all respondents were inclined to trust the EPC and the information it provides. This percentage was higher among respondents who reported having an EPC with energy efficiency recommendations (50%) than among those who did not have an EPC (40%). Distrust in the EPC was highest among the group of respondents who reported having an EPC without recommendations (25%). Trust in the accuracy of EPCs was not found to be very strong with the majority of respondents.

The survey showed that there were different levels of trust among the countries. Figure 6 shows that of the five surveyed countries, trust levels of homeowners in the Netherlands were lowest. This could be due to bad publicity about the labels at the starting phase of the implementation.

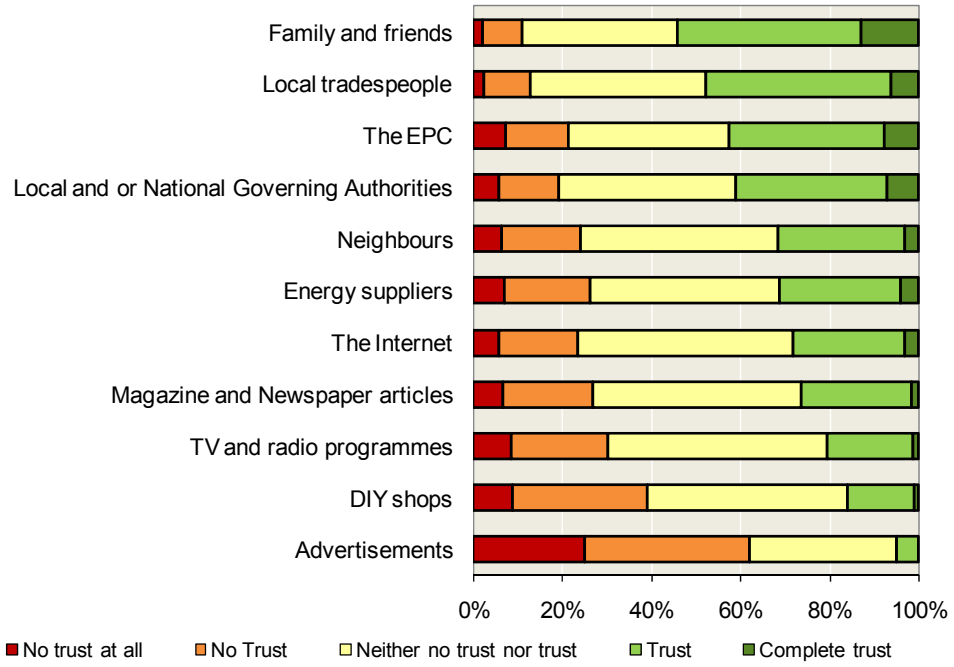
Figure 6 *Levels of trust in the EPC in Finland, England, Netherlands, Germany and Denmark (Denmark N=536, Germany N=682, the Netherlands N=354, England N=347, Finland N=64; Source: Adjei, Hamilton & Roys, 2011)*



Interestingly, trust levels in the EPC corresponded closely with trust levels in 'local and/or national governing authorities'. On average, the EPC ranked third after family and friends and local trades people, and followed by local or national governing authorities. However, significant country-specific differences with respect to trust levels in the different types of sources of information were found. In Finland and Denmark trust was highest in local and national authorities and in the EPC, ranging from

about 50% to 65%. In Germany and England, trust was highest in family and friends, ranging from about 55% to 65%. Considering that, on average, more than 20% of the homeowners indicated 'no trust' or 'no trust at all' in the EPC there is clearly room for improvement.

Figure 7 *Level of trust in various sources of information on energy efficiency (combined: Denmark N=695, Germany N=1068, the Netherlands N=530, England N=593, Finland N=102); Source: Adjei, Hamilton & Roys, 2011)*



In four countries that had little experience with energy labels (Bulgaria, Czech Republic, Latvia, Portugal) few of the homeowners participating in interviews had heard about the energy label. In Belgium, all the informants whose houses had not be assessed for energy performance, had heard about the energy assessment process, but none wanted to have their houses assessed. In Bulgaria, some informants were inclined to trust energy labels while others questioned the accuracy of labels. In Bulgaria and Portugal, some rather knowledgeable informants voiced criticism about methods employed in energy efficiency assessments and therefore about the value of the label (Bartiaux 2011).

4.4. Practical information increases the perceived usefulness of the EPC

Recommendations

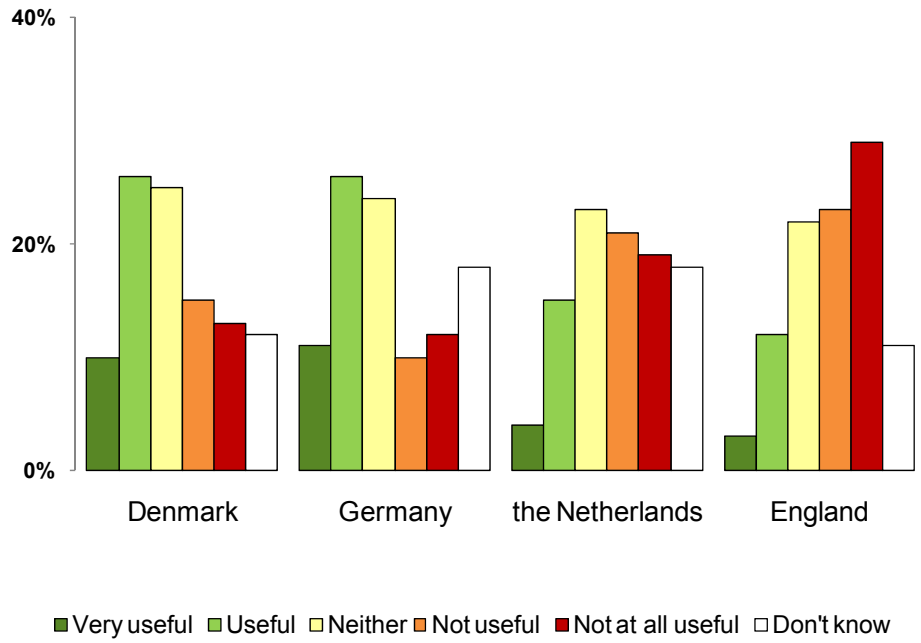
There is some variation across countries with respect to the usefulness of the EPC as a source of information regarding possible energy efficiency measures, associated cost and current utility cost.

- More tailored advice should be provided on the EPC itself or via a link to the internet.
- Further research can help to establish what kind of information homeowners would be most interested in and how it could best be presented.
- Considering country differences, learn from 'best practices' and tailor information provided in the EPC to the national situation.

Findings

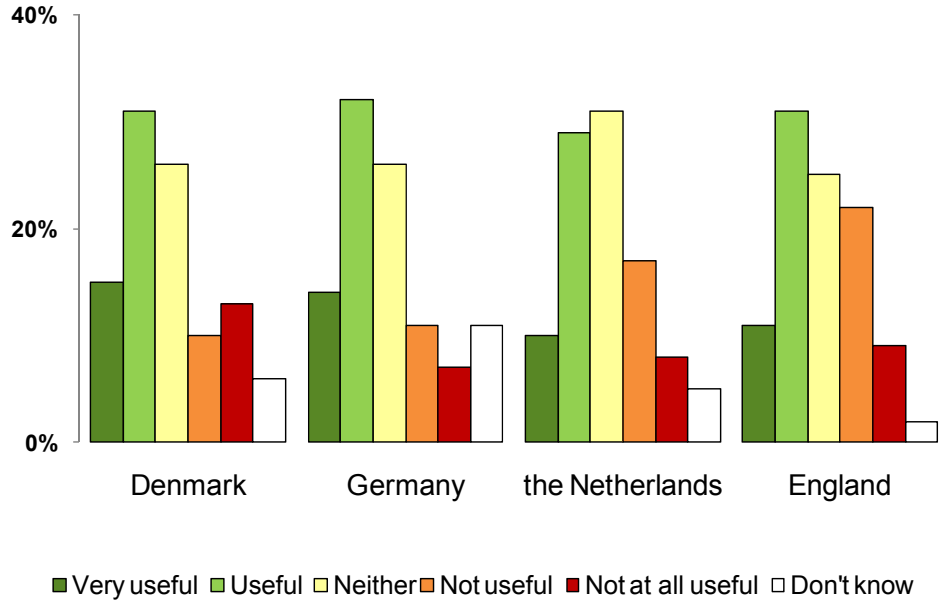
There were also differences among countries in how homeowners value the usefulness of the EPC as a source of information about energy costs. In Denmark and Germany, almost 40% of homeowners with an EPC considered it a useful document in that respect (Figure 8), but in England and the Netherlands less than 20% of homeowners thought the same. Nearly 30% of homeowners in England considered the EPC 'not at all useful' in providing this information.

Figure 8 *Usefulness of the EPC as a source of information on the energy (electricity and heating) costs of your home (Denmark N=582, Germany N=425, the Netherlands N=454, England N=429; Source: Adjei, Hamilton & Roys, 2011)*



Around 40% of homeowners who were aware of the recommendation report on their EPC rated the EPC "very useful" or "useful" for providing information about the home improvements needed to reduce energy bills (Figure 9).

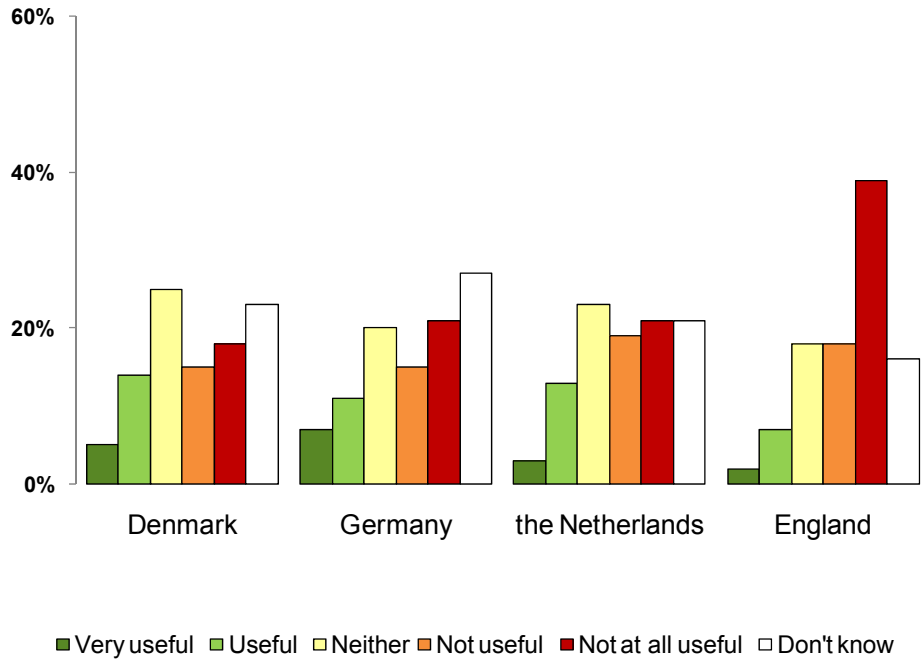
Figure 9 *Usefulness of the EPC as a source of information on the home improvements needed to reduce your energy bills (Denmark N=581, Germany N=426, the Netherlands N=455, England N=429; Source: Adjei, Hamilton & Roys, 2011)*



In England and the Netherlands, over a quarter of homeowners did not find the document useful.

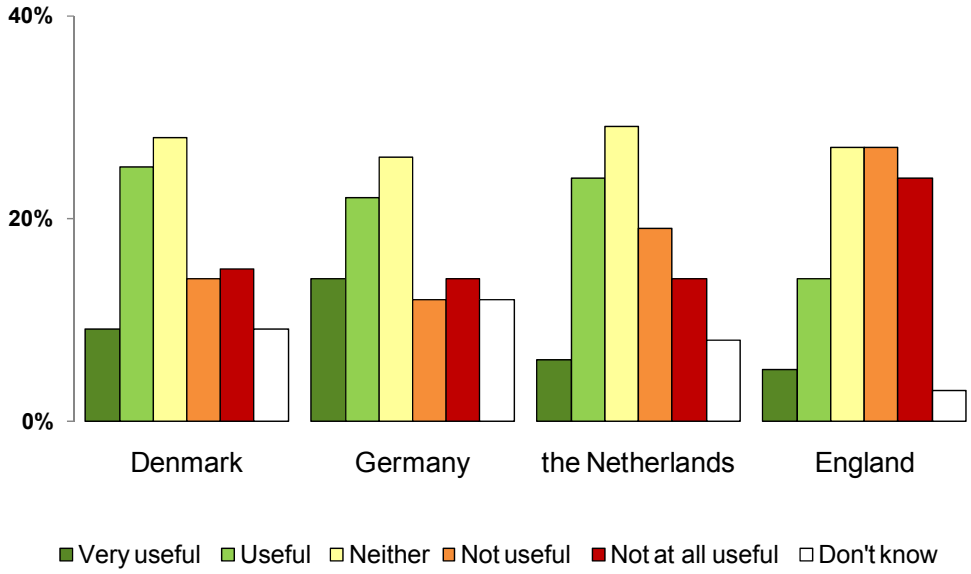
Figure 10 shows that around a fifth of homeowners in Denmark, the Netherlands and Germany thought the EPC provided useful information on where to go for advice and further information on energy efficiency measures. However, less than 10% of homeowners in England agreed and almost 40% stated that it was “not at all useful”.

Figure 10 *Usefulness of the EPC as a source of information on where to go for advice and further information on energy efficient measures (Denmark N581, Germany N=429, the Netherlands N=455, England N=424; Source: Adjei, Hamilton & Roys, 2011)*



There was also some variation in homeowners’ rating of the usefulness of the EPC in providing information on the cost of making energy efficient home improvements. More than a third of homeowners in Germany and Denmark considered the document useful for providing this service, while less than a fifth of homeowners in England stated this. More than half of homeowners in England considered the document “not at all useful” or “not useful” for providing this kind of information (Figure 11).

Figure 11 *Usefulness of the EPC as a source of information on the costs of making energy efficient home improvements (Denmark N=581; Germany N=426; The Netherlands N=455; England N=429; Source: Adjei, Hamilton & Roys, 2011)*



The in-depth interviews also revealed some shortcomings of energy labels. Since the interviews were mostly carried out in countries with a shorter history of EPC implementation, sometimes people who had received an energy audit were approached. It was, amongst other, reported that the audit report did not deliver any new information that the informants did not already know (Bartiaux 2011: 20). The following quote is from a man living in an energy-audited multi-apartments building ('I' is for the interviewer):

> *I: "Were 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)"*
> (Bartiaux 2011: 119)

5. Home purchasing

This chapter discusses factors that influence the home purchasing decision. The most important factors identified in this research are property price, location and the availability of outdoor or garden space. The first directly energy-related factor that can be found on rank nine of top-priorities are the expected cost for energy and water only. The condition of a property, which also has implications for energy consumption, ranked sixth.

5.1. Top-five home buying priorities do not relate to energy efficiency

Recommendations

- Many non-energy related aspects are deemed important when people consider buying a property. However, many people are interested in expected utility costs and find the condition of the property even more important in their decision-making. Here the EPC can deliver important contributions, e.g. by providing more information about expected energy consumption in understandable figures, related costs and the costs and savings of potential energy efficiency measures. This would enable people to take these issues better into account when choosing between several properties and planning future investments in a purchased home.
- Further research can help to identify what kind of energy-related information home buyers would consider during decision making. The EPC can play a larger role in this process if it is better tailored to people's information needs.

Findings

To understand the importance of energy efficiency when buying a property, we have to consider the context of the home buying process. Figure 12 shows home buying priorities based on the survey conducted in five countries.

Survey respondents in Denmark, Finland, Germany, the Netherlands and the United Kingdom reported the following as the most important factors to play a role in decision making when purchasing a dwelling:

1. availability of outdoor space,
2. price,
3. location
4. feeling about the neighbourhood
5. size

About 75% take condition of the dwelling into account and 60% considered potential energy and other utility costs an important factor. Less than 50% also took into account the type of heating system in the dwelling.

Figure 12 *Home buying priorities rated 'very important' or 'important' by homeowners (Denmark N=740; Germany N=1135; The Netherlands N=562; England N=622; Finland N=107; Source: Adjei, Hamilton & Roys, 2011)*

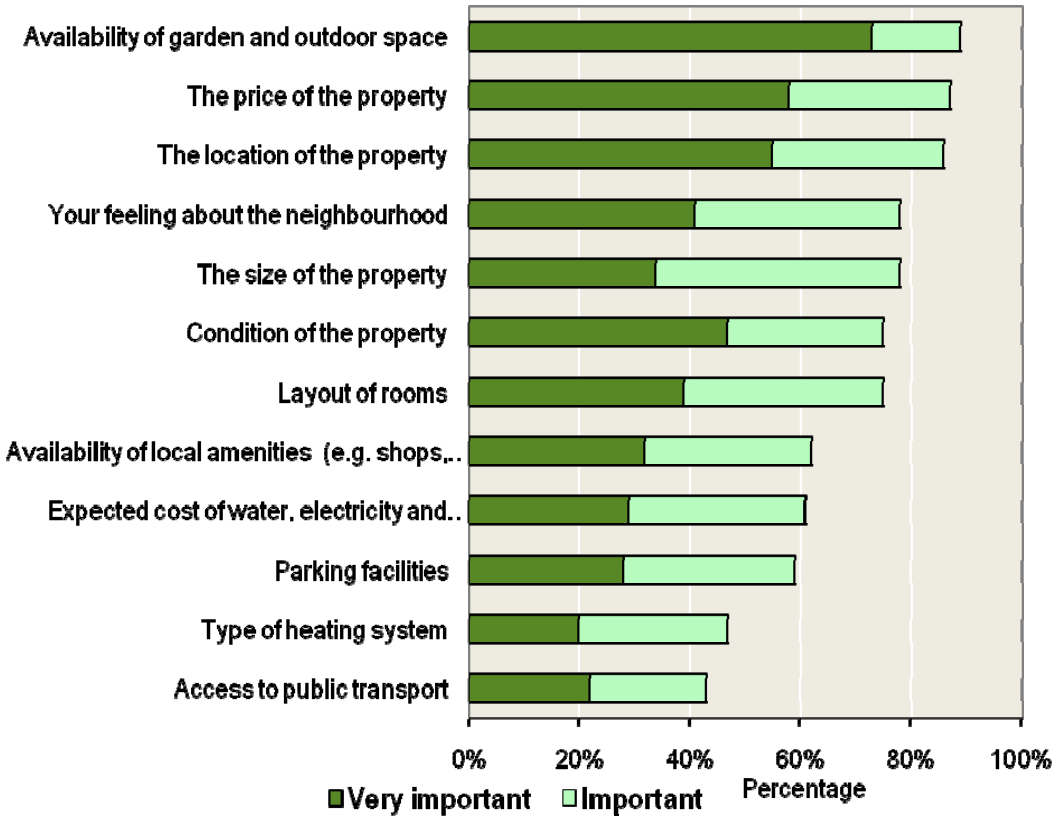
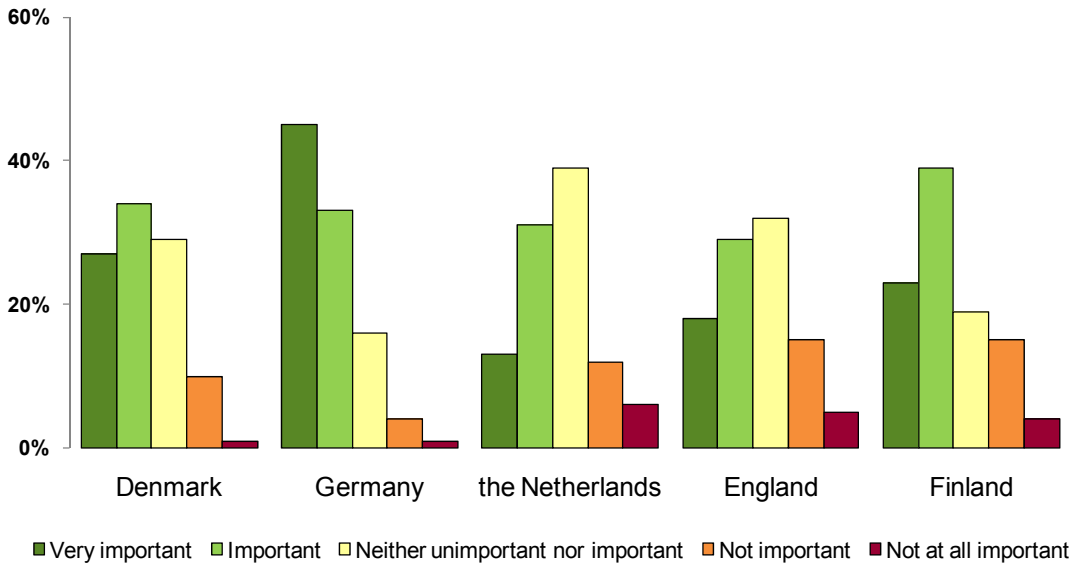


Figure 13 shows that there are differences among countries in how important they consider utility costs to be. Germany stands out from the other countries as nearly 80% of homeowners considered utility costs to be important when they purchased a property. Overall, 61% of homeowners considered utility costs to be important, although this was less of a factor for homeowners in the Netherlands (44%) and England (48%).

Figure 13 *Importance of utility costs (Denmark N=733, Germany N=1135, the Netherlands N=558, England N=621, Finland N=108; Source: Adjei, Hamilton & Roys, 2011)*



5.2. EPC plays minor role in home purchase process

Recommendations

- Make display of EPC in all property advertisements mandatory (part of recast EPBD).
- Make sure that the information people are interested in is provided either on the EPC or online (e.g. heating system, expected heating costs, how to decrease cost).
- Stimulate real estate agents to play a more profound role in the promotion of EPCs.

Findings

The Energy Performance Certificate played a small - if any - role in respondents' purchasing decision. 70% of survey respondents had received an EPC when purchasing a dwelling. However, only half of them actually saw the EPC before making an offer on their current property. Of this group, only a third considered the EPC to be an important factor in their decision making and less than 10% made use of the EPC as negotiation instrument when making an offer.

Estate agents play a pivotal role in informing homeowners about the EPC. Over 40% of homeowners were made aware of the Energy Performance Certificate through an estate agent, varying in each country; in England over 60% of homeowners were informed about the EPC through their estate agents compared to 24% of homeowners in Germany. Property sales material was the source for 60% of respondents from Denmark, 46% from England, 26% from Germany and 22% from the Netherlands. Therefore, estate agents are a key actor in the homeowners' reaction to the EPC.

6. Home improvements

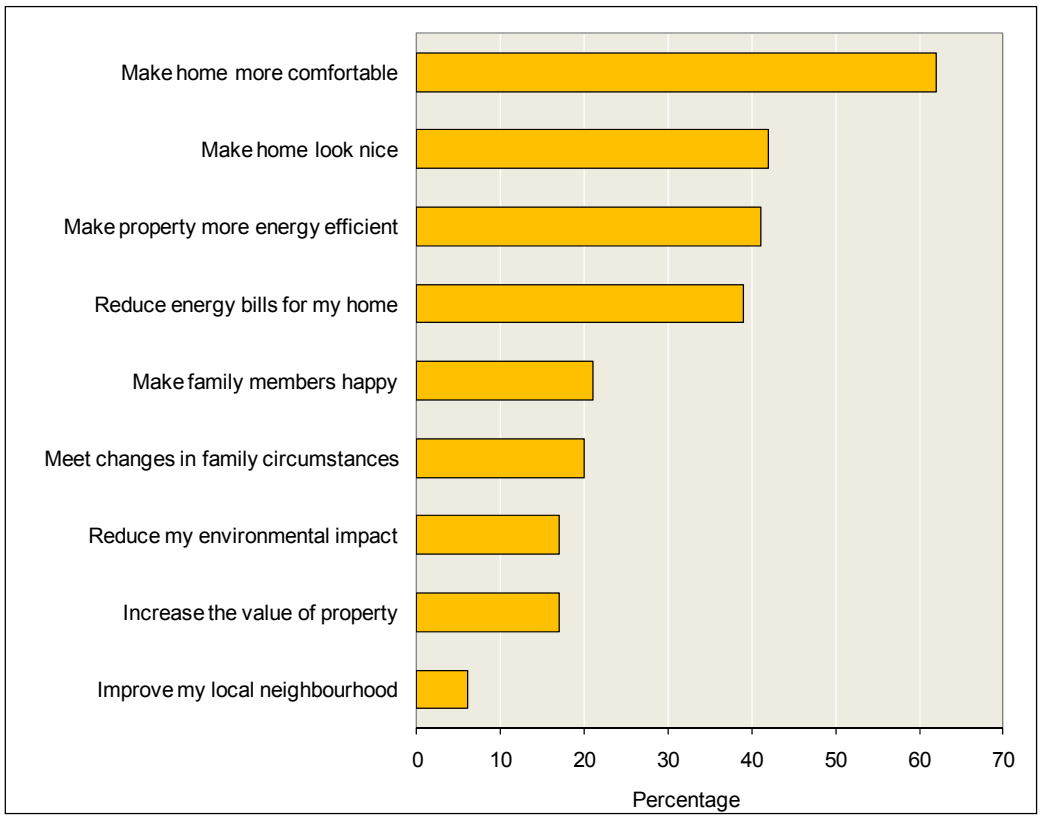
This chapter describes the factors that influence people's decision-making with respect to home improvements. These factors are context-dependent and interact with one another. Some of these factors can be influenced to create favourable conditions for energy efficiency home improvements. Some of these factors can even be addressed through energy labels. But most often energy efficiency is just a part of the overall decision-making process.

6.1. Home improvement process is influenced by many factors

Across all ten countries involved in this project the main drivers for home improvements were found to be improving the **condition** of the dwelling, increasing **comfort** levels and improving **appearance** of a dwelling. Concerning appearance, two important observations could be made.

Figure 14 shows the different reasons why homeowners improved their homes, based on the answers they gave in the five country survey. Energy efficiency and the reduction of energy cost were important motivators for about 40% of the survey respondents.

Figure 14 *Reasons for completing improvements rated very important by homeowners (Denmark N=491, Germany N=673, the Netherlands N=479, England N=524, Finland N=81; Source: Adjei, Hamilton & Roys, 2011)*



The in-depth interviews provided more details about the reasons for home improvement. Interviews with homeowners in Belgium, Bulgaria, Czech Republic, Latvia and Portugal showed that personal comfort was related to heat, space, light and sometimes also silence. Therefore, energy efficiency renovations were often not people's first concern and were often considered as part of other renovation works, e.g. those aimed at better comfort or at gaining more living space.

There is a complex interplay of motives, financial and other, that influence people's decision-making. The following quote shows that energy savings are not necessarily the prime motive for home improvements:

> *"So, the idea is not to save something like (pause) in the past. We, Bulgarians are a bit, a bit not thinking in such cases. For example, there is a crisis, right, and everyone wants to cut his expenses. Well, I always try to increase my income, not to cut expenses. Because these expenses you have accomplished them, you need these things. You want to maintain them (pause)".*
> (Ivan, Bulgarian man, in his mid 30s, owner of a small construction company) (Bartiaux 2011: 89).

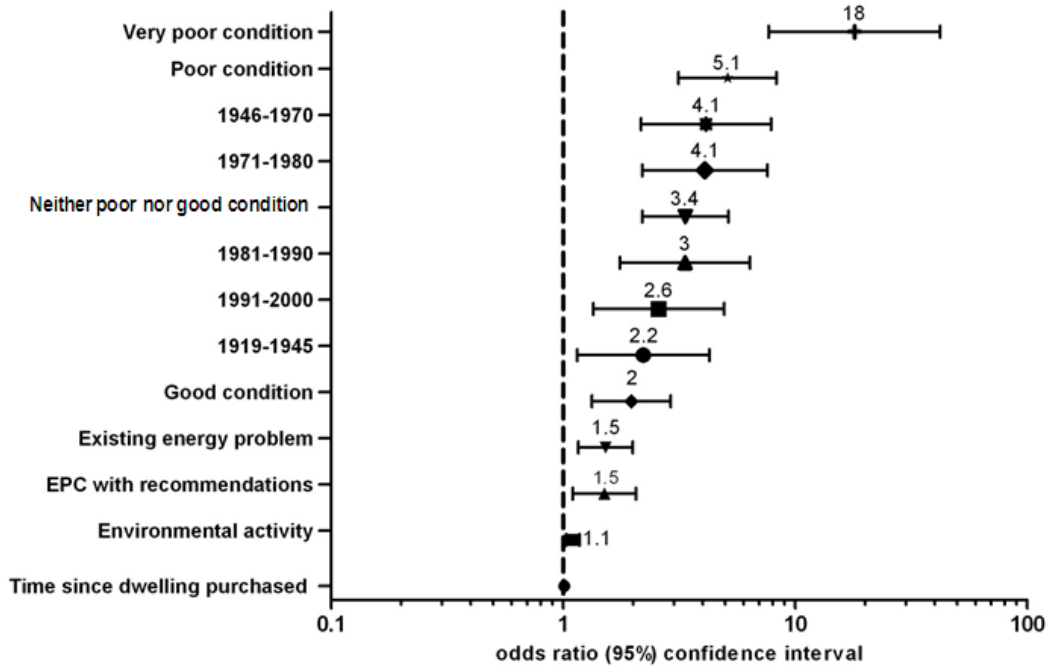
Aesthetic appearance can also be a barrier for certain energy-efficiency measures, when homeowners maintain a historic building envelope due to legislation or simply because of personal taste. This issue was raised in interviews in Belgium, the Czech Republic and Portugal.

In the five countries involved in the survey the EPC was found to be a factor that influenced homeowners' decision making. The graph below (Figure 15) shows various factors that influence homeowners' energy efficiency investments. All the factors shown on the right of the dotted line (i.e. 1 and above) increase the likelihood that an energy efficiency measure would be completed.

For example, homeowners with an EPC with recommendations were about one and a half times more likely to have carried out one or more energy efficiency measures than homeowners without or unaware of the EPC for their home. However, other factors had a more striking influence on homeowners' decision making.

The age and condition of the dwelling increased the likelihood that an energy efficiency measure would be completed. The poorer the condition of the homeowners' current dwelling, the more likely they were to have carried out one or more energy efficiency measures. Homeowners in older dwellings were also more likely to have carried out an energy efficiency measure.

Figure 15 *Factors influencing the energy efficiency behaviour of all homeowners in the 5 surveyed countries (Adjei, Hamilton & Roys, 2011)*



6.2. Energy efficiency improvements already carried out

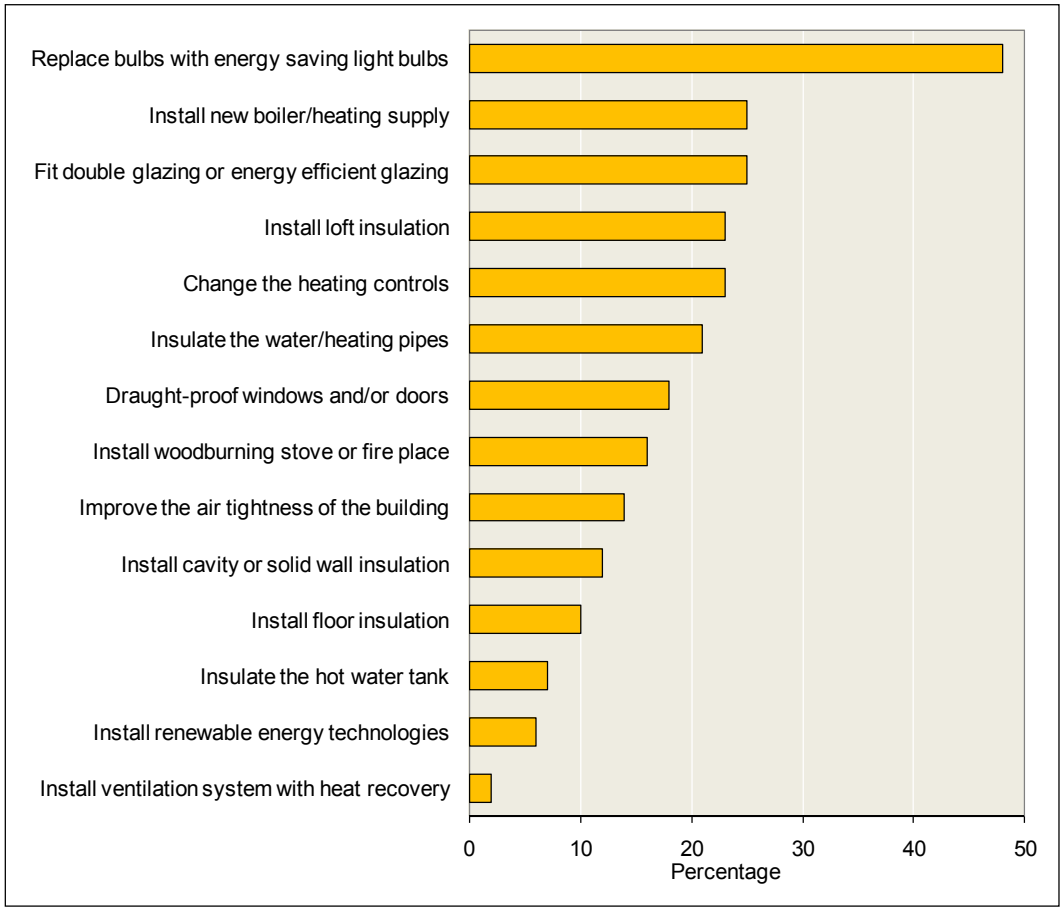
Recommendations

- Homeowners do not make a very strict distinction between renovations in general and energy efficiency renovations in particular. Therefore, the EPC should aim to support people in taking energy efficiency into account whenever planning renovations.
- Many factors motivate investments in energy efficiency. People's interest in the information the EPC provides may be increased if it communicates co-benefits, e.g. improved thermal or acoustic comfort, of energy efficiency renovations in addition to energy and cost savings.

Findings

In the survey, people were asked whether they had implemented energy efficiency measures. Figure 16 shows the most popular energy related measures: energy saving lighting bulbs were most often installed. Popular building related measures were boilers and double glazing.

Figure 16 *The popularity of different energy efficient improvements among all surveyed households (Denmark N=743, Germany N=1165, the Netherlands N=565, England N=625, Finland N=109; Source: Adjei, Hamilton & Roys, 2011)*



Informants in the five countries where the EPC had been implemented more recently were also asked about energy-related renovations. The use of energy efficient light bulbs was not considered during these interviews. The most popular measure in all 5 countries, apart from Portugal, was the replacement of frames and windows. In Wallonia, roof insulation comes next. In Bulgaria, half of the 24 informants conducted a full renovation of their dwelling. In Latvia, the second energy-related renovation that was most often carried out by the informants was wall insulation. In the sample from Portugal, boiler replacement and heating system replacement were more often seen than frames and windows replacement. However, given the small sample size in each country, all these renovations may have taken place by chance.

6.3. EPCs do play a role in energy efficiency improvements

Recommendations:

- **Provide information about potential costs of energy efficiency renovations and related savings on the EPC or online.** Homeowners are interested in learning about how much it may cost to implement recommendations provided by the EPC and how high related savings might be. Since such information requires some explanation and elaboration, it may be useful to provide short advice on the EPC and elaborate explanation online (possibly incl. links to professionals homeowners can consult – see next recommendation).
- **Provide information whom to consult for further support and information.** Financial issues are not the only – and for some people not even the main – motivating factor to implement energy efficiency improvements. Therefore, it is important to address other barriers to the implementation of EPC recommendations. One of these is the need for further information and support. This can be tackled through helping homeowners find professionals that can support decision-making and provide helpful advice.
- **To increase EPC effectiveness, specific tailor-made recommendations should always be included.** Awareness of having an EPC, in particular one with recommendations, is positively correlated with the implementation of energy efficiency measures.
- **Local (mobile) support centres for homeowners can bring information and support to people who otherwise have trouble finding advice.** In particular in rural areas, homeowners report difficulties finding knowledgeable professionals. Local (mobile) support centres can deliver practical advice to where it is needed most.

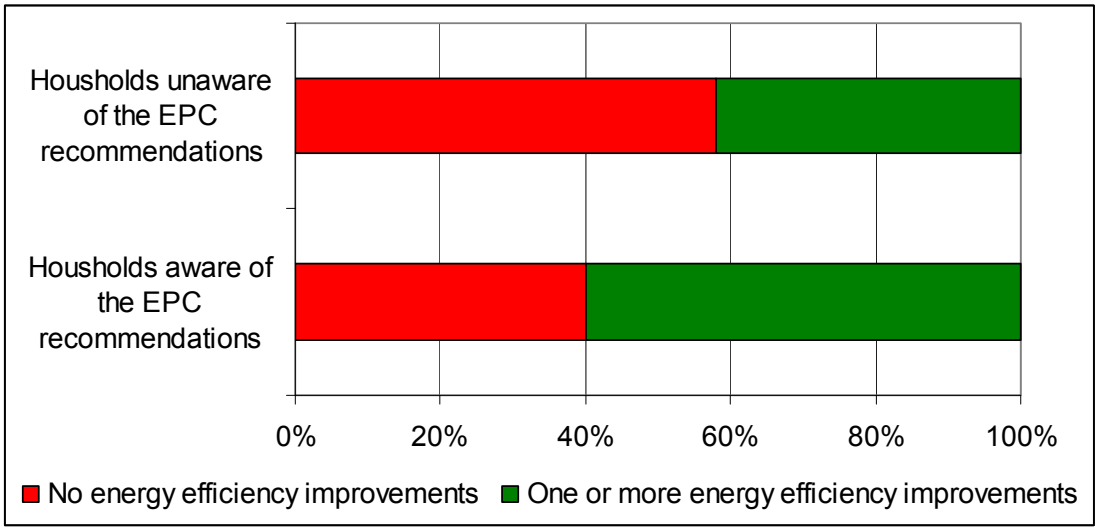
Findings

Interviews in five Member States where very few homeowners had energy labels, but where several had energy assessments of their dwellings, indicated that the information and advice provided helped raise awareness for some energy efficiency renovation options, even if most of these informants were reluctant to admit a possible influence of these recommendations on the renovations that they effectively carried out.

The survey among homeowners in five Member States with a longer history of EPBD implementation and labelling schemes showed that homeowners who reported having an Energy Performance Certificate with recommendations were more likely to have implemented energy efficiency renovations than homeowners without EPC, or with EPC but without recommendations.

Figure 17 shows notable differences between the percentage of homeowners carrying out energy efficiency improvements depending on whether they had knowledge/awareness of a full EPC (including recommendations), or an EPC without knowledge/awareness of the recommendations report.

Figure 17 *Relation between awareness of EPC recommendations and energy efficiency behaviour in the 5 surveyed countries (Denmark N=587, Germany N=438, the Netherlands N=457, England N=430, Finland N=25; Source: Adjei, Hamilton & Roys, 2011)*



The collected data did not show clear causality. Possibly the awareness of EPC recommendations is a trigger for taking technical measures, but maybe people who are interested in energy efficiency are simply more aware of EPC recommendations.

6.4. The importance of information and support

The survey and interviews showed that home improvement is, to a large extent, also a social process. It should not come as a surprise that people talk about renovation plans and problems encountered with others and try to help each other out.

In the survey, respondents were asked to indicate whether friends and family try to persuade them to think more about their energy consumption and vice versa – whether they try to convince friends and family to do so. On average less than 15% of the respondents agreed with the statement that friends and family try to get them to pay more attention to energy consumption, while almost 40% stated that they are trying to convince others to do so. Although social desirability may have influenced respondents' agreement with these statements, these figures indicate that energy use is a topic that is talked about, and it might as well indicate that the people who responded to the survey are among the more interested in energy issues.

During interviews, informants were asked about the support they had received and needed in the process of decision-making and implementing home improvement measures. It turned out that social and professional networks play a very important role in every aspect of home improvements and are intricately linked. Very often professionals are part of people's social networks. Sometimes, informants were professionals themselves. Despite the important links, social networks and professionals are discussed separately below.

6.5. Family and friends play a pivotal role

Recommendations
Policy can aim to stimulate the positive effect family and friends have on the implementation of energy efficiency. One possible approach may be to encourage people to talk about the EPC and to share experiences with implementation of energy efficiency measures with others, e.g. in online fora or in

open home events. The strengths of these social networks are their informality and bottom-up characteristic. Therefore it is difficult to incorporate these networks into formal policy measures. The only thing governments can do is facilitate the role of social networks:

- Find ways to facilitate contacts, for instance on websites, in order to help people find others who renovated their building and can give advice.
- Facilitate open house programmes to show real examples of energy efficiency.

Findings

Family and friends were found to play a central role in almost all aspects related to information-gathering, decision-making and implementation of home improvements. The interviews in Belgium, Bulgaria, Czech Republic, Latvia and Portugal showed that friends and family:

- are a trusted source of advice,
- may even trigger the decision to renovate,
- help find professionals,
- share experiences with similar renovation works,
- help do DIY works, such as roof insulation.

Friends and family provide these kinds of support often if they are professionals, but also if they are not professionals themselves. The lack of support by family and friends was also discussed as one of the main barriers to home improvements, again indicating the importance of support in private surroundings. There was also a case of a group of neighbours who collectively decided to renovate with the same contractor, i.e. supporting one another, who then even received a discount. A key issue in this respect is trust. Respondents appear to trust people they know directly or through others, whether lay-men or professionals.

When asked which sources respondents would consult for further information about energy efficiency, family and friends ranked third after a government-funded body and the internet.

Although social and family networks were experienced as helpful support by most informants, there was also some indication during the interviews that friends and family can pose a hindrance to home improvements. In some cases, friends or family members were opposed to certain measures for various reasons, such as having had negative experiences or knowing someone who had. This shows that it is important to provide independent and competent technical advice and to deliver good service and high quality works in the home improvement sector in order to stimulate positive word-of-mouth. This issue is discussed further in the following section.

6.6. A good professional seems hard to find

Recommendations

- **Include information on the EPC about where and how to find competent professionals.** Policy can aim to increase the access to knowledgeable experts, e.g. by providing information about available directories on the EPC.
- **Establish knowledge and training centres for professionals and make attendance obligatory (Danish example: Knowledge Centre for Energy Renovation of Buildings).** Policy can aim to increase skills and competences among professionals to ensure that energy-related issues are taken into account whenever people decide to renovate (parts of) their homes. This can be done by setting up knowledge and education centres, for example like the Danish Knowledge Centre for Energy Renovation of Buildings.

Findings

Interviews showed that informants' social networks often included professionals or that they redirected informants towards professionals. However, survey and interview respondents across all 10 countries also reported some difficulty in finding knowledgeable and competent professionals to carry out energy efficiency works. Some Belgian, Portuguese and Czech interviewees indicated to be more knowledgeable about energy efficiency issues than professionals they had encountered.

Especially in rural areas of Bulgaria, people reported difficulties with finding professionals. The quality of renovation works done by professionals was also criticised by some.

In the survey, several homeowners reported they would be discouraged from carrying out home improvements because of difficulties with finding reliable tradespeople and installers. Trust in information provided by local tradespeople is generally high.

Figure 18 *Impact on decision to do work: Difficulties finding reliable tradespeople (Denmark N=701, Germany N=1081, the Netherlands N=546, England N=606, Finland N=103; Source: Adjei, Hamilton & Roys, 2011)*

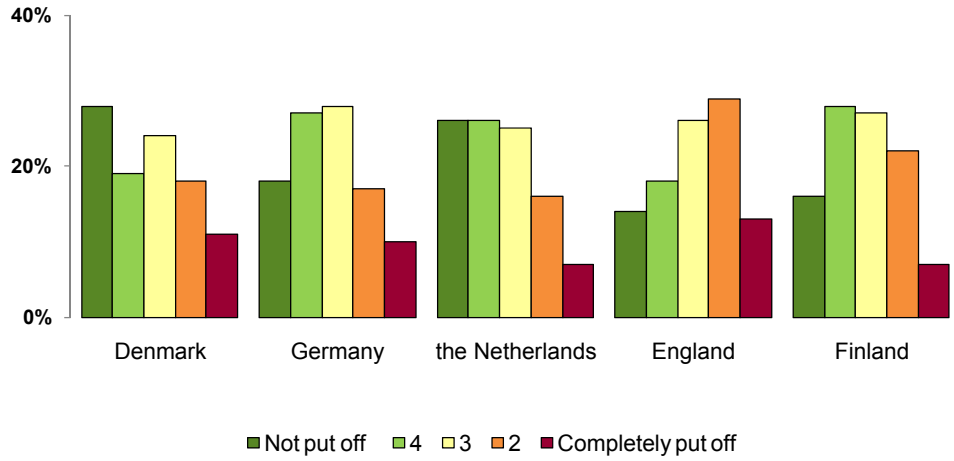


Figure 19 *The level of access to installers of energy efficiency home improvements(Denmark N=572, Germany N=1012, the Netherlands N=501, England N=517, Finland N=94; Source: Adjei, Hamilton & Roys, 2011)*

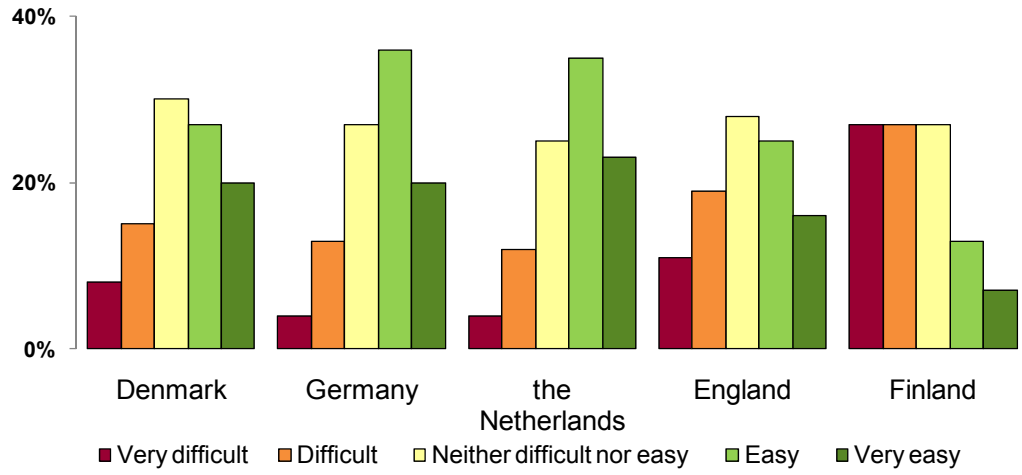
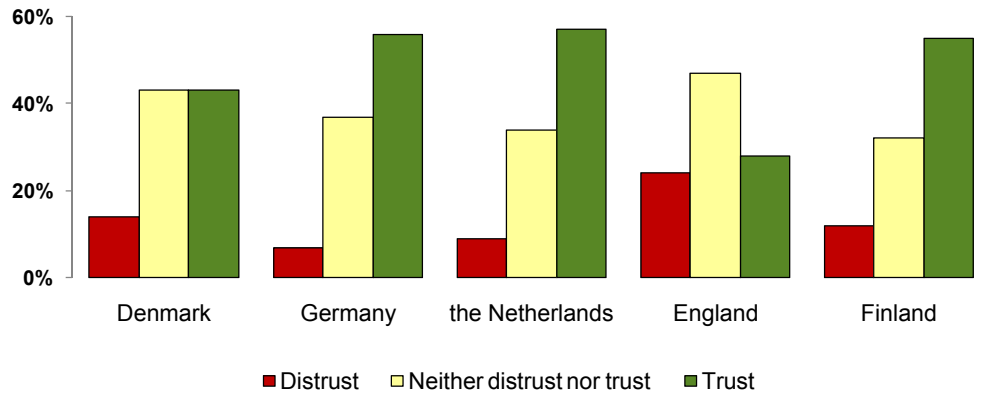
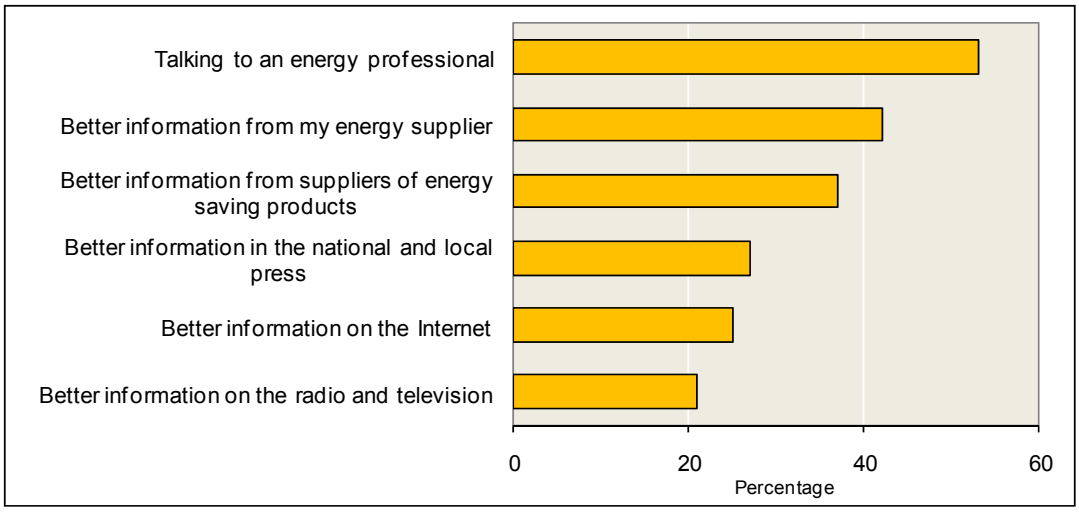


Figure 20 *The Level of trust in local tradespeople as a source of information (Denmark N=715, Germany N=1090, the Netherlands N=533, England N=596, Finland N=105; Source: Adjei, Hamilton & Roys, 2011)*



Local tradespeople are also a valued source of further information on energy efficiency improvements. The majority of survey respondents indicated that "talking to an energy professional" would help them decide on actions necessary to improve the energy efficiency of their home:

Figure 21 *Source of further information that would help decision-making on energy efficiency improvements (Denmark N=743, Germany N=1165, the Netherlands N=565, England N=625, Finland N=109; Source: Adjei, Hamilton & Roys, 2011)*



6.7. The need for trustworthy information

Recommendation

- The EPC can be useful as a sign-post for further information, e.g. a public information centre close by or a trustworthy website with more detailed information.

Findings

Information, advice and support are crucial for the implementation of energy efficiency measures in people's homes. Knowledge about and choice between different renovation options and related costs are important drivers for renovations. Trust in the source of information is also a crucial factor in

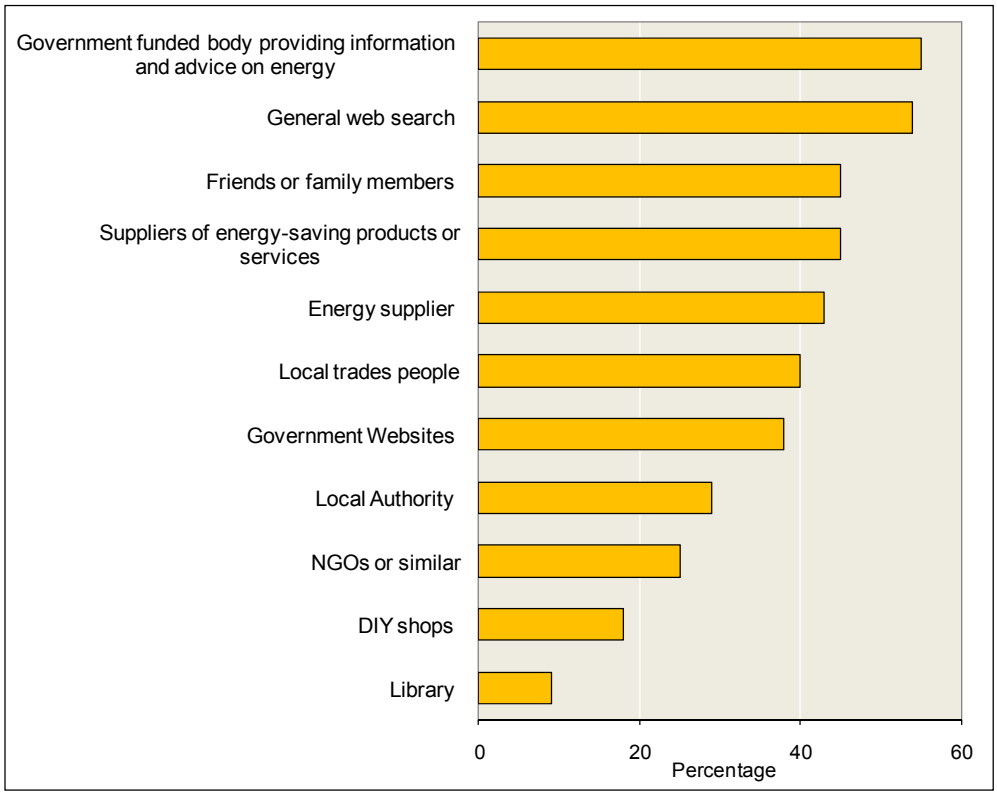
decision-making. At the same time, receiving contradictory information can cause insecurity about whom to trust and what to do. Apart from family, friends and professionals, there is a range of different sources of advice that people consult – or ignore, depending on their level of trust.

The survey and interviews showed that people frequently consulted the internet but did not necessarily trust the information it offered. Generally, there appeared to be a lot of uncertainty regarding whom to trust. The survey found that just over 60% of homeowners considered access to energy efficiency information easy or very easy; less than 10% experienced difficulty. Homeowners have a high level of trust in information provided by family & friends and national or local authorities. Other trusted sources of advice were energy professionals, suppliers of energy related products and services and energy suppliers. People had little trust in information provided by advertisements and in Do-It-Yourself shops (Figure 7).

The sources that people would like to consult for further information on energy efficiency vary slightly from those they most trust. This indicates that reliability is just as important as trust and that people may consider professional energy advisers more knowledgeable than their family and friends when it comes to energy efficiency advice.

Figure 22 shows what sources people would use for further information on energy efficiency improvements.

Figure 22 *Sources of further information on energy efficiency improvements (Denmark N=743, Germany N=1165, the Netherlands N=565, England N=625, Finland N=109; Source: Adjei, Hamilton & Roys, 2011)*



6.8. Getting financial support takes time and patience

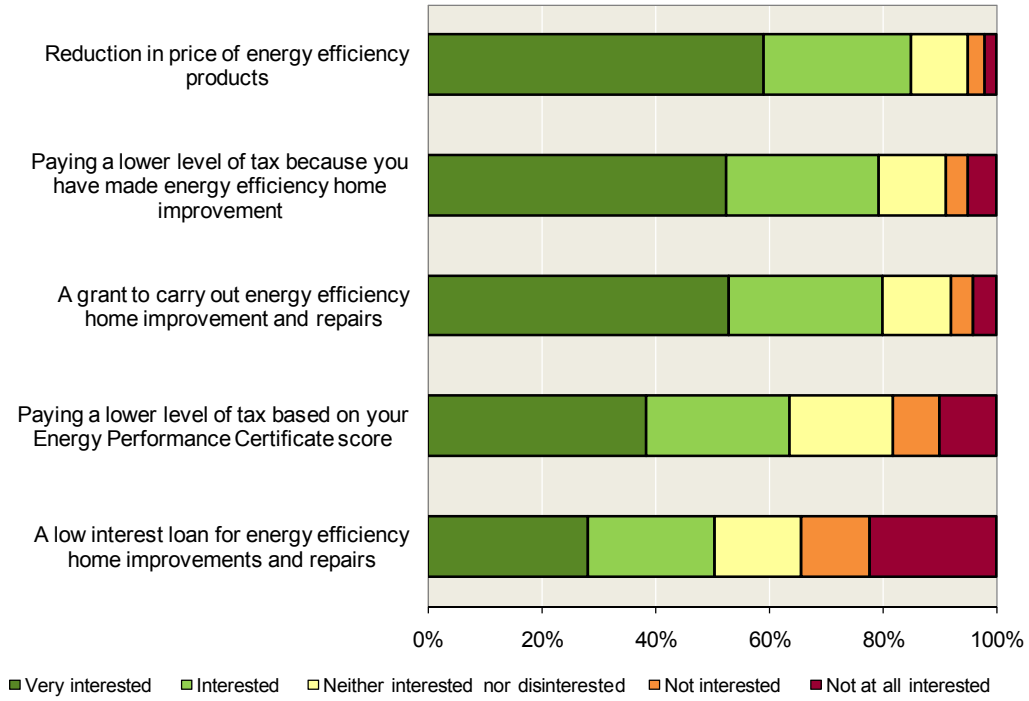
Recommendation

- To stimulate energy efficiency renovations, support and incentive schemes need to be available and easily accessible to all. Ideally, the EPC should point to further sources of information about available support schemes. If this information is linked to household specifications on the EPC this could help to make support schemes more accessible.

Findings

Among the countries participating in the online survey, the awareness of available incentive programmes was rather high and most respondents had profited from one or more available incentive schemes. Policy instruments such as low-interest loans, subsidies or tax rebates were considered to be relevant incentives. More than half of all homeowners were very interested in a grant, tax rebates, or price reduction of energy efficiency products. A fifth was not at all interested in a low interest loan for energy efficiency home improvements and repairs and 10% were not at all interested in paying lower taxes based on their Energy Performance Certificate score. A quarter was not at all interested in a low interest loan for energy efficiency home improvements and repairs. However, preferences for certain instruments varied across countries. Over 60% rated the amount of grant money and access to the right type of grant important in most countries. Denmark marked the lower end of interest in grant money with only a bit over 40%, while Germany was the highest with a bit over 75%.

Figure 23 *Level of interest in monetary and fiscal incentives (Denmark N=697, Germany N=1084, the Netherlands N=543, England N=597, Finland N=105; Source: Adjei, Hamilton & Roys, 2011)*



In the in-depth interviews, criticism about the time and effort necessary to apply for available incentives and wait for processing of the application was reported in most countries. Moreover, despite the fact that most informants seemed to be well-informed, the lack of information about available support schemes and required application procedures was frequently criticised. Information gathering, application procedures and administrative competences (incl. on the Internet) were considered "too complex and too time-consuming". For most informants, incentives were helpful but not determinant, meaning that they would carry out the works independently of available incentives. Some people considered incentives as "too restrictive", e.g. in not supporting DIY works.

7. Expert views on IDEAL EPBD findings and recommendations

During the course of the IDEAL EPBD project several meetings with experts were held to present project questions, findings and recommendations and to receive relevant input and information. Two meetings per country were organised on national level. In addition there was a one-day workshop at the end of the project with international experts in Brussels.

7.1. National workshops

On national level, project partners received important updates on the policy developments in their own countries and advice how to tailor recommendations even better to the national situation. Project findings and recommendations were appreciated by experts and considered to be helpful for current discussions. Not all experts appreciated the finding of the IDEAL EPBD project that the EPC hardly influences homeowners' decision-making.

Furthermore, several experts added or advised slight changes to some recommendations developed by the project team. For example:

- Make the energy label calculation method more transparent and easier to use to also make label issuing less costly.
- 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.
- Develop accreditation schemes also for those who are to carry out the much needed energy efficiency renovation works to make sure they are of high quality, (cost) efficiency and (energy) effectiveness.
- 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.
- The inclusion of web-links in the EPC to direct homeowners to further information on the Internet is risky considering the long life-time of buildings and the usually much shorter life-time of websites. In addition, there need to be sufficient off-line information and support for it to be accessible to all.
- Factual knowledge on the actual effects and effectiveness of incentive schemes is often lacking. Policymakers need better support for decision-making through evaluation of available incentives.
- Incentive and financial support schemes for homeowners need to take social equity in account and ensure that also lower income households can benefit from them.
- Portugal is planning to develop a system that allows homeowners a less costly re-evaluation of their property once renovations have been carried out. This approach changes the EPC into a more pro-active tool that shows homeowners what they have achieved and what is still possible.
- 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.
- 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.

These comments and suggestions have been taken into account in the development of the key recommendations of the IDEAL EPBD project.

7.2. International workshop

During a workshop with international experts on 14 September 2011 in Brussels, findings and recommendations were presented and discussed in the light of EU-level policy making. Three issues received most attention: making the label publicly available, increasing availability of and homeowners' trust in the EPC, making additional information available.

Making the energy rating of buildings publicly available
Following the Danish example of a database where everyone can view the energy rating of every building that has already received an EPC, the IDEAL EPBD project proposed to make energy labels publicly available. This recommendation triggered a discussion of privacy issues and experts' advice to "be careful" with this recommendation. There are different traditions and acceptance issues about privacy laws in each country and in some countries strong opposition to such policies may arise.

Experts' recommendation was to follow developments in Denmark and to research the effect of publicly available energy labels. In any case, 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. In addition, homeowners should be given control whether or not to be contacted by professionals regarding energy efficiency issues.

Increasing availability and trust
One of the main problems of the current EPB implementation system appears to be that the seller of a dwelling rather than its buyer and future occupant receives the label. This may be one reason why many homeowners are not aware of having received an EPC at property purchase. This issue is partially addressed in the EPBD recast which requires the label to be included in real estate advertisement.

In addition, most countries have fines for non-compliance and strict penalties, but they seem to be hardly used. Experts agreed that there needs to be stricter enforcement of compliance. Experts disagreed whether it makes more sense to fine non-compliance or to encourage compliance.

Experts also addressed the question whether an increased availability and visibility of EPCs increases homeowners' trust in EPCs and the attention paid to it. The IDEAL EPBD project clearly shows that other property characteristics are much more important to people and that this may be one reason why little attention is paid to the EPC during purchase. This triggered a discussion on how the EPC could have an impact on the market price of a property, forcing homeowners to pay more attention to energy efficiency.

Making additional information available
The IDEAL EPBD project found that homeowners are interested in estimated cost, savings and pay-back times of recommended energy efficiency measures. Experts wondered if the long pay-back times of some measures may discourage investments rather than motivate. At the same time it was acknowledged that the IDEAL EPBD project clearly shows the relevance and usefulness of making financial implications of savings more explicit and accessible on the EPC label. One suggestion therefore was develop incentive schemes that deliver immediate rewards if important measures with long pay-back times are carried out.

Another point of discussion was the idea to provide additional information about possible saving measures, associated cost and pay-back time available online. Such website has recently been launched in the Netherlands. The UK has such information available online for some time already, but less than 1% of homeowners who receive an EPC actually visit this website. The challenge seems to be how to make such websites more useful and attractive.

8. Linking IDEAL EPBD and previous studies

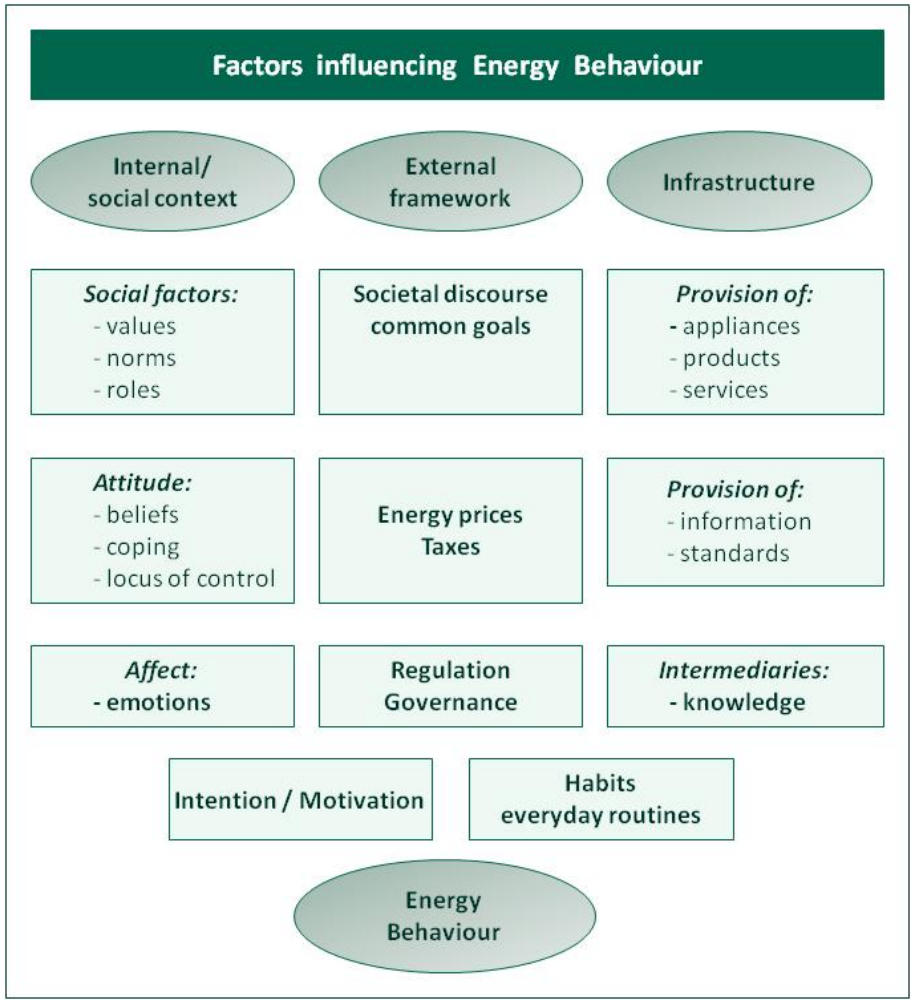
The IDEAL EPBD project conducted a literature review and developed a conceptual framework of the factors influencing energy behaviour. On the one hand, this framework was broader in its focus than the survey and interviews with homeowners as, in addition to energy efficiency investment behaviour,

it also focused on routine energy consumption behaviours, such as taking a shower. On the other hand, with respect to factors influencing investment behaviour, the framework had a more narrow focus than the survey and interviews as it only considered home improvements and not home purchase.

The literature review resulted in a conceptual framework including four groups of factors that influence energy behaviour, daily consumption behaviour and one-time investment behaviour (Figure 24):

- Factors that relate to the individual, such as personal norms, values and beliefs, the socio-economic background, and its immediate environment (e.g. family and friends),
- Factors that relate to the wider context, such as political, economic and cultural framework conditions (e.g. available incentive schemes),
- Available infrastructure, including energy efficient appliances or building standards ("hardware") and competent professionals ("software"),
- Individual motivation (intention) and everyday routines.

Figure 24 *Factors influencing energy behaviour (Source: Brohmann, Cames, Gores 2009)*



The literature review found that the interrelationship between the different factors and their influence on people's energy behaviour varies according to a person's specific situation, the type of energy behaviour considered and the type of policy instruments in place (or planned).

The EPBD employs energy labels as main policy instrument to realise the cost-effective saving potential in the residential building sector. To assume energy labels alone can stimulate energy efficiency investments implies the following assumptions:

- Homeowners act rational, only taking into account possible cost and savings.
- There are no other barriers to energy efficiency investments than lack of information.

Regarding the question of the effectiveness of energy labels to succeed in this, the findings of the IDEAL EPBD project correspond with research findings reviewed in an early stage of the project. The survey among over 3000 homeowners found that homeowners who were aware of having received an EPC including recommendations were more likely to have carried out energy saving measures. A study published in 2001 found the same: people who owned a labelled or certified house carried out energy-related home improvements to a larger extent (Cowi 2001).

However, the question whether the correlation of having a building certificate and investing in energy efficiency is also a causal relation is still not completely answered. There are indications that EPCs may influence homeowners' decision-making with respect to energy saving investments (Shorrock 2005) and there are indications, based on the Danish Labelling Scheme, that no savings are triggered by the label but by other factors (Kjaerbye 2008). These other factors include:[7]

- economic incentives (EEPH 2008, Uitdenbogerd 2007),
- people's social context, e.g. family and friends (Bruppacher 2001),
- social norms and values (Jensen 2004),
- trustworthy information (Bartiaux 2003),
- tailored advice (Uitdenbogerd 2007),
- timing (Alatorvinen 2009).

The multitude of factors that play a role calls for supportive measures and packages of policy instruments that, in addition to or instead of a document like the EPC that informs homeowners about possible energy saving measures, help to realise the energy saving potential in the residential building sector. The call for additional help and support is backed by relevant scientific theories from three lines of research: behavioural economics, psychology and sociology.[8]

Behavioural economics

Many earlier models for micro economic decision-making were based on the assumption of a rational actor which seeks to maximise utility within given budget constraints. Empirical results from social psychology as well as behavioural economics question both the assumption of the perfectly rational actor as well as the assumption of self-interest as single guiding motivation. New approaches of behavioural economics meanwhile incorporate empirical results of psychology.

In this new line of research the model of bounded rationality assumes – and is backed by empirical data – that individuals have difficulty processing all of the information that is available to them. The main assumption is that decision processes are shortened by rules of behaviour (heuristics) or

[7] For an elaboration, see De Best-Waldhober, M., Tigchelaar, C., Uyterlinde, M., Brohmann, B. & Cames, M. (2009) Identifying influential factors for consumers' behaviour related to residential energy performance. Available at: http://ideal-epbd.eu/index.php?option=com_content&view=article&id=12&Itemid=14&lang=nl

[8] Taken from Brohmann, B., Cames, M. & Gores, S. (2009). *Conceptual Framework on Consumer Behaviour – with a focus on energy savings in buildings.* Deliverable 2.1 of the IDEAL EPBD project. Supported by Intelligent Energy Europe, available at: http://ideal-epbd.eu/index.php?option=com_content&view=article&id=12&Itemid=14&lang=en

routines as a result of limited capacities for processing information (Belz and Billharz 2005; Kahneman and Tversky 2002). In this theoretical view the time and resource consuming effort of gaining information can be interpreted as costs.

Psychology

Psychological research on consumer behaviour in the field of energy conservation and efficiency has a wide focus. The commonality would be that most of this research has an empirical base. This has led to a large quantity of models and effects that describe psychological processes. Coming from this base, several studies aim to increase the predictive power of models describing processes that are key to consumer behaviour.

Three main streams of research can be discerned by distinguishing between a focus on quality of information and of information processing, on the link between attitude and behaviour, and on motivation (i.e. preferences based on values) for behaviour.

Information is a key variable in the explanation of energy efficiency behaviours. Although many other variables are influential as well, if individuals have no knowledge of energy efficiency whatsoever they are unlikely to have any attitudes or motivation that can be converted to behaviour. There is a large empirical base for effects regarding information source, quality and processing in general (see for instance Petty & Cacioppo, 1986). Torgler and Garcia-Valinas (2007) find that – with regard to the prevention of environmental damage – the general political interest and orientation as well as social capital and a higher financial satisfaction have a strong impact on individual preferences.

Specifically applied to residential energy efficiency, factors such as knowledge about choices and costs, comparative feedback, tailored advice (Uitdenbogerd, 2007) or trust in the (motivation of the) source of the information (Gram-Hanssen et al. 2007) have been studied.

Attitude-behaviour models have been dominant for a long time in social psychology research, e.g. on energy conservation. They look at the relation and the effects caused by given knowledge in combination with social pressure such as norms and behavioural intentions. A variety of such models exists and has evolved over the years. A much studied model is the theory of planned behaviour from Fishbein and Ajzen (1975), that hypothesizes that attitudes are formed from an individual's beliefs about a behaviour as well as an evaluation of its outcomes. Together with normative beliefs about what valued peers might think of the behaviour, these attitudes lead to an intention to act, which in turn predicts behaviour. A meta-analysis showed that the predictive power becomes greater when these constructs correspond more specifically with the behaviour in question (Kraus 1995). However, many other behavioural models exist, some further exploring constructs or processes within attitude-behaviour models.

A third line of research comes closer to economic models of consumer behaviour, but usually has different assumptions. How incentives affect behaviour is often hypothesized as being influenced by peoples' motivation or value preference (Kelley, Thibaut 1978; Schwartz 1992). People who value maximizing joint outcome seem to have stronger pro-environmental beliefs and are more willing to engage in diverse types of environmentally significant behaviour than people who value maximizing own outcome (Cameron, Brown, Chapman, 1998; Joireman et al, 2001). How incentives affect behaviour is often studied by looking at the interaction with several other factors such as attitudes or the cognitive burden of information gathering and processing, which shows how much seemingly different lines of research are interwoven. If anything, this kind of research shows the necessity of interdisciplinary research to gain new scientific insight.

Sociology

Regarding consumption issues, sociology offers two main streams of research. One is the analysis of everyday life (Shove 2003) which is closely linked to the use of products and technical appliances or infrastructures (van Vliet 2002). Technical sociologists discuss the concept of lifestyle regarding consumption practices with the implications of context and build on the structuration theory of Giddens (1991). Already in early research on energy issues (Lutzenhiser 1993), the focus was on demographic and lifestyle aspects. The large variation in energy use is seen as one side-effect of

these – and other – factors such as household size, cultural conventions or systems of provision. Therefore, the individual behaviours and the underlying reasons and motives are under study in the context of social practices (van Vliet 2002). Lifestyles and identity management with regard to energy consumption have been an issue of research since the late 1980er years (Bartiaux 2003). The meaning of personal identity and aspects of motivation to behave in a pro-environmental manner in the need area of housing were – inter alia - evaluated by Gram-Hanssen (2002).

Wilhite et al. 2000 point to the drivers of increasing energy use: how new 'needs' are constructed and how expectations of comfort and convenience evolve. These expectations are not created by energy users alone: they are also co-constructed by producers of energy-using equipment and systems of provision (Shove 2003; Spaargaren 2003; van Vliet 2002).

Combining insights from economics, psychology and sociology

Resuming the different contributions of research, we find a diverse set of solutions and recommendations how to address the consumers and their behavioural environment. The following table outlines core characteristic positions of the disciplines and an interdisciplinary research approach on five key aspects of consumer behaviour.

Table 1 *Core aspects of energy related behaviour (Source: Own compilation based on Heiskanen & Schönherr 2009)*

	Economics	**Psychology & marketing**	**Sociology**	**Interdisciplinary research**
Focussed aspects of consumer behaviour	• Purchasing of products • Household economics also includes the use of the product in 'household production'	• Most research focuses on purchasing behaviour • Some studies also address use and disposal behaviour	• Previously focussed on purchase and ownership of products • Recently more attention to use in household context	• Purchasing, use and disposal - no distinction between market and non-market activities
Assumptions on energy behaviour	• 'Rational' behaviour, utility maximisation	• Multiple motivations (self-interested /altruistic) • Bounded and multiple rationalities	• Habit or norm driven behaviour; 'logic of appropriateness'	• Diverse
What individual factors influence consumer behaviour?	• Budget • Preferences	• Factors underlying preferences: personality	• Family • Demographics • Lifestyles • Norms and roles	• Marketing • consumption as symbolic communication • Lock-in to existing systems of provision
Framework conditions influencing consumer behaviour	• Prices of products • Macro-economic conditions influencing consumer income and propensity to spend vs. save	• Framework conditions are addressed from the individual perspective: e.g. opportunities, that intervene between attitudes and behaviour	• Conventions • Social interaction • Socio-technical systems (e.g., urban structure)	• Low prices of natural resources and energy • Technological development

	Economics	Psychology & marketing	Sociology	Interdisciplinary research
How to change behaviour?	• Information and advice • Market transformation • Internalising externalities • Providing public good or regulating the use of public goods	• Information and persuasion • Empowerment	• Targeting the social system surrounding the individual • Changing institutions and infrastructures	• Via products, e.g. standards and voluntary agreements • Via markets, e.g., increased transparency • Via consumption by providing 'software' (information) and 'hardware' (infrastructures)

The table above, which is based on three strands of research on consumer behaviour, clearly indicates that 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 call for bundles of instrument bundles, each helping to address current barriers. The IEA (2008) collected the following barriers in an earlier study:

- lack of knowledge (by owners, installers, advisers, consumers),
- lack of financing mechanisms (economic barriers),
- lack of capacity by installers,
- tradition, less flexibility and
- large number of actors involved (decision makers, ownership).

Research in Norway identified three additional clusters of issues that pose a barrier to significant progress in energy efficiency (Throne-Holst, Strandbakken, Sto 2006):

- cultural aspects – visions of a good life are connected to big and well-equipped homes;
- economic aspects – consumers expect a short payback time (3-5 years);
- informative aspects – information not only on what and how, but on when.

Another important barrier is the principal agent-problem where the owner who should make the investment does not necessarily benefit from it in the operation phase (Gelissen 2008).

Findings of the IDEAL EPBD project and previous studies agree that energy labels help to raise awareness for energy efficiency (Sunikka 2005) and that this effect can be enhanced through increased visibility. Furthermore, previous studies and the current research agree that public acceptance of and trust in a labelling scheme can be increased through coherent quality assurance and continuous evaluation and 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, Lorenzen 2003).

9. Concluding discussion

Findings of the IDEAL EPBD project show that the effectiveness of Energy Performance Certificates can be improved through better availability, presentation and content. With respect to content, it became clear that the inclusion of concrete recommendations increases perceived usefulness as well as awareness and possibly use of the EPC. In terms of presenting the energy efficiency of a dwelling to homeowners, it has been noted that label categories are better understood than contingent scales. As for availability, timing proves to be crucial. An EPC needs to be provided to (future) homeowners at the right time to inform important decisions regarding home purchase and home renovation. In addition, it is important that EPCs are tailored to individual dwellings and also available to apartment owners. This is of particular importance in CEE countries.

These findings call for further research to tailor the EPC as much as possible to homeowners' needs in terms of availability, content and presentation of the information. Work on improving the label can be inspired and guided by best practice experiences in other countries, but should also take socio-economic and cultural differences of countries into account. On a European level, the development of country-specific EPCs can be supported by facilitating the exchange of knowledge and experiences, comparison of effectiveness and the creation of general guidelines.

In addition to findings on the EPC specifically, the IDEAL EPBD project delivers relevant findings on other factors that play a role in people's decision-making when it comes to buying or renovating their home. One of the most important findings is that the EPC hardly plays a role in comparison to other factors, such as outdoor space, price and location when deciding on home purchase; age and condition of the dwelling and support by professionals, family and friends also play a role when planning and implementing home renovations.

Figure 25 *Factors influencing the why and how of energy-related renovations (based on >100 interviews in Belgium, Bulgaria, Czech Republic, Latvia and Portugal; Source: Bartiaux 2011)*

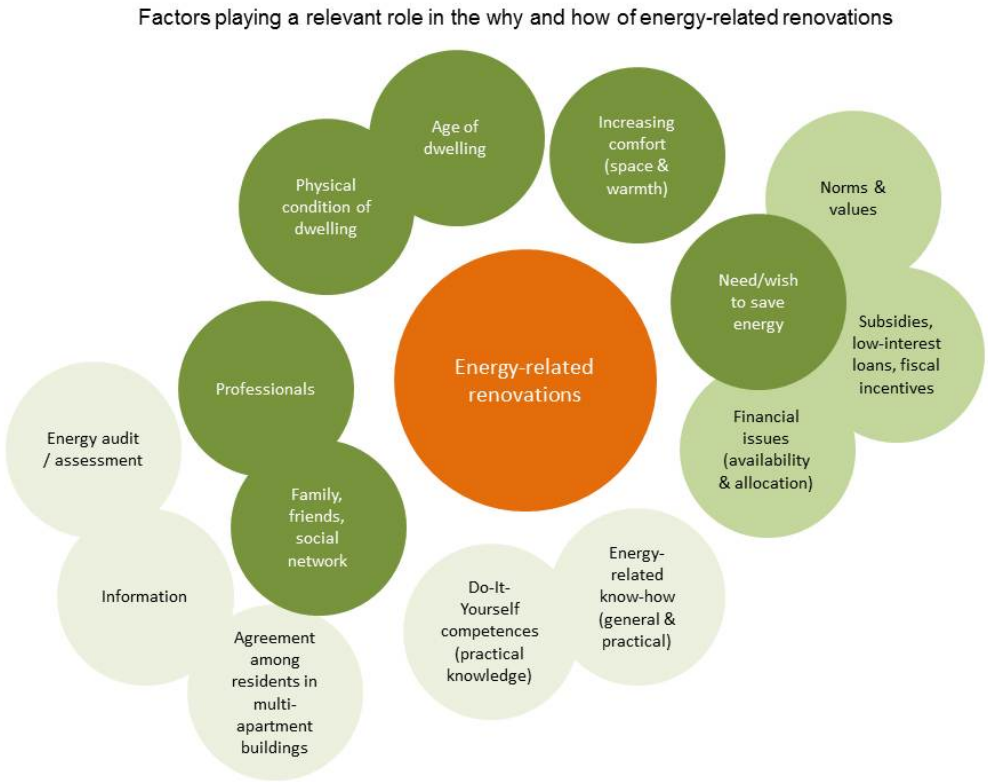


Figure 25 illustrates the different factors influencing decision-making on energy-related renovations as they were identified in over 100 in-depth interviews in Belgium, Bulgaria, Czech Republic, Latvia and Portugal. The colour intensity of a bubble indicates how frequently the issue was mentioned and how important informants described it to be. The distance between bubbles gives an indication how much the different issues were described to be related and how much they were impacting one another.

The analysis of survey responses by over 3000 homeowners in Denmark, Finland, Germany, the Netherlands and England also showed the many factors that play a role in people's decision-making regarding energy efficiency renovations. The main factors are the condition of the property, the age of the property, and existing energy problems. Homeowners with an EPC with recommendations were twice as likely to have carried out one or more energy efficiency measures than homeowners without or unaware of having an EPC. However, other factors, such as age and condition of a dwelling had a more striking influence on homeowners' decision making.

It may not be surprising to find that people are hardly concerned with the EPC or energy efficiency itself, but care a lot about the condition of their home, indoor comfort levels and in many cases also about (expected) utility costs when buying or renovating their home. It may also not be surprising to find that many people do not make a strict distinction between energy efficiency and other renovations and view all renovations as investments in making their home their own, more comfortable and more valuable.

Instead, this research gives important insight into which factors are most influential in people's decision-making regarding home purchasing and home renovations. It shows the 'environment' of decision-influencing factors the EPC enters upon issuing. It is this 'environment' that the EPC should aim to influence to more effectively support energy-efficiency improvements.

The IDEAL EPBD project delivered one crucial finding with respect to EPC effectiveness: homeowners who already implemented one or more energy efficiency measures are more likely or more aware of having an EPC with recommendations. Despite all room for interpretation of such a finding, one thing is certain: people who are interested in energy efficiency know their EPC better.

In order to turn the EPC into a document that interests more or all people in energy efficiency, it needs to link well with people's questions and concerns, i.e. with the crucial decision-influencing factors. What condition is the dwelling in? How much might a renovation cost? Who can help me?

One concrete starting point is to turn the EPC into a document that informs homeowners better about the current condition of their home, how this relates to energy consumption (including easy-to-understand consumption and cost figures) and the cost and benefits of possible improvement measures. Cost and benefits mentioned could go beyond purely monetary issues and also focus on comfort and aesthetics. Renovation advice could go beyond energy efficiency measures, but point out how important and beneficial it is to consider energy efficiency issues in any renovation plans. In addition, the EPC could function as guide to further information, professional advice and qualified construction workers.

Another concrete starting point is to turn the EPC into a certificate that stays with a home and (objectively) documents changes over the lifetime of a dwelling. It could be updated upon renovations and then include new recommendations for further improvements. Instead of a 'momentary certificate' it thereby becomes a 'lifetime pass' that supports homeowners in their step-by-step process of home improvement. For homeowners who may not know how long they will stay in a certain place or may already know that they will not stay very long, it would be helpful if the 'low hanging fruits' of energy efficiency that are cheap or have short pay-back periods are clearly communicated.

Further research focusing on the question what the EPC ideally should communicate to interest people in energy efficiency and to help them pay attention to it can deliver farther reaching insights. Such research should depart from the finding of this study that the EPC is hardly effective in its current form, but could become more effective if it helps homeowners answer the questions they have when wanting to buy or renovate a building – or if it points to signposts where answers can be found.

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Appendix A Country specific findings and recommendations

In this presents general findings and recommendations based on the IDEAL-EPBD project. The project consortium also developed reports for each of the ten countries participating in the project, presenting country-specific findings and recommendations tailored to the specific situation and ongoing political debates.

The ten national reports can be found on the project website www.ideal-epbd.eu. The table below shows the key recommendation for each country. By clicking the country name you will be redirected towards the national findings and recommendations on the website. For more information contact the authors of the national papers.

Country	Key recommendation
Belgium (Wallonia)	Expand the target group for already existing loans from the family fund.
Bulgaria	Support the organisation of homeowners associations in multi-family buildings.
Czech Republic	Create a database with all EPCs.
Denmark	Create direct dialogue between energy auditor and homeowner.
Finland	Establish quality assurance procedure for whole energy efficiency improvement process.
Germany	Shift to A-G scale to improve level of understanding.
Latvia	Shift to A-G scale to improve level of understanding and increase the role of EPC in the framework of building energy efficiency.
The Netherlands	Improve the public's trust levels in EPCs.
Portugal	Inform the public better through more communication about the EPC.
The United Kingdom	Improve the level of advice available to householder with an EPC by wider advertisement of the EPC advisor.