



EU Policy Recommendations

Recommendations for EU policy on retrofitting multi-occupancy, mixed tenure buildings.

SHORT REPORT (Deliverable 7.2)

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Lead organisation: Centre for Sustainable Energy (UK)

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1 Summary

Low Energy Apartment Futures (LEAF) is a European-wide project to improve the energy efficiency of apartment blocks. It aims to identify and overcome key barriers to retrofitting these properties. The project is funded by the EU's Intelligent Energy Europe (IEE) programme and partner organisations in six countries.

Background

Energy use in homes makes up a quarter of energy-related greenhouse gas emissions in Europe and the EU has committed to a 20% reduction in these by 2020 from 1990 levels. An estimated 43% of the European population live in apartment blocks, but this is a sector that is greatly overlooked in policy and in practice. Retrofitting apartment blocks is more complex than other domestic buildings and there are additional challenges to overcome, but there are also great opportunities for achieving significant energy savings and reductions in greenhouse gas emissions.

The three year LEAF project included the development of toolkits for retrofitting apartment blocks and pilot retrofit projects on 24 case study buildings. Feedback has been collected from a wide range of stakeholders involved in multi-occupancy retrofit projects, and extensive policy research and analysis has been carried out. As such LEAF partners are in a unique position to make policy recommendations, based on recent experience of carrying out retrofit projects in six European countries to improve retrofit of multi-occupancy buildings across Europe.

Key findings and recommendations

A key issue to improving apartment blocks identified through the LEAF project was the financial barrier (including funding schemes, financial incentives and difficulties in agreeing personal contributions for improvements which affect multiple householders within a building). However this is far from being the only challenge. For retrofit to be successful, additional effort must also go into addressing the difficulties associated with buildings under multiple ownership. These include information provision, engagement of building occupants and other stakeholders, and working with installers on technically complex retrofit projects. There are also specific legal and regulatory barriers to overcome, such as decision making with multiple stakeholders, limitations of EPCs, requirements for minimum standards and planning regulations.

Recommendations were developed in response to these key issues and include calls for:

- improvements to EPC methodology and accreditation schemes
- changes to the format and content of EPC reports
- improvements to public funding schemes
- expansion of financial support initiatives
- introduction of more stringent minimum standards
- improved information provision on low carbon retrofit
- upskilling of the workforce
- implementation of maintenance plans and improved management structures in multi-occupancy buildings

2 Introduction

2.1 Aims and objectives

This report provides recommendations for EU policy on retrofitting multi-occupancy, mixed tenure buildings.

The policy recommendations are designed to address a range of issues broadly affecting the uptake of energy efficiency measures (as recommended in an EPC) in multi-occupancy buildings. Where applicable, recommendations address relevant regulations and initiatives which impact both on the overall retrofit process in multi-occupancy buildings, and on the installation of specific measures, such as communal heating/power solutions; internal and external insulation; and measures appropriate in protected (historic) multi-occupancy buildings.

This report reflects a package of work within the Low Energy Apartment Futures (LEAF) project which has the following objectives:

- 1 Analysis and assessment of existing policy relating to uptake of EPC recommendations in partner countries and at the EU level, and how it may be better applied to multi-occupancy buildings.
- 2 Identification of changes or additional policies that may aid and promote retrofit of multi-occupancy buildings.
- 3 Utilisation of evidence from project pilots and stakeholder interviews to provide justification for these changes.
- 4 Presentation of recommendations within the wider context of local, national and EU targets for carbon emission and energy reduction.
- 5 Facilitation of local and national policy changes through dissemination events.

2.2 Methodology

The policy recommendations are the result of extensive policy research, practical retrofit experience on case study buildings, and engagement with stakeholders (summarised in Figure 2-1).

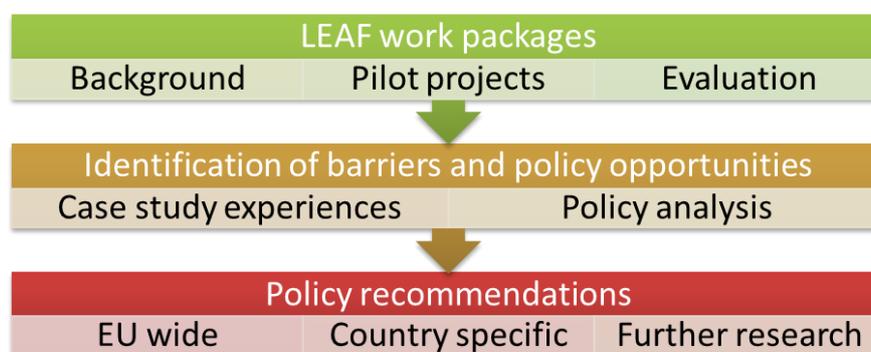


Figure 2-1: Methodology for producing policy recommendations

The work involved in creating the policy recommendations draws on findings from three other LEAF work packages: background research on national carbon emissions and energy reduction policies to inform the delivery of the LEAF toolkits (WP2), delivery of pilot retrofit projects (case study buildings) in partner countries (WP5), and monitoring and evaluation including stakeholder consultation and feedback (WP6).

These inputs were used as the basis for further work exploring barriers and policy opportunities in the retrofit of multi-occupancy buildings as part of the LEAF work package solely looking at policy recommendations (WP7). This used: experiences from case study buildings (questionnaires, discussions with partners, identification of lessons learned); further policy analysis including a review of EPBD implementation in the partner countries, identification of other relevant policies, review of policy impact and relevance, and cross country comparisons.

The key barriers and opportunities were then used to draw out and refine policy recommendations, leading to:

- Examples of best practice
- A core set of policy recommendations relevant across all partner countries
- Specific national recommendations
- Recommendations for further research

Case studies and questionnaires

As part of the LEAF project, seven partner organisations identified a selection of multi-occupancy, mixed tenure buildings to work with and offer support to install energy efficiency and low carbon measures¹. Partners' experiences of identifying and working with these pilot project case study sites has provided a wealth of learning and lessons about the challenges, barriers and opportunities for retrofitting multi-occupancy buildings. Some of these are country-specific, whilst others apply across many (or all) countries.

Work on the case study buildings spanned two and a half years (April 2013 to December 2015), although initial contact with many of the buildings was made prior to the project starting (late 2012). To help monitor progress and capture lessons from this aspect of the project, all partners kept a record of key communications and actions at each site. These were then reviewed in detail to develop an in-depth understanding of the key processes, challenges and success factors in implementing energy efficiency measures at each site.

A questionnaire was also developed to capture partners' perceptions of barriers and success factors in retrofitting multi-occupancy buildings based on their experiences of working on the case study buildings, their considerable expertise in this sector (outside the LEAF project), and also building on the findings from previous LEAF activity (WP2) which explored perceived barriers and opportunities to retrofit. It listed a number of factors associated with retrofitting multi-occupancy buildings. Project partners were asked to rate each factor

¹ The eighth partner, FLAME, did not directly work with case study buildings but worked with local energy agencies in France involved in the pilots.

according to how much it applies to their experiences working on case study buildings, which triggered further discussion and exploration of the issues. Results are discussed below.

Further research and policy analysis

Responses to the first round of questionnaires (carried out in October 2014) were used to guide the development of early policy recommendations, discussed at partner meetings throughout 2015.

Between April 2014 and October 2015, further policy research and analysis was carried out, identifying and exploring local, national and EU level policies in partner countries, examining their relevance, usefulness, and potential for replication, with a particular focus on policy recommendations based on case study experiences. Further input from partners and stakeholders was also taken into account and used to help shape and prioritise the recommendations, drawing on findings from:

- local and national stakeholder meetings and events
- additional feedback from partners experiences with case study buildings
- toolkit evaluation

Policy recommendations were further developed and then discussed, revised and finalised as a collective at the October 2015 and December 2015 partner meetings².

² Includes online meetings

3 Policy background

This section of the report presents a brief overview of EU law and EPC regulations, to provide context for the policy recommendations that follow. LEAF papers 2.1 ‘Report on background context within each partner country’ and 2.2 ‘Recommendations for toolkit development’ provide more background on the situation in each of the project partner countries.

3.1 EU law and energy efficiency of buildings

The Energy Union strategy, launched in February 2015 as one of the EU’s ten priority areas for action, has five areas of focus, one of which is ‘Energy efficiency contributing to a moderation of demand’. The strategy identifies improvements to energy efficiency in buildings as crucial.

The 2010 Energy Performance of Buildings Directive (EPBD) and the 2012 Energy Efficiency Directive (EED) represent the EU’s principle legislation governing energy consumption in buildings. The key areas of legislation addressed by each of these Directives is summarised in Box 3-1. The EPBD is the principle legislation of relevance to the LEAF project. Further information about the requirements of these Directives is presented below. Information about progress with implementation in each LEAF partner country is provided in Annex 1.

Box 3-1: Principle EU legislation addressing the energy performance of buildings

Energy Performance of Buildings Directive	Energy Efficiency Directive
<ul style="list-style-type: none"> • Certification of building energy performance • Inspection of heating and air conditioning systems • A target for all new developments to be ‘nearly zero buildings’ (NZB) by the end of 2020 • Setting minimum energy performance requirements • Financial support mechanisms to improve the energy efficiency of buildings 	<ul style="list-style-type: none"> • Energy efficient improvements in at least 3% of government-owned and occupied buildings • Energy efficiency a priority in government building procurement • Long-term national building renovation strategies to be established through National Energy Efficiency Action Plans

Several other policies are also worth mentioning, but are less relevant than the EPBD and the EED in terms of the scope of this project:

- Directive on Minimum Levels of Energy Taxation, which affects retrofit because taxes on fuel used for domestic space and water heating makes different heating systems, and addressing insulation levels, more or less attractive from a cost-benefit perspective.
- Renewable Energy Directive, which is responsible for support (including subsidies) for renewable energy technologies including domestic scale heat and electricity generation.

- Performance of Heat Generators for Space Heating/Hot Water (Directive 92/42/EEC) ('The Boiler Directive'), which sets minimum standards for energy efficiency of boilers.
- Buildings provisions in the SAVE Directive (93/76/EEC)
- Directive 2006/32/EC on energy end-use efficiency and energy services
- Energy Labelling Directive
- Ecodesign Directive
- Community framework for the taxation of energy products and electricity (Directive 2003/96/EC)

3.2 Energy Performance in Buildings Directive

Under the Kyoto Protocol, the EU is committed to maintaining the global temperature rise below 2°C and reducing overall greenhouse gas emissions by at least 20% below 1990 levels by 2020 (by 30% in the event of an international agreement being reached).

Buildings account for 40% of total energy consumption (36% of carbon dioxide emissions) in the EU and some 35% of the EU's buildings are over 50 years old³. Improving energy efficiency standards and increasing the use of energy from renewable sources in this sector therefore constitute a vital part of delivering on the EU's commitment to the Kyoto Protocol. The EPBD is a key legislative instrument for reducing the energy consumption of buildings in EU Member States. Three of the five requirements of the EPBD are relevant to the LEAF project ((1), (2) and (5) – see Box 3-2) and described further below.

Box 3-2 Requirements of the EPBD (2010/31/EU)

1. Provide an energy performance certificate at the point of sale or rental of buildings;
2. Establish inspection schemes for heating and air conditioning systems or put in place measures with equivalent effect;
3. Ensure all new buildings are nearly zero energy buildings by 31 December 2020 (public buildings by 31 December 2018);
4. Set minimum energy performance requirements for new buildings, for the major renovation of buildings and for the replacement or retrofit of building elements (heating and cooling systems, roofs, walls, etc.);
5. Establish national financial measures to improve the energy efficiency of buildings.

Minimum Requirements and Certification

Under the EPBD, Member States (MS) must establish and apply minimum energy performance requirements for new and existing buildings and ensure the certification of building energy performance.

³ <http://ec.europa.eu/energy/en/topics/energy-efficiency/buildings>

It is up to each Member State to set its own minimum requirements for the energy performance of buildings, under the proviso that these requirements should allow for a “cost-optimal” approach to delivery. ‘Cost-optimal’ is defined as “*the energy performance level which leads to the lowest cost during the estimated economic lifecycle*” (Article 2.14) – i.e. the cost of improvements are in balance with the energy cost savings over the lifetime of the building. Whilst a minimum energy performance requirement must be established to adhere to this cost-optimal level, how cost-optimal is calculated and the level of the performance is up to each MS.

The EPBD also requires MS to implement mandatory certification of buildings (new and existing). Articles 11 and 12 of the EPBD (2010/31/EU) set out the requirements for ensuring the standards of building energy performance through Energy Performance Certificates (EPCs), as follows:

“The prospective buyer and tenant of a building or building unit should, in the energy performance certificate, be given correct information about the energy performance of the building and practical advice on improving such performance... The energy performance certificate should also provide information about the actual impact of heating and cooling on the energy needs of the building, on its primary energy consumption and on its carbon dioxide emissions.”

The requirement for recommendations on EPCs for cost-effective measures that could improve the energy performance of a building place presents a key opportunity and role for EPCs in driving improvements in the energy efficiency of the EU’s housing stock.

Whilst the requirement for EPCs is valid in all EU MS, there is a degree of flexibility as to how this is implemented. For example, the Directive states that an EPC has to be issued in an independent manner by a qualified and/or accredited expert, but the assessment methodology (how the energy performance of buildings is calculated) “*may be differentiated at national and regional level*”.

Whilst the European Commission supports a certain harmonization of the implementation of the EPBD across MS (for example by proposing to use international (CEN⁴) standards for the assessment and by requesting that all MS evidence that their minimum energy performance requirements are “cost-optimal”) the actual day-to-day and practical implementation of the Directive varies from one country to the next. As a result, EPCs are not directly comparable between different countries.

Support Initiatives

The EPBD requires the application of financing and other instruments to facilitate and support improvements in the energy efficiency of buildings in each MS. The nature and design of policies, programmes and interventions will have significant implications for the uptake of measures. This is particularly important in the context of the LEAF project to understand the potential drivers and barriers to installing measures in the pilot projects.

⁴ CEN is the European Committee for Standardization - an association that brings together the National Standardization Bodies of 33 European countries.

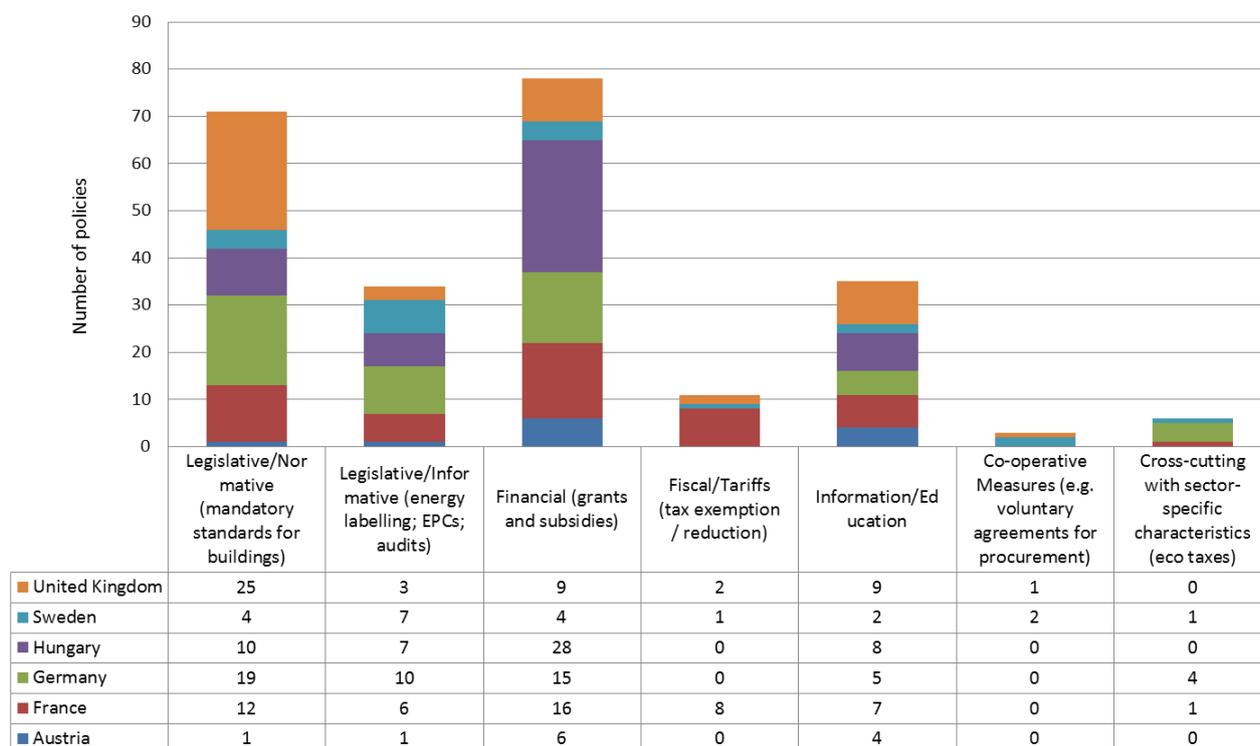
3.3 National policy context

Under previous work carried out through the LEAF project⁵ comparisons have been carried out on national and local policies and legislation, prevalence of multi-occupancy housing, the EPC situation and finance mechanisms in partner countries. In order to refine policy recommendations, relevant national policies have been examined in more detail.

Across the European Union Member States, there are a very large number of policies and policy instruments which aim to improve energy efficiency in buildings. That number reduces when policies are narrowed down to those which specifically impact on retrofit of measures in existing multi-occupancy buildings (i.e. excluding new buildings and individual owner-occupied dwellings). Nonetheless the ODYSSEE and MURE Databases⁶ identify several hundred policy instruments and measures (current, completed and proposed) for energy efficiency policy measures in the six LEAF partner countries (see **Error! Reference source not found.**).

Based on examination of national policies and discussions with LEAF partner organisations, national policies of relevance were identified and used as the basis of national recommendations for each partner country. These are available in separate reports.

Figure 3-1: Policy instruments and measures (by measure type) in the residential sector implemented in LEAF partner countries



⁵ http://www.lowenergyapartments.eu/wp-content/uploads/2014/01/LEAF_Background_Context_D2.1_Jan14.pdf

⁶ www.odyssee-mure.eu and www.measures-odyssee-mure.eu/summarytype_mr.asp

4 Challenges for retrofit in multi-occupancy buildings

This part of the report begins with a summary of the key challenges for retrofit in multi-occupancy buildings. The three subsequent sections discuss in more detail how these barriers and opportunities were identified, by: presenting the results of the case study questionnaires; reviewing issues related to the EPBD and use of EPCs; explaining issues raised in stakeholder meetings, via local and national policy analysis and through feedback from the case study and toolkit evaluations.

4.1 Key barriers and opportunities

The key issues identified through partners' experiences in retrofitting case study buildings, policy analysis and stakeholder feedback are summarised in Figure 4-1.

INFORMATION PROVISION	DEMAND SIDE FACTORS	SUPPLY CHAIN ISSUES	FUNDING AND FINANCE	LEGAL AND REGULATORY
<ul style="list-style-type: none"> • Understanding of energy use, including costs and benefits of improvements • Engaging stakeholders (occupiers, owners, agents) • Delivery of information provision • Quality of information available 	<ul style="list-style-type: none"> • Motivation and engagement • Communication and decision making barrier • Large number of stakeholders in multi occupancy buildings • Whole building approach • Access to reliable installers 	<ul style="list-style-type: none"> • Availability of tradespeople • Project management • Ambition of retrofit projects • Installer networks • Accreditation schemes • Proactive identification of opportunities • New and innovative measures 	<ul style="list-style-type: none"> • Split incentives, personal contributions, competing purchase decisions • Inconsistent and inaccessible funding schemes • Expansion of financial incentives • Range of funding mechanisms to incentivise take up 	<ul style="list-style-type: none"> • Planning and building regulations • EPC methodology and accreditation schemes • Improvements to EPCs • Minimum standards • Regulations for multi occupancy buildings

Figure 4-1 Key barriers and opportunities in retrofit of multi-occupancy buildings

4.2 Issues related to EPBD and EPCs

Key differences in the implementation of the EPBD EPCs between MS that have implications for the LEAF project (i.e. focusing on retrofitting multiple-occupancy buildings) include:

- The method for calculating energy consumption of the building
- Whether this is on an individual dwelling or whole building basis
- What information is presented on the certificate

- Level of support for energy efficiency and low carbon measures

Previous LEAF research includes a Guidance Document on Energy Performance Certificates⁷ for each partner country as well as papers providing more detailed background information about how the Directive has been implemented in each country and the barriers to retrofitting multi-occupancy buildings⁸. This provides important context for the lessons learned through the pilot case studies and policy recommendations that follow.

The EPBD acts as a core driver for national policy in all MS and as such provides excellent opportunities to support implementation of energy efficient retrofit, but some important issues have been flagged up through the LEAF project where the EPBD either is not being fully implemented, or could be improved to address barriers being experienced on the ground. Progress made towards meeting EPC requirements varies in different countries, with some significant gaps identified, including the absence of publically available databases of EPCs, and problems with quality, content and appearance of EPCs. Key issues are summarised below:

Method for calculating energy consumption of the building

- Methodologies for calculations of energy efficiency in buildings are applied inconsistently, and do not allow for cross country comparisons. In particular, a detailed specification for methodologies for assessing building performance is needed to improve accuracy and reliability of data and allow for better comparison. In some cases the methodologies provide inaccurate recommendations. This isn't because of the assessor making errors but the actual methodology behind the calculations.
- Calculation of cost effectiveness should include grants and expected bill savings and allow for maintenance costs over the lifetime of the planned improvement and replacement when it is no longer effective.
- Accreditation schemes are urgently needed in some countries to improve the quality of EPC assessments – EPCs are not always accurate and measures recommended are not necessarily the most appropriate for the building, or for maximising energy efficiency in a given property.
- Because of the differences in EPC methodology, data, appearance and quality control, it is not possible to use EPCs to compare buildings across different countries. This impacts on the quality of consistent EU data available to measure achievement of EPBD goals and also on aims to facilitate a single market.

Format & presentation of information on the EPC

- EPCs have been criticised for being complex and not very “user-friendly” , with insufficient explanations about the different information presented. Member States need to improve the format of EPCs, to create a clear and engaging document that residents are encouraged to use and act upon.
- Recommendations for improvement measures are often poorly presented in the EPC. The experience of partners in the LEAF project has provided further evidence of this. For example, in Austria EPC recommendations have been criticised for being embedded

⁷ http://www.leaftechnicaltoolkit.de/files/LEAF_EPC_Guidance_EnglandWales_final_26_03_14.pdf

⁸ <http://www.lowenergyapartments.eu/about-leaf/background/>

within an annex; in Sweden recommendations are considered too general in nature and to offer limited energy savings; in France recommendations for improvements are lacking altogether.

- Whilst differences in the content and layout of EPCs in each country are perhaps necessary, LEAF partners would like to see, as a priority for action, a tightening of regulations to ensure that recommended measures are an integral part of the EPC in all countries and are tailored to the property through a site assessment.
- The provision of information in EPCs could be modified to make it easier for consumers to understand, including the financial implications of making energy efficiency renovation decisions. For example, including information on: savings on energy bills; potential maintenance costs; grant levels; and costs (both upfront and bill saving) of energy performance measures as compared with similar maintenance measures (e.g. external insulation as compared with simple façade painting). Modifying the terminology used could also help to address a language barrier where use of technical terms disengages householders. For example, talking about running costs rather than energy efficiency would be more meaningful for many people.
- It needs to be made very clear whether EPCs are based on *predicted* energy consumption (as is the case in most EU countries) or on *measured* energy consumption (as happens in Sweden).

Individual dwelling vs. whole building EPCs

- In some countries (for example the UK, and for some cases in France) Energy Performance Certificates (EPCs) are only produced for individual apartments and not for the whole building, so carrying out whole building retrofit based on EPC recommendations is virtually impossible (although the LEAF project has developed a workaround as part of its technical toolkit).
- Further, communal areas are not always included within EPC assessments. This means that recommendations regarding lighting and stairwell insulation would not be included in the EPC.
- Conversely, in countries where whole building EPCs are available but not individual dwellings within the building (for example in Sweden), the potential for energy savings at apartment scale are not considered and opportunities may be missed for individual owners or occupiers to make improvements.
- All EPCs for individual dwellings within multi-occupancy buildings should include certain information, as a minimum requirement, about the building within which they are located. In England and Wales EPCs for apartments do not even contain the basic address information to allow easy identification of the block where they are based. This is a major barrier for example to Local Authorities who wish to use EPC data to promote energy efficiency programmes.
- Beyond this basic information, information provided in EPCs for building units should ideally allow consideration of the comparative costs and benefits of taking action on the whole building as opposed to taking action on the individual building unit. Comparative information of this sort is very important and useful particularly for owners of private apartments who (depending on different MS property law) may have the opportunity to collaborate to make energy efficiency upgrades at the building level rather than just in their individual units.

Access to EPC information

- Not all countries currently have an EPC database, and in those countries where there is a database it is not necessarily publically accessible. This is a requirement of the EPBD but has not yet been fully implemented in all countries. Making EPC information freely and publicly available, for example through national databases (or one central EU wide database) could provide a valuable resource to improve access to information about energy performance of buildings and inform decisions about improvements.
- In some countries (e.g. France and Netherlands), an association has been recognised between good energy ratings and properties attracting greater sale and rental prices. As such the EPC itself can be a driver for energy efficiency improvements. Anecdotal evidence does indeed indicate that EPC recommendations steer decisions on which energy efficiency improvements are made in buildings. If the potential for EPC ratings to be used to stimulate behaviour change, further work is needed in this area, firstly to establish the link and secondly to flag it up more widely to encourage more retrofit.

5 Good practice examples

Long term national renovation strategies are not sufficient to stimulate the level of renovation which is needed. Some countries have done more to address this than others (e.g. Germany). The LEAF project has flagged up some examples of best practice, several of which are listed below. These include both national strategies and also regional/national schemes which could be replicated elsewhere.

- a) **Maintenance funds ring-fenced for energy efficiency improvements.** This only exists in very few situations currently and tends to be specific to management arrangements in certain multi-occupancy buildings. It stimulates renovation of buildings by making funding accessible for energy efficiency improvements (as distinct from general building maintenance), getting around the financial barrier to retrofit. This could be adopted as a national strategy and could be used to target, for example, the worst EPC-rated multi-occupancy buildings to ensure funding is available to undertake essential work. As a policy it would work effectively alongside the introduction of minimum requirements.
- b) **Requirement to do energy efficiency work at the same time as maintenance work is carried out.** This policy is being introduced in France from 2017 and is an excellent example of best practice which not only stimulates energy efficient retrofit but also makes improvements more cost effective. When improvements are made alongside other maintenance work rather than separately, there are associated cost savings on, for example, scaffolding, access to pipes and wires, or re-decoration following building work.
- c) **Funding for measures which exceed legal requirements.** In Germany a national programme offers grants or cheaper interest rates for retrofit of residential buildings and buildings of communal and social infrastructure. Measures supported exceed the legal requirements of the Energieeinsparverordnung and as such, encourage a level of retrofit beyond simply meeting requirements. Similarly, Austrian subsidy systems calculate the amount of funding based on the quality of the refurbishment achieved in order to improve energy performance in buildings (i.e. beyond legal requirements).
- d) **Minimum standards for energy performance at point of sale / let.** This policy measure, currently in place in Scotland for housing associations, sets a minimum rating (in Scotland a D rating is currently required), and ensures that when a property is sold or leased to new tenants, improvement work must be carried out if the property does not meet minimum energy performance levels.
- e) **Rental Price Points System.** In the Netherlands, rent setting is based on a 'home points system', in which various features like space and facilities add points. Energy efficient improvements add points, meaning that a higher rent can be charged so the landlord or building owner can recoup the cost of making improvements, whilst the occupier benefits from cheaper running costs which balance out a higher rent.
- f) **Local trade support programmes.** A UK scheme run by CSE as part of a Local Authority retrofit programme provides training courses to help local skilled tradesmen,

like plasters and renderers, enter the market for external solid wall insulation, addressing the barrier of gaps in the supply chain.

- g) **Scottish area based programmes for home energy efficiency improvements.** In Scotland, the Home Energy Efficiency Programmes' (HEEPS) Area Based Schemes form a 10 year programme which is funded by the Scottish Government and tops up ECO funds. Schemes are delivered through local authorities, who are best placed to understand the nature of local housing provision and co-ordinate a local supply-chain. The programme is focussed on the most deprived areas in the country and hard-to-treat measures, such as external wall insulation (with previous programmes having installed easier low-cost measures).
- h) **Long term leases.** In Germany leases tend to be long term and residents have more of a vested interest in paying for improvements to properties which they do not own. In addition, management arrangements in multi-occupancy buildings are well structured and improvements can be co-ordinated centrally.
- i) **Subsidies paid directly to installers.** The Energy Company Obligation is a UK scheme which provides funding for energy efficiency improvements. Unlike most other schemes, payments for improvements go straight to the installers (not the resident), ensuring that funds are actually used to pay for energy efficiency improvements, and making it easier for residents to manage payments in multi-occupancy buildings. This system limits consumer choice of installer, but in some situations this drawback is outweighed by the advantage of simplifying the payment process.
- j) **Subsidies for building-wide energy efficiency improvements paid to building management committees.** The greater Lyon federation of cities offers subsidies to owners associations to pay for works which are implemented across multi-occupancy buildings such as external wall insulation, shared ventilation systems, and shared heating system.
- k) **Demonstration homes.** The UK Green Open Homes programme was set up with funding from central government in the UK and stimulates renovation through demonstration projects and using the principle of social norming. Householders who have made energy efficiency improvements to their homes open them to visitors to explain what they have done, how it works and what the benefits are. Evaluation data show that visitors are influenced to make improvements to their own homes.
- l) **Combining subsidies and loans.** In France, subsidies are often combined with loans. Loans are easily to obtain for owner associations because of lending arrangements which are not dependent on age, health or income. The only criterion is that the borrower pays building management fees (i.e. costs requested by the property manager to pay for cleaning and lighting of the shared parts of the building). The amount borrowed can be as much as the total cost of improvement measures minus the subsidies and the length of the repayment period is flexible (monthly instalments spread over 3, 5, 7 or 10 years). This is an opportunity which could be trialled in other countries.

m) **Paying for improvements linked to energy bills.** The Green Deal model in the UK (no longer running) provided a way around occupiers not having access to funds to pay for up-front costs of low carbon improvements. Finance packages were calculated based on potential improvements and anticipated energy savings, with costs recovered through an additional payment added to electricity bills. The energy saving improvements which are installed reduce energy use in the property (and therefore the running costs), so the overall bill, in theory, does not increase. The Green Deal itself did not prove to be a success for a number of reasons (such as the interest rate applied) but the premise of upfront costs paid back through a payment added to energy bills is replicable.

6 EU wide policy recommendations

The LEAF project addresses barriers and identifies opportunities to retrofit apartment blocks. Key issues identified through the project have been used to develop a set of policy recommendations for addressing the challenges and barriers to undertaking energy efficiency refurbishment in multi-occupancy buildings. Recommendations are framed around the experiences and lessons learned in the LEAF project, particularly the work with case study sites, and take into account partner expertise in this sector, stakeholder feedback, in depth policy analysis by the project partners, and evaluation of the LEAF toolkits.

The core LEAF policy recommendations are listed below and are also broken down by topic in the following section. Recommendations specific to the EPBD have been separated out, and recommendations for further research in this field are also included below.

These recommendations should be read in the context of the full discussion of issues and opportunities identified during the LEAF project, described in the full policy recommendations report, and separate national recommendations reports⁹, including local considerations to be taken into account when considering suitable policy changes.

6.1 List of core recommendations

1. Develop and maintain a publicly available database of all EPCs
2. Improve quality of energy saving calculations presented in the EPC
3. Improve communication of recommended measures on EPCs
4. Improve overall clarity and explanation of content of EPCs
5. Improve comparability of EPCs between different MS
6. Ensure there are whole building EPCs in all MS (with minimum standards linking to communal areas)
7. Improve the availability, design and management of public funding schemes,
8. Expand the level and type of financial support initiatives
9. Develop the role of EPCs in financial support initiatives for energy efficiency improvements
10. Introduce minimum requirements at the point of renovation
11. Introduce minimum requirements at the point of sale and/or lease
12. Improve the provision of information on low carbon retrofit
13. Expand local energy advice services and demonstration projects
14. Implement accreditation schemes for installers and EPC assessors
15. Upskill the workforce, with a focus on developing local networks and improving ambition and quality of retrofit projects
16. Improve integration between low carbon retrofit and maintenance and renovation work

⁹ <http://www.lowenergyapartments.eu/project-findings/policy-recommendations/>

17. Require maintenance plans and funds for multi-occupancy buildings
18. Require management arrangements for multi-occupancy buildings which include communication structures and decision making processes.

6.2 Recommendations linked to key issues

Information provision

These recommendations include a strong focus on improvements to EPCs so that they can be used more effectively as a driver for low carbon retrofit. There are also recommendations around provision of information to address barriers which have been identified.

• Develop and maintain a publicly available database of all EPCs
• Improve quality of energy saving calculations presented in the EPC
• Improve communication of recommended measures on EPCs
• Improve overall clarity and explanation of content of EPCs
• Improve comparability of EPCs between different MS
• Ensure there are whole building EPCs in all MS (with minimum standards linking to communal areas)
• Improve the provision of information on low carbon retrofit
• Expand local energy advice services and demonstration projects

Demand-side factors

Stimulating demand is a challenge for policy makers since so much depends on consumer attitudes and behaviour. Many of these recommendations focus again on EPCs and information provision in order to address the information barrier which is one step in the process leading to a decision to install energy efficiency improvements. Access to finance and funding also features here since money to pay for improvements is obviously crucial, and subsidies have been shown to stimulate demand. Incentives (implying voluntary take up) should be combined with regulations to mandate improvements to properties at key points in time (i.e. when a building is renovated; when a dwelling is sold or a new tenant takes on a lease). We also note the importance of combining low carbon improvements with other retrofit and maintenance work (including a supply chain role in identifying opportunities and a requirement for long term building maintenance plans so that works can be planned ahead and carried out more cost effectively). Finally there is a recommendation for basic management structures to be in place in all multi-occupancy buildings to overcome communication and decision making barriers where multiple stakeholders are involved.

• Develop and maintain a publicly available database of all EPCs
• Improve quality of energy saving calculations presented in the EPC
• Improve communication of recommended measures on EPCs

<ul style="list-style-type: none"> • Improve overall clarity and explanation of content of EPCs
<ul style="list-style-type: none"> • Improve the availability, design and management of public funding schemes
<ul style="list-style-type: none"> • Expand the level and type of financial support initiatives
<ul style="list-style-type: none"> • Introduce minimum requirements at the point of renovation
<ul style="list-style-type: none"> • Introduce minimum requirements at the point of sale and/or lease
<ul style="list-style-type: none"> • Improve integration between low carbon retrofit and maintenance & renovation work
<ul style="list-style-type: none"> • Require maintenance plans & funds for multi-occupancy buildings
<ul style="list-style-type: none"> • Require management arrangements for multi-occupancy buildings which include communication structures and decision making processes.

Supply-side factors

The supply chain of course has a vital role to play in any retrofit project, but there are currently barriers around the accessibility of trained and reliable installers, the difficulties in co-ordinating where multiple contractors are needed, and the overall lack of a joined up approach integrating the supply chain. Our recommendations are twofold, looking at improving quality of retrofit works on the one side, and on the other improving support for the sector so that it can expand to deliver the scale of retrofit which is required. This second area includes improving funding schemes (where appropriate moving away from single-measure schemes) and expanding financial support initiatives so that builders and installers have more leverage to market low carbon measures to householders, including making improvements alongside existing retrofit and maintenance work.

<ul style="list-style-type: none"> • Improve the availability, design and management of public funding schemes
<ul style="list-style-type: none"> • Expand the level and type of financial support initiatives
<ul style="list-style-type: none"> • Improve integration between low carbon retrofit and maintenance & renovation work
<ul style="list-style-type: none"> • Implement accreditation schemes for installers and EPC assessors
<ul style="list-style-type: none"> • Upskill the workforce, with a focus on developing local networks and improving ambition and quality of retrofit projects

Funding & finance

Issues related to paying for low carbon retrofit are exacerbated in multiple-occupancy buildings because of the number of different stakeholders involved, limited resources in building maintenance funds, length of time to make a decision between multiple stakeholders, and low priority given to energy efficiency improvements compared to essential maintenance work and other demands on limited funds. Most countries have some form of state support for energy efficiency measures, but funding is often inconsistent and piecemeal, in some cases actually acting as a barrier rather than a facilitator of retrofit. These issues are reflected in our recommendations, which reinforce the need for improved public funding, greater access to other financial support and development of the role of EPCs in identifying and paying for improvements. The recommendation for longer term maintenance plans with ring fenced funding is repeated since this affects the way that

energy efficiency improvements are paid for and also the ability to plan ahead and achieve cost effectiveness in retrofit projects. Where there is not already a process, basic management arrangements need to be in place so that decisions affecting multiple stakeholders can be made, allowing improvements to go ahead and not be stalled by problems with communication or one party preventing progress.

<ul style="list-style-type: none"> • Improve the availability, design and management of public funding schemes
<ul style="list-style-type: none"> • Expand the level and type of financial support initiatives
<ul style="list-style-type: none"> • Develop the role of EPCs in financial support initiatives for energy efficiency improvements
<ul style="list-style-type: none"> • Require maintenance plans & funds for multi-occupancy buildings
<ul style="list-style-type: none"> • Require management arrangements for multi-occupancy buildings which include communication structures and decision making processes.

Regulations

There is a strong case to be made for legal and regulatory mechanisms to be put in place or tightened or to help to stimulate retrofit in multi-occupancy buildings. We have already mentioned recommendations to improve EPCs, including addressing inconsistencies between different member states which make enforcing the EPBD a challenge. There are also recommendations for appropriate minimum requirements (for energy performance) at the point of sale and lease, and when renovations are carried out. Finally the recommendation is reiterated for management arrangements to be in place to improve communication between residents and other stakeholders, and facilitate decision making and co-ordination on retrofit projects.

<ul style="list-style-type: none"> • Improve comparability of EPCs between different MS
<ul style="list-style-type: none"> • Introduce minimum requirements at the point of renovation
<ul style="list-style-type: none"> • Introduce minimum requirements at the point of sale and/or lease
<ul style="list-style-type: none"> • Require maintenance plans & funds for multi-occupancy buildings
<ul style="list-style-type: none"> • Require management arrangements for multi-occupancy buildings which include communication structures and decision making processes.

6.3 LEAF policy recommendations specific to the EPBD

The points below summarise progress made by the six LEAF partner countries on the EPBD, expanding on section 4.3 above and concentrating on the requirements around EPCs and actions which still need to be prioritised in order to achieve EPBD goals. There is considerable overlap with the key areas for action identified in the latest review of progress with implementation of the EPBD by the Concerted Action group.

- **Development and maintenance of a database of all EPCs is not yet complete.** One of the Key Implementation Decisions of the EPBD is for partner countries to develop and

maintain a national database of all EPCs. This should be a priority action for those countries which have not yet made EPC data publically available.

- **Improve quality of energy saving calculations presented in the EPC.** The reliability of calculated energy savings presented on EPCs in some countries is questionable, particularly in blocks of apartments. This has been a real issue for the LEAF project as the EPCs lack the weight needed to garner the trust of residents and building managers and persuade them of the benefits of renovation. We therefore strongly support research to address this, with the aim of improving and standardising methodologies.
- **Improve communication of recommended measures on EPCs.** Recommendations for improvement measures are often poorly presented. The experience of partners in the LEAF project has provided further evidence of this. For example, in Austria EPC recommendations have been criticised for being embedded within an annex; in Sweden recommendations are considered too general in nature and to offer limited energy savings; in France recommendations for improvements are lacking altogether. Whilst differences in the content and layout of EPCs in each country are perhaps necessary, LEAF partners would like to see, as a priority for action, a tightening of regulations to ensure that recommended measures are an integral part of the EPC in all countries and are tailored to the property through a site assessment as far as possible.
- **Improve format of EPCs.** EPCs have been criticised for being complex and not very “user-friendly” (UK and Sweden), with insufficient explanations about the different information presented (France and Austria). MS need to improve the format of EPCs, to create a clear and engaging document that residents are encouraged to use and act upon.
- **Ensure EPCs are comparable between different countries.** Because of the differences in EPC methodology, data, appearance and quality control, it is not possible to use EPCs to compare buildings across different countries. This impacts on the quality of EU data available to measure achievement of EPBD goals and also on aims to facilitate a single market.
- **Address funding infrastructure.** Financial support for installation of EPC recommended measures has been a major issue for LEAF project partners in working to retrofit multi-occupancy buildings. Public funding tends to be limited, short term, focussed on specific measures, with complex eligibility criteria. These issues need to be addressed for public funding to be used to successfully achieve EPBD objectives via installation of energy efficiency improvements in buildings. LEAF partner organisations would recommend subsidies which are more accessible, better explained, and which run over longer timeframes in order to provide consistency and increase confidence for consumers and suppliers (and ultimately increase installation rates).
- **Make improvements to public funding schemes in order to leverage private finance.** The latest review of progress on the EPBD by the CA group highlights the importance of not relying solely on government subsidies for financing energy efficiency measures. However, for private finance to be leveraged against public funding, the latter must be simple, consistent, and have sufficiently long timeframes to enable take up.
- **Develop the role of EPCs in financial support initiatives for energy efficiency improvements:** The role of EPCs as a mechanism for leveraging financial support for

improvement measures is still evolving, with many schemes making no formal or direct link to EPCs. Two of the LEAF partner countries have implemented schemes that make this association explicit: the French PT2+ loan scheme and the UK's Green Deal programme. The most common role of the EPC is to verify the energy savings expected from installing specific measures. This suggests the full potential of EPCs to influence energy efficiency retrofits is yet to be realised and there is work to do in most MS in making this link.

6.4 Recommendations for further research

The LEAF project, and in particular project partner experiences of working with multi-occupancy buildings attempting to undertake energy efficiency refurbishment, raised various issues and questions for further consideration.

Data

- Further data is required specifically on multi-occupancy buildings – their number, the number of occupants, tenure type, energy performance, and opportunities to improve energy efficiency and install renewable energy technologies. Although the potential of this segment of the building stock is huge, its scope and complexities are not fully understood, and more accurate data will help with the development and realisation of retrofit programmes.
- In some countries (e.g. France and the Netherlands) it is recognised that a good energy rating is associated with properties attracting greater sale and rental prices and as such, the EPC itself can be a driver for energy efficiency improvements. Further data is needed in all countries for research to establish conclusively whether or not there is a direct link between energy performance ratings and market value. If there is strong evidence it can be used to stimulate retrofit and improve public understanding of EPCs.
- There is a need for professional and impartial advice services to be mapped so that gaps can be identified and support provided to help fill those gaps.

Motivations and engagement

- Engagement of residents and stakeholders is essential to stimulate demand for energy efficient retrofit, but the factors affecting the level of priority residents of different countries place on energy efficiency and low carbon retrofit are little understood. More work is needed in this area.
- The level of (perceived) success of the EPC system varies in different countries. For example, Germany considers the EPC system to be working effectively, whereas Hungary's experience is to the contrary, experiencing a number of challenges (including the issuing of EPCs issued without a site visit). Critically analysing and understanding reasons behind these varying levels of success with implementation should remain a priority, to ensure learning is shared effectively.

- More research is also needed on buyer / tenant understanding of EPCs, and the extent to which this affects sale/rental value and the buyer / renter's choice of property.

Funding and finance

- Acceptable levels of contribution from the State is subjective, and differs from one country to the next; within countries; and between individual buildings. Research into a 'minimal level of support' that appears sufficient to stimulate and ensure measures are taken up would aid the development and targeting of funding schemes.
- Payback periods were identified by LEAF partners as a factor affecting decision making. If public funding is used to help pay for improvements, and if the level of funding is linked to payback, there are questions about how payback is calculated. If it is incorrectly assessed the occupant risks being worse off financially. Research into real life examples, modelling of different funding models, and perceptions of acceptable payback level in different countries would again help to set optimal funding levels.
- Similarly, different levels of affluence of occupants within one property can mean some residents are able and willing to pay for measures, but others are not and as a result work cannot go ahead (i.e. the latter overrules the former). Is there a financing mechanism that could be designed to specifically address this issue for multi-occupied buildings, for example loans (currently in use in Scotland and France)? Is there more that could be done at the macro-level, for example lower rate VAT on energy efficiency measures; tax incentives; energy efficiency-linked stamp duty rates and other fees associated with buying/selling? Both of these questions bear further investigation.
- The role of EPCs as a mechanism for leveraging financial support for improvement measures is still evolving, with many schemes making no formal or direct link to EPCs. Two of the LEAF partner countries have implemented schemes that make this association explicit: the French PTZ+ loan scheme and the UK's Green Deal programme. The most common role of the EPC is to verify the energy savings expected from installing specific measures. This suggests that the full potential of EPCs to influence energy efficiency retrofits is yet to be realised and there is work to do in most MS in making this link.

Regulatory and property factors

- Little work has been done to explore the effectiveness of enforced implementation of energy efficiency improvements. For example if a property is below a certain standard of energy efficiency and improvement measures identified are deemed cost-effective, should the building owners be required to undertake the work? (This then raises the question of what is deemed cost-effective and how this is calculated; and how the work is paid for – the resident may simply not have the capital to pay for it which means there needs to be an accessible and low/zero-interest loan system in place). The Scottish government is considering this as part of their private housing standard regulations (still to be announced). They may expect minimum EPC ratings and/or they may expect particular measures to have been installed.

- Protected building status may restrict certain energy efficiency solutions, but this is not a bad thing – it is important that the aesthetic, heritage and cultural value of buildings are recognised. However, is there a need in some countries to review certain legislation given the need to drastically reduce household energy consumption in order to meet emissions targets and reduce fuel poverty? For example:
 - Are there some aspects of protected building regulations that are unnecessarily rigid?
 - If so, how could these be amended to ensure buildings are still suitably protected, but not an unnecessary barrier to energy efficiency improvements? (For an example of an extensive research study in this area see: http://www.cse.org.uk/downloads/file/warmer_bath_june2011.pdf)
 - Can better information and guidance be presented on sensitive retrofit which achieves energy efficiency improvements but is not to the detriment of other special characteristics of the building?
- One of the recommendations made in this report is about setting a requirement for management structures in multi-occupancy buildings so that there is a means to communicate with stakeholders and to reach decisions on energy efficiency retrofit. However this is an area which needs more research so that all issues are addressed, including complexities about freehold/leasehold ownership, consensus decision making, consultations on retrofit plans, regularity of resident meetings, ensuring a building maintenance plan is in place and adhered to, and ensuring adequate regulation of external management companies.
 - Critically important is research into what sort of management structures are most effective and what are the success factors.
 - In the UK it would be extremely important to know whether, for example, factoring organisations work and if this management structure is something that should be applied.