A guide to

THE IMPLEMENTATION OF THE AMENDED ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE (EPBD) 2018

Prepared by

EuroACE

20 YEARS

THE EUROPEAN ALLIANCE OF COMPANIES FOR ENERGY EFFICIENCY IN BUILDINGS

INTRODUCTION

The amendment of the Energy Performance of Buildings Directive (EPBD) is one of the most important changes that has occurred in the EU buildings sector in the last 15 years. At last, EU legislators have recognised that the biggest challenge in the buildings sector is not the standards we use for our new buildings but the ones we use to renovate our existing ones. In part because of hard work by EuroACE and others, awareness has been raised around the fact that our existing buildings consume more than 40% of all primary energy in the EU and emit more than 36% of our CO_2 emissions.

It therefore follows that if politicians are serious about achieving the climate goals set out in the Paris Agreement by 2050 and in delivering benefits to European businesses and citizens, then the buildings sector absolutely must be addressed. This unavoidable fact has been our key motivation in preparing this detailed guidance note on the amended aspects of the EPBD. We trust that it will be a useful reference document for public and private stakeholders that are engaged in addressing the challenge of improving the energy performance of our building stock.

Adrian Joyce
Secretary General
EuroACE

PRELUDE

This document contains six chapters that address the main changes that were introduced by the Amending Directive 2018/844/EU to the provisions of the EPBD (Directive 2010/31/EU):

An earlier version of this document was presented in public for the first time at the C4E Forum in Warsaw, Poland on the 14th June 2018. Following that presentation, a number of submissions were received from key stakeholders, which have been considered and incorporated into this final text. EuroACE is grateful to those that took time to share their views with us.

This document is targeted at the government officials in the EU Member States that will have the task of implementing the amended EPBD. Is will also be of interest to stakeholders in the whole construction value chain from the owner, through the design teams to the site and to all associations that represent this value chain.

Brussels, 26th October 2018

RECOMMENDATIONS ON THE AMENDED DIRECTIVE FROM EuroACE

Following its analysis of the amendments to the EPBD, EuroACE has identified **12 key recommendations** that it offers to public and private stakeholders at national and European levels. Following these recommendations should ensure that the significant multiple economic, social and environmental benefits of robust implementation of the amended EPBD can bring will be realised in all the Member States of the EU.

Recommendation 1: Resources and technical capacity

Full implementation of the amended EPBD will benefit from the assignment of appropriate financial and human resources to the mandated administrative bodies of each Member State. This will normally require a dedicated department or agency staffed with qualified persons to oversee the transposition and implementation efforts in the Member State. These departments or agencies should also be charged with stakeholder interaction and the management of consultation processes

Recommendation 2: The crucial role of buildings

Legislators must keep in mind that long-term energy and climate goals cannot be achieved without fully addressing the energy waste in our building stock. Therefore, robust and speedy transposition and implementation of the amended EPBD must be treated by the Member States as a policy priority that should be undertaken in full collaboration with relevant stakeholders

Recommendation 3: Existing EPBD implementation efforts must continue

National efforts on the implementation of the unchanged elements of the EPBD must continue unabated, ensuring that no hiatus occurs while preparing for the transposition and implementation of new and revised parts. Constant, structured engagement and involvement of stakeholders from the buildings sector should always be included in these national efforts

Recommendation 4: Embedding milestones and measurable progress indicators into LTRS

To be truly effective and to boost confidence in many segments of the stakeholder community, Member States are recommended to bind the required milestones for 2030 and 2040 into their long-term renovation strategies (LTRS) and to benchmark progress against these and against the measurable progress indicators that will reflect national conditions

Recommendation 5: Fulfilling consumer needs

Choosing to introduce building renovation passports as a tool to inform, motivate and incite building owners to undertake energy renovation is a manner by which national and regional governments can bring tangible support to consumers, thus boosting energy renovation rates and depths. Ensuring ambitious energy renovations will also result in dramatic improvements in the health of occupants, reducing their overall health costs

Recommendation 6: Building the knowledge base together

EuroACE urges all stakeholders involved in improving the energy performance of our building stock to record and share the anonymised key statistics of their projects and to work with national or regional authorities on the best means to make the accumulated information available to researchers, building owners and all interested parties

Recommendation 7: It's all about the money

Member States are urged to fully exploit all the new means to increase available investment capacity for energy renovation projects including the aggregation of projects, the de-risking of investments, using public funds to leverage private funding, giving timely guidance on financing, setting up one-stop shops and sharing success stories and experiences with other Member States

Recommendation 8: Continuous communication

Member States should allocate adequate funding to allow for the continuous communication of their efforts to tackle energy waste in buildings to the general public. These efforts should always include a description of the benefits that arise when energy renovation is properly carried out. It is not sufficient to only publicise a new programme or renovation scheme during the launch phase, meaning that communication campaigns must co-exist with the full lifespan of programmes and schemes aimed at tackling energy waste in buildings

Recommendation 9: You can't maintain what you don't measure

Member States are urged to retain inspection regimes for heating, cooling and ventilation systems that currently have thresholds below the newly-set thresholds in the amended EPBD. They should also encourage that all recommendations arising from inspections are implemented so that the full potential of technical buildings systems (TBS) and building automation and control systems (BACS) are leveraged for improved energy performance outcomes.

Recommendation 10: Integration counts

Keep in mind that TBS and BACS operate at their most efficient levels when they are installed in combination with a highly performing building envelope and when they are subjected to continuous commissioning, inspections and maintenance. Integrating passive and active approaches delivers the best results

Recommendation 11: Calculate energy demand first

In the calculation of the energy performance of a building, the use of on-building, on-site or nearby renewable energy sources should not be used as a proxy for increased energy performance as the best energy is the energy you don't need. To use RES as a proxy risks failing to deliver the full range of multiple benefits to consumers

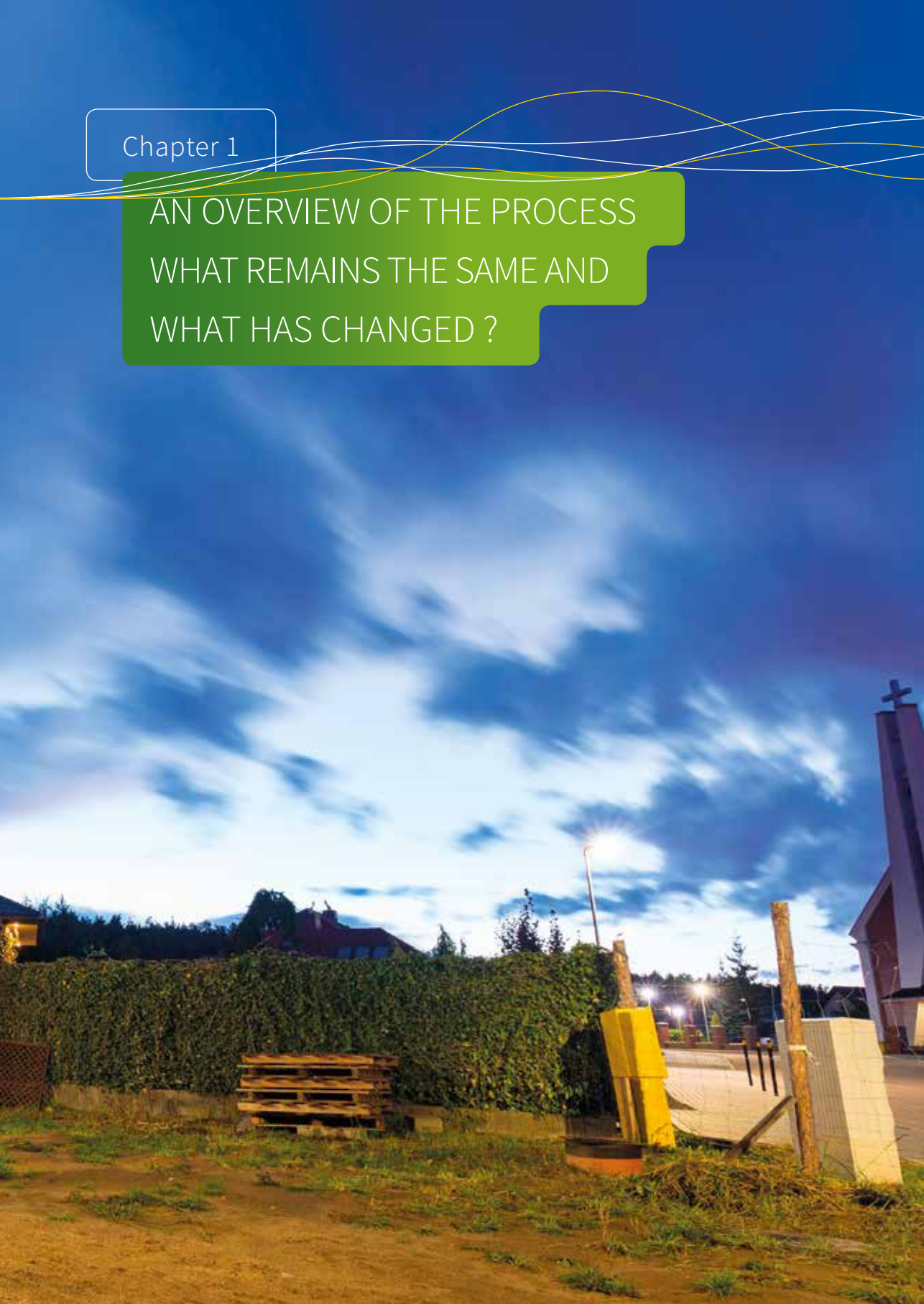
Recommendation 12: Keep everyone onside

In the event that the national methodologies for the calculation of the energy performance of buildings is to be revised, national authorities should engage and cooperate with market-based stakeholders to ensure that compliance with changes are first fully understood and accepted by affected stakeholders


BVG

Chapter 1

AN OVERVIEW OF THE PROCESS WHAT REMAINS THE SAME AND WHAT HAS CHANGED ?



The EU has set itself climate and energy goals for 2030 and 2050 and it has committed to the Paris Agreement on Climate Change. To ensure that the EU is on track to meet these goals, the European Commission published a proposal in late 2016, as part of the Clean Energy for All Europeans Package[1] , to amend the Energy Performance of Buildings Directive (EPBD). The proposal for the EPBD contained a restricted, but important number of changes that were intended to strengthen the provisions of the Directive in light of developments in the construction sector since the publication of the recast version in 2010 and to ensure that buildings play their role in the achievement of the overall EU Climate and Energy goals to 2030 and 2050.

Context

Negotiations between the co-legislators were formally completed on the 30th May 2018 and the official publication of the Amending Directive (2018/844/EU) took place on the 19th June 2018, meaning that it came into force on the 9th July 2018. The end of the transposition period therefore falls on the 10th March 2020. EuroACE undertook the task of preparing this guidance document to highlight the key changes to the EPBD and to also emphasise the need for ambitious, complete and robust implementation of the amended EPBD in all Member States of the EU.

The two main results of the changes are:

1. To require Member States to focus more on the energy renovation of their building stock to transform it into a highly energy efficient and decarbonised stock by 2050, facilitating its cost-effective transformation towards nearly zero-energy buildings (nZEB)
2. To modernise the Directive and the buildings sector by taking on board key advances in several building technologies ranging from self-regulating devices to building automation and control. The modernisation includes the proposal for a smart readiness indicator (see Chapter 5) and tackling some barriers to the development of e-mobility (not covered in this document)

Therefore, **buildings have a central role to play in the energy transition of the EU**. The International Energy Agency (IEA) has pointed out that 76% of investments needed to achieve the Paris Agreement goals must go to energy efficiency and the Buildings Performance Institute Europe (BPIE) has found that just 3% of buildings in the EU were assessed as highly energy efficient in 2017, leaving the other 97% in need of energy renovation before 2050. Undertaking ambitious renovation of this stock, as now required by the EPBD, will bring multiple benefits at economic, societal and environmental levels, improving the quality of life of all Europeans, through job creation, economic growth, increased asset values, better health and productivity and greater comfort for all.

EuroACE now looks to the Member States of the EU to rapidly scale up their efforts, in conjunction with stakeholders, to transform their entire building stock in line with the vision set out in the amended EPBD. The scale of the opportunity is enormous, requiring preparedness and increased cooperation from all stakeholders involved. EuroACE believes that the implementation of the amended EPBD provides an impetus for societal betterment that cannot be missed.

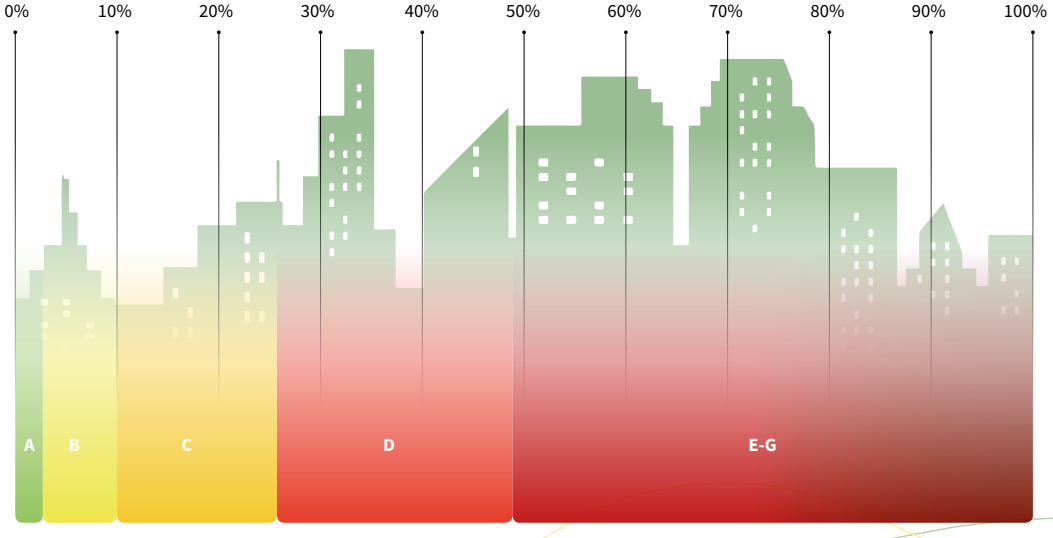
[1] Use this site as a starting point to explore the Commission's proposal:
https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/clean-energy-all-europeans

What has NOT changed?

Before giving an overview of what has changed in the amended EPBD, public and private stakeholders are reminded that much has not changed. This means that implementation of the EPBD as a whole must continue at a good pace and it will be important to incorporate the revised elements in the ongoing implementation efforts in the Member States. Principle among the elements that have not changed are:

1. The provisions relating to the setting of minimum energy performance requirements for, inter alia, the building envelope and its technical buildings systems (Articles 1.2(c) and 4) remain in force meaning that Member States must maintain, strongly implement and regularly review, their national minimum energy performance standards
2. The retention of unchanged provisions relating to the calculation of cost-optimal levels (Articles 4 and 5) means that it is still necessary for Member States to ensure that the minimum energy performance levels that they set for their building stock are ambitious and cost effective
3. The provisions requiring Member States to set system requirements for technical building systems (Article 8.1) remain fully in force. Optimising the use of these systems over time significantly contributes to maintaining high energy performance to the benefit of all occupants
4. All the provisions relating to nearly zero-energy buildings (nZEB) (Article 9) are retained, which should lead to further, more focused efforts from the Member States to plan how they will transition their overall building stock from its current state to a nearly zero energy stock. The 1st January 2021 remains the date by which all new buildings should be nZEB, preceded by 1st January 2019 for all new public buildings
5. Finally, the important provisions relating to the preparation, issuing and display of energy performance certificates (Articles 11, 12 and 13) are unchanged, although further efforts are certainly needed to ensure that EPCs are fully deployed and made available to consumers. Additionally, EuroACE believes that there are grounds to consider changes to this aspect in the next revision, particularly considering probable developments in the use of individual building renovation passports (see Chapter 3)

DISTRIBUTION OF THE BUILDING STOCK IN THE EU PER EPC CLASS



Source: BPIE Factsheet entitled *97% of buildings in the EU need to be upgraded*

Why is this important?

Many of the unchanged aspects of the Directive are, in fact, key elements of the regulatory architecture that the Member States have put in place for improving the energy performance of their buildings and for inciting the market to act. Putting the laws and regulations in place took time and they have not yet had their full beneficial effect in all countries. Having so much that remains unchanged means that Member States can continue to confidently pursue the full implementation of the current EPBD whilst incorporating all of the new elements.

For the setting of minimum energy performance requirements, EuroACE looks to the Member States to ensure that their regulations apply adequate nZEB requirements for new buildings and set minimum requirements for existing buildings at a level that will ensure that the long-term goal of achieving a highly energy efficient (nZEB) building stock by 2050 will be reached. This requires, among other things, dynamic building codes that can adapt to changing market and social conditions.

For the roll-out of nZEB the retention of the provisions as they were should ease the burden on Member States and, hopefully, lead to a clearer and more converged set of national provisions. This would improve the situation for both market actors and citizens, better informing the steps needed to bring existing buildings towards an nZEB performance level – a requirement that remains fully part of the amended Directive.

EuroACE notes with interest that the unchanged provisions relating to the cost optimal level of minimum energy performance requirements means that the second versions of the national reports on how Member States calculate cost optimality for their regulations were due to be submitted to the European Commission on the 31st March 2018.[2]

[2] At the time of writing (26th October 2018), the reports from 15 Member States are available on the website of the European Commission. See here: *https://ec.europa.eu/energy/en/content/eu-countries-2018-cost-optimal-reports*

What has changed?

While many changes have been introduced by this revision process, many of them build on existing provisions, altering or strengthening them. As a result, the Member States should find it easier and simpler to implement the revisions. The main changes of note are:

Long Term Renovation Strategies

1. The requirement for Member States to prepare long-term renovation strategies (LTRS) has been moved from the Energy Efficiency Directive (EED) to the amended EPBD (new Article 2a). In making this change the provisions relating to the LTRS have been strengthened and expanded (see Chapter 2)
2. The new requirements mean that Member States must lay down plans that will steadily lead to the transformation of the building stock in the EU to reach nearly zero-energy performance levels by 2050
3. There is also now a requirement for Member States to consult with stakeholders in the preparation and implementation of the LTRS

Building Renovation Passports

4. Additional duties have been placed on the Commission (Article 19) to review the directive (before 2026) and to examine new issues (before 2020) such as integrated district level approaches and building renovation passports (Article 19a) (see Chapter 3), the latter to be voluntarily implemented by the Member States

Financing

5. A significant strengthening of the provision on financing (Article 10), which now requires Member States to link financial measures that support energy renovation works to the improvement in the targeted or achieved energy performance of the funded buildings (see Chapter 4)

Smart and technology-equipped buildings

6. The provisions relating to technical building systems (TBS) (Article 8) have been changed and expanded – notably to include mandatory individual room temperature control and to include mandatory assessment of energy performance of TBS at part-load.
7. The introduction of a "Smart Readiness Indicator" (new paragraphs Article 8 (10) and (11)) that will help to assess the preparedness of a building to integrate smart technologies that respond to the needs of the occupant, increase energy efficiency and allow for interaction with the grid

FRANCE

As an example of pushing building owners to undertake energy consumption planning, the French building sector law (http://www.assemblee-nationale.fr/15/ta-commission/r1253-a0.asp), which was endorsed by the French Senate on the 16th October 2018, sets an obligation for private owners of tertiary (i.e. non-residential) buildings to reduce their energy consumption by 40% by 2030 as compared to 2010, 50% by 2040 and 60% by 2050. The implementing decree is expected to be issued in due course.

EuroACE believes that such a requirement is a very good incentive for building owners to look at their building's long-term needs, in particular for energy consumption. This is very useful, as understanding energy consumption in the operational phase is the key to savings in heating and cooling systems. Such long-term energy efficiency obligations should ideally also be accompanied by technical advice and financial schemes.

8. The provisions relating to periodic inspections (Articles 14 and 15) of heating, cooling and ventilation systems have been extensively changed (see Chapter 5), whilst retaining the possibility of using alternative approaches
9. New provisions relating to the installation of building automation and control systems (BACS) and electronic monitoring (Articles 14 and 15), which becomes mandatory before 2025 for certain types of large buildings

Annex I

10. Annex I on the methodology to describe the energy performance of buildings – including how to count the use of renewable energy sources – has been revised in order to increase transparency of the calculation methodologies and to incite Member States to use European standards more for measuring the energy performance of their buildings (see Chapter 6)

Other

11. Article 2 containing definitions, has been altered and slightly expanded, especially in relation to TBS so that a broader range of systems are brought into the definition and a separate definition for BACS is included
12. The provisions on new buildings (Article 6) have been slightly simplified, whilst the provisions in Article 7 on existing buildings have been slightly modified.
13. Article 8 introduces a requirement around charging points for electric vehicles, which must now be provided within car parks associated with buildings, both new and undergoing major renovation. This aspect of the amended EPBD is not addressed in this guidance document

Why is this important?

The changes to the Directive should lead the Member States to achieve increased ambition for the energy performance of their building stock. One tool that they can rely on to achieve this will be the national long-term renovation strategy (LTRS). This is a good and necessary development that is elaborated further in Chapter 2.

The changes also mean that our regulatory structure catches up with current practices in the construction sector and with some of the recent and influential technological changes that are affecting the sector. This is especially true for TBS and BACS and how the new requirements impact on their integration into buildings (see more in Chapter 5)

What benefits will arise from ambitious implementation of the Amending Directive?

At the core of the effort to implement the amended EPBD are the extensive multiple societal and individual benefits that will arise for EU citizens, businesses and their governments through the full transposition and implementation of the amended Directive. EuroACE ceaselessly promotes these benefits and it notes that there is an increasing recognition among governments, regions and cities across the EU that multiple benefits do result from ambitious renovation programmes. Examples of good programmes are increasing in countries as diverse as Estonia, France, Ireland and Italy.

To list just a few of the key benefits that are most frequently referred to:

1. A higher-quality, energy efficient, built environment leads to improved health, comfort, indoor air quality and well-being for citizens, as we all spend more than 90% of our time inside buildings
2. Worker productivity and learning capacities increase significantly in holistically renovated buildings
3. Energy poverty will, to a large extent, be alleviated when Member States implement their long-term renovation strategies in a rigorous and highly quality-controlled manner
4. Ambitious renovation programmes give a boost to the construction sector leading to the creation of more local jobs, economic growth and increased asset value for owners
5. Lower CO_2 emissions resulting from less burning of fuels for heating contributes to the achievement of the Paris Agreement goals and improves outdoor air quality, further improving health and well-being in the population
6. Public finances get a boost from increased tax income from new workers and the use of more products in construction as well as from reduced social security payments to unemployed and under-employed persons and reduced overall healthcare costs
7. Highly energy efficient buildings can, through the exploitation of their thermal mass,

reduced heat loss and their smart connected technologies, contribute to balancing the grid, increasing grid flexibility, facilitating RES integration, improving energy security and leading to lower energy imports

What role will stakeholders play?

EuroACE sees clearly that after completion of the formal adoption process at EU level, the national authorities will be first in line to act as they transpose the new requirements to national law. After that the regional, local and city authorities, with the support of stakeholders, will step in and will have to devise the ways and means of putting the provisions of the national laws into force in their territories. All stakeholders will have to get informed about the changes to the EPBD and then consider to what extent they can be active in playing a role in the transposition and implementation of the new provisions.

To have their voice heard, all stakeholders will have to be part of any formal consultation processes and be in direct contact with key officials within the governance structures active in the buildings sector. In this respect, it is useful that the Member States are now required by Article 2a(5) of the amended Directive to hold a public consultation during the preparation of their LTRS and to establish the way in which stakeholders are consulted during the implementation of the LTRS.

It will also be necessary to ensure a good understanding between stakeholder groups, ideally through collaborative approaches where all points of view can be heard and considered. The more inclusive the collaboration between public sector and private sector can be, the higher the chance of reaping tangible benefits from the process of implementing the amended EPBD. One great example of such collaboration from which to draw inspiration is the work of the Build Upon Project (see below for a URL link to the project) that was run in 13 countries, supported by national green building councils and unusual suspects. It enabled all stakeholders involved in energy renovation activities to channel input and advice to the relevant national authorities.

Resources and references for this Chapter:

eceee Guide to EU Approval Process giving a clear overview of the legislative process in the EU as used for adopting energy efficiency legislation: *https://www.eceee.org/static/media/uploads/site-2/policy-areas/steering_through_the_maze_7(winterpackage).pdf*

IEA Presentation from 2016 indicating that 76% of investments to reach the Paris Agreement goals must be in energy efficiency: *https://www.ucc.ie/en/media/research/iew2016/BrianMotherway.ppsx*

BPIE Factsheet indicating that 97% of buildings in the EU are in need of energy renovation:
http://bpie.eu/publication/97-of-buildings-in-the-eu-need-to-be-upgraded/

Build Upon Project website contains many resources on stakeholder engagement and collaboration:
http://buildupon.eu/

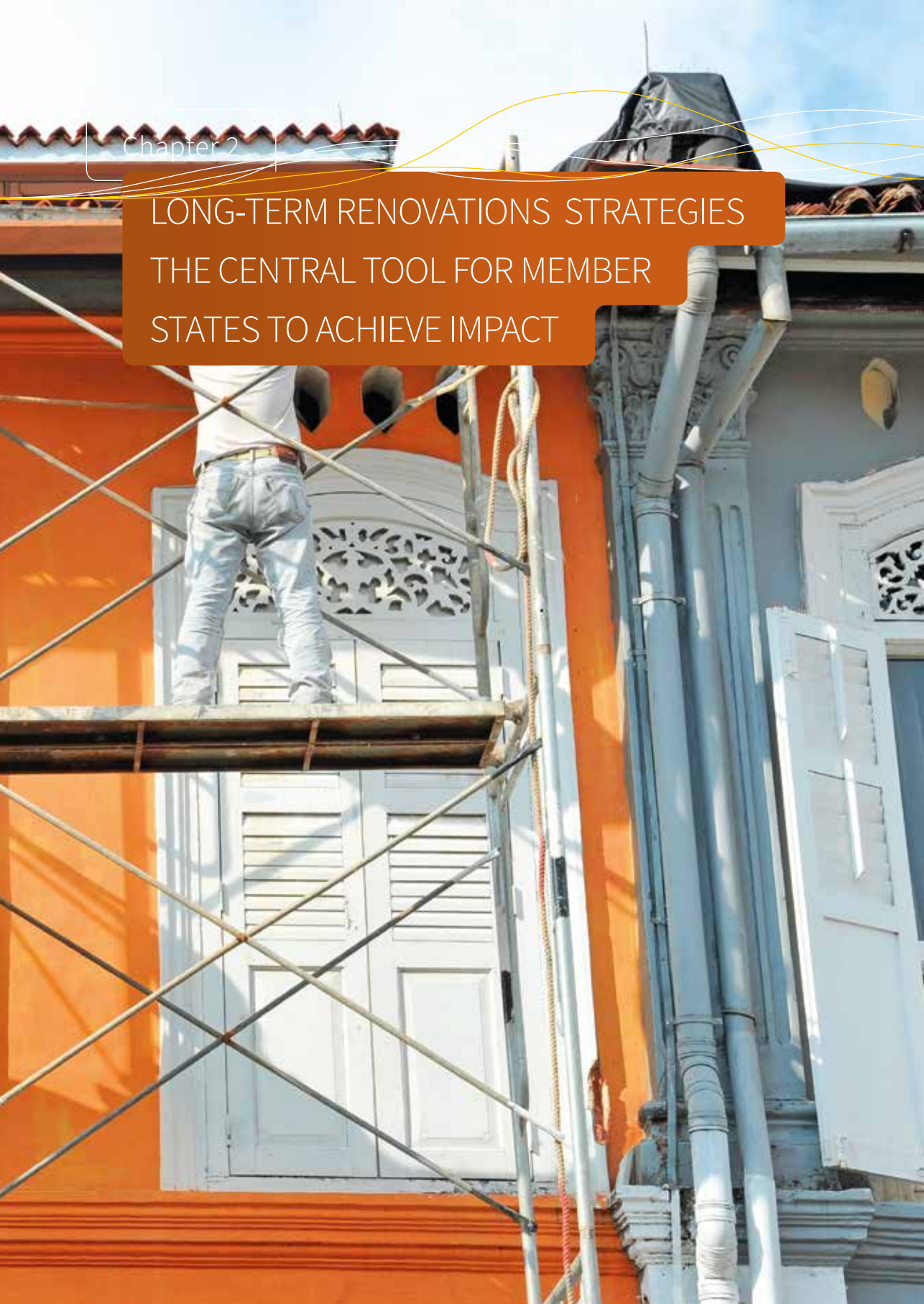
BPIE Factsheet on definitions of nZEB from the EU Member States:
http://bpie.eu/publication/nzeb-definitions-across-europe-2015/

IEA Book entitled "Capturing the Multiple Benefits of Energy Efficiency:
http://www.iea.org/publications/freepublications/publication/Multiple_Benefits_of_Energy_Efficiency.pdf

European Commission impact assessment of the revision of the EPBD:
https://ec.europa.eu/energy/sites/ener/files/documents/1_en_impact_assessment_part1_v3.pdf

Chapter 2

LONG-TERM RENOVATIONS STRATEGIES THE CENTRAL TOOL FOR MEMBER STATES TO ACHIEVE IMPACT



A key change in the amended EPBD, which is set to have a sizeable impact relates to the need for Member States to prepare and implement national Long-Term Renovation Strategies (LTRS) for their building stock. This provision offers a great tool to Member States for transforming the overall building stock to nZEB performance levels as a complement to the requirements that apply to new buildings. It was moved from the Energy Efficiency Directive (2012/27/EU) to the amended EPBD (Article 2a) and its requirements on Member States were reviewed and strengthened.

What has changed?

1. Each Member State must now prepare an LTRS, which is, in effect, a roadmap with an action plan on how to transform their building stock to a highly energy efficient and decarbonised building stock by 2050. It goes further to emphasise that the LTRS must facilitate the cost-effective transformation of existing buildings into nearly zero-energy buildings (nZEB), a provision already contained in Article 9(2)
2. The LTRS must be supported by measurable progress indicators, by indicative milestones in 2030 and 2040 and must explain how they contribute to the achievement of the overall 32.5% energy efficiency target set by the EU for 2030 (in the Energy Efficiency Directive). This clarifies expectations that the LTRS will be implemented and that their impact will be monitored – a big and welcome change
3. A clear reference to the possibility of using trigger points in the life of the building and building renovation passports to stimulate cost-effective deep renovations is included, thus encouraging more holistic approaches in energy renovation projects. Member States will need to identify these trigger points as part of their LTRS and in accordance with national practices
4. The LTRS must include policies and actions to target the worst-performing segments of the national building stock, address market failures such as occur in multi-family homes, with split incentives etc. and set out actions to alleviate energy poverty

5. The LTRS must include policies and actions that target all public buildings, a measure that should also lead to stronger implementation of Article 5 of the Energy Efficiency Directive, which relates to increasing the renovation rate of public buildings
6. Member States are now required to develop initiatives to promote smart technologies and well-connected buildings in a manner that has

a positive impact on energy savings

7. The revised Article contains more detailed requirements on how Member States can mobilise investment into energy renovations. The revised provisions also require the Commission to collect and disseminate, among the Member States, best practices on successful financing and aggregation of energy renovation projects

8. Member States are required to establish how they will undertake structured consultation of stakeholders during the preparation and implementation of their LTRS
9. Reporting on the content of LTRS and on the progress of the implementation of the LTRS has been moved to the new Governance Regulation, which requires that the LTRS be reviewed and revised every ten years by Member States. This is because they form part of the National Energy and Climate Plans, the first of which must be completed by 31st December 2019 (see timeline)
10. The title of the Article has been changed from Building Renovation to Long Term Renovation Strategy, thus giving a clear indication of its purpose. All points of the current requirements on Member States have been retained and enhanced, whilst new points have been added
11. Recital 9 of the amending Directive suggests that to further support improvements in the energy performance of their stock, Member States should consider applying (or retaining), in their LTRS, requirements for rental properties to achieve a certain prescribed level of performance

TIMELINE FOR PREPARATION OF LTRS

Initially, by derogation, the first LTRS must be submitted by the Member States to the European Commission as a stand-alone document. Subsequently, it will be included as an Annex to the National Energy and Climate Plans (NECP) that are required by the Regulation on the Governance of the Energy Union. Therefore, the timeline that Member States must respect in the preparation and submission of their LTRS is as follows:

Why are these changes important?

The EU sets the general framework conditions within which each Member State must act. These framework conditions set out the minimum requirements that must be met and never restrict Member States from going further, if it suits the national context. Keeping this principle in mind, EuroACE believes that it is a very positive sign that the amended EPBD has raised the minimum requirements for what must be contained in a national LTRS.

A national LTRS can and should be the backbone of all the efforts that a Member State undertakes to transform its building stock and should, therefore, be comprehensive, complete and coherent with other related policies and actions. To achieve such an outcome, wide consultation of the public and of affected stakeholders is essential and is now fully included. It is also crucial that Member States describe and prepare actions that facilitate the implementation of their LTRS.

Although the milestones for 2030 and 2040 are indicative, EuroACE expects that the Member

States will appreciate the benefits that using milestones brings. It also suggests that the milestones should be set as the aimed-for energy demand of the national building stock as this will give a clear expression of the ambition level that the Member State believes should be achieved at each intermediary milestone. Such milestones set markers to which all actors can refer when planning policies and actions; they boost confidence among investors as to the level of ambition and they stand as reference points against which to measure progress to 2050. They ease the adoption of more progressive measures such as the phasing out of F and G Class buildings, giving confidence to owners that the market is evolving. For all these reasons, EuroACE urges Member States to make sure that they attain their milestones as key leverage points for making progress to the achievement of the overall vision.

EuroACE sees the requirement to include an estimate of the share of renovated buildings in 2020 in the overview of the national stock as a first important milestone that will set the benchmark for the subsequent milestones in 2030 and 2040. EuroACE also believes that interested stakeholders can be relied on, through the public consultation process, to assist Member States in estimating the 2020 share, including the general depth of renovation achieved.

The implementation of the LTRS should lead to a real mobilisation for energy renovation across the whole of the EU. EuroACE notes that Member States that have set up a single, clearly mandated and well-staffed entity that is charged with the responsibility of overseeing the preparation, implementation, review, assessment and revision of its LTRS, are the ones that reap the most benefits for their citizens. These same entities are sometimes also charged with the job of managing public consultations related to the LTRS and are well-placed to undertake this work.

BELGIUM (Wallonie)

The Belgian Region of Wallonie adopted its long-term renovation strategy in 2017. It was prepared through detailed consultations with a large number of stakeholders who were organised in thematic work groups covering all relevant aspects of the strategy. This meant that the strategy was very well received in the market. In a second phase of consultations, the Region is now working again with stakeholders to define the precise means through which the strategy will be implemented in the market.

For further information on the approach used and to read the strategy itself (in French) visit:

https://energie.wallonie.be/fr/strategie-de-renovation.html?IDC=9580

What are the positive features of robust LTRS?

The earlier versions of the renovation strategies that were delivered by the Member States under the requirement set by the Energy Efficient Directive were judged by the analysis of the Joint Research Centre (JRC) to be inadequate, falling well below expectations. The JRC issued recommendations for future LTRS that should now be followed as it is necessary to avoid a repeat of the previous experiences. Co-preparing robust LTRS with affected stakeholders is therefore desirable because it will:

1. Provide an opportunity to analyse and correct earlier weaknesses, taking into account the recommendations of the JRC and of affected stakeholders
2. Deliver a 360° perspective to governments on what should be in a solid LTRS
3. Permit a greater, upfront understanding of the challenges and issues to be faced in transforming the existing building stock
4. Allow for the sharing of lessons learnt in earlier initiatives, especially those designed by local and city authorities
5. Enhance the preparedness of stakeholders and increase their commitment to the implementation of the resulting LTRS
6. Encourage a structured approach to describing the existing building stock and lead to the definition of more tailored actions
7. Allow the development of tailored narratives for actions needed for certain building typologies
8. Enable governments to undertake better energy and climate planning, notably by anchoring milestones along the way against which to benchmark progress

What benefits will arise for society from ambitious implementation of Long-term Renovation Strategies?

As noted in Chapter 1, multiple benefits accrue at different levels in society with individual benefits motivating building owners to action and wider societal benefits raising quality of life for all. EuroACE notes that LTRS must include an evidence-based estimate of the multiple benefits that will arise from the implementation of the LTRS.

Readers are directed to the sources at the end of this chapter for detailed information on the following selection of benefits:

1. The cost of energy bills is reduced through energy renovation. This is self-evident as the amount of energy required to provide

appropriate thermal comfort in a building after renovation is much less than the energy required to provide that level of thermal comfort before renovation. Indeed, in several cases such as the Energiesprong initiative in The Netherlands, energy bills are zero cost after renovation works

2. When the energy renovation works are carried out in a holistic manner, ensuring that the right combination of materials, equipment and controls are installed together, the comfort, health and well-being of occupants is boosted. This has many beneficial effects including:
   a. Health care costs for the government are reduced as sickness levels in the population drop. In fact, for every €1 invested, at least €0.42 is saved in healthcare costs
   b. Productivity and speed of learning increase, leading to more profitability in businesses and higher grades in educational facilities
3. The economic activity induced by increased energy renovation rates and depths brings growth to the whole economy. For each additional million euro spent in energy renovation an average of 17 new local jobs are created in the EU. These are quality jobs that are spread across all the actors involved, from architects and engineers to bricklayers, plumbers, labourers and facility managers
4. Public finances receive a significant boost as tax income increases from the new jobs created, VAT revenues on materials and equipment increases, social welfare payments decrease as unemployment is reduced and overall healthcare costs fall as well-being among occupants increases

How to ensure that the LTRS will drive energy renovation

EuroACE considers that of all the provisions contained in the amended EPBD, it is in the preparation, implementation, evaluation and revision of the LTRS that is the most important place for the voice of affected stakeholders to be heard. Their input, right along the process can alleviate much of the burden from the shoulders of the administrations at national, regional and local levels, whilst ensuring a smooth uptake of the measures included in

the LTRS. For this involvement to be effective, it must be purposefully structured, rigorously pursued and well-integrated. The good news is that the amended EPBD requires Member States to define modalities for consulting stakeholders in an inclusive and transparent way during the preparation and implementation of their LTRS.

This puts a responsibility on stakeholders to take an active, positive and constructive role throughout the whole process, bringing all their experience and expertise to the table and sharing it for the purpose of creating the best outcome for all. It means, for example, that in the setting up of a consultation process organised and managed by the national government, affected stakeholders should self-organise and, having developed a consensus on what to propose for the LTRS, advocate for their voice to be heard. It also means gathering and sharing key data from projects to increase the quality and quantity of data on renovation works in all Member States.

Another role that stakeholders can play is to frequently and consistently communicate on the multiple benefits that arise from energy renovation in their region or country, collaborating with governments, local authorities and the general public. In this respect they can be the originators of new evidence of the multiple benefits by undertaking own-research and/or engaging in research with others. Sharing success stories from projects of which the stakeholders have knowledge can be a powerful contribution as we all respond well to real-life stories. These success stories can also be spread across borders to catalyse and motivate actions across the EU.

Resources and references for this Chapter:

Copenhagen Economics the multiple benefits of ambitious renovation programmes:
https://www.copenhageneconomics.com/dyn/resources/Publication/publicationPDF/8/198/0/Multiple%20benefits%20of%20EE%20renovations%20in%20buildings%20-%20Full%20report%20and%20appendix.pdf

IEA book on capturing the multiple benefits of energy efficiency:
http://www.iea.org/publications/freepublications/publication/Multiple_Benefits_of_Energy_Efficiency.pdf

BPIE Publications on a wide variety of subjects that affect the energy performance of buildings:
http://bpie.eu/publications/

European Commission impact assessment of the options to revise the Energy Performance of Buildings Directive:
https://ec.europa.eu/energy/sites/ener/files/documents/1_en_impact_assessment_part1_v3.pdf

How Many Jobs? A report by the European Energy Efficiency Forum on the job creation potential of investment in energy efficiency:
https://euroace.org/wp-content/uploads/2016/10/2012-How-Many-Jobs.pdf

Build Upon Project website contains many resources on stakeholder engagement and collaboration:
http://buildupon.eu/

European Building Stock Observatory containing searchable information on the EU stock on a country-by-country basis:
https://ec.europa.eu/energy/en/eu-buildings-database

Better Places for People, is an initiative of the World Green Building Council and it has produced a set of infographics that present many multiple benefits. See here:
http://www.worldgbc.org/sites/default/files/Better%20Places%20for%20People%20-%20Schools%20-%20Infographic.pdf

Chapter 3

BUILDING RENOVATION PASSPORT A POWERFUL NEW OPTION FOR MEMBER STATES

A new option that has been opened for Member States – within the context of the Long-Term Renovation Strategies (LTRS) discussed in Chapter 2 – is the use of Building Renovation Passports (BRP). These are empowering documents that give building owners and/or managers more reliable, personalised and independent information on the potential for energy savings that is tied up in their buildings, whilst also describing the path to achieve those savings and correlated benefits. The provisions of the amended EPBD also requires the Commission to undertake, before 2020, a feasibility study on the topic as a complement to the Energy Performance Certificate (EPC).

What is a Building Renovation Passport?

It is a document – in electronic of paper format – that outlines a long-term (up to 20 years) step-by-step renovation roadmap for a specific building based on an on-site audit that fulfils specific quality criteria and indicators. It is prepared in consultation with the building owner and ensures that the full energy-efficiency potential of the building is achieved by the end of the term covered by the roadmap.

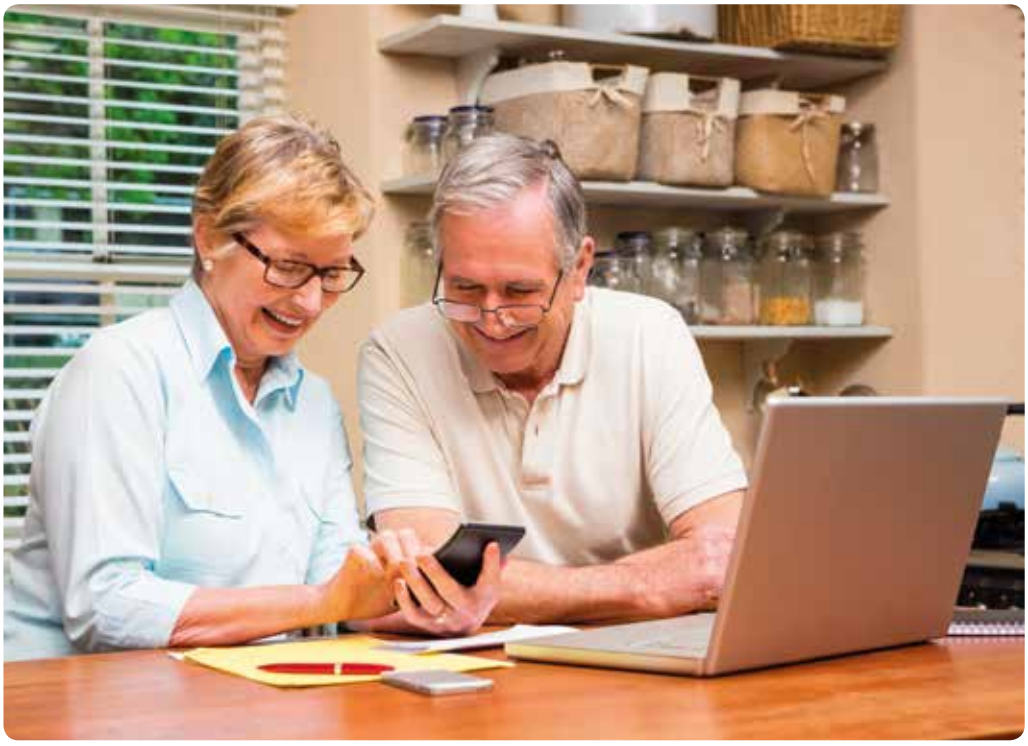
What has changed?

1. The possibility for Member States to introduce an optional scheme for individual building renovation passports (BRP) is included for the first time in the context of the requirement that Member States prepare an LTRS for their building stock (Article 2a.1(c))
2. Furthermore, Article 19a requires the Commission to carry out a feasibility study before 2020 on the possibility and timeline for the introduction of optional BRP's as a complement to the Energy Performance Certificate (EPC). The text of this Article gives some hints about the possible content of a BRP

Why is this important?

The references to the possible use of a BRP in conjunction with the LTRS and, possibly the EPC, reflects the need for better guidance and support for owners throughout their energy renovation journey. Although recommendations are included in the EPCs of most countries, they are not adequately tailored to the needs of the owner and do not motivate them into action. Findings from the new, EU-funded iBRoad project clearly demonstrate this lacuna in the present approach. The inclusion of references to the BRP in the amended EPBD is a recognition that well planned and coordinated step-by-step energy renovations are not only the best way to ensure the compatibility of short-term measures with the long-term goals set for the building stock but can also be significantly more motivational for building owners than the current, too often generic, recommendations included in EPCs. They can also anticipate future mandatory requirements and they can, as a result, collectively contribute to the achievement of the 2050 vision for the building stock.

The inclusion of the references to BRPs in the amended EPBD shows that successful pilot projects in individual Member States can directly influence the EU legislative framework. In fact, there are three Member States that are advancing plans for the widespread use of BRPs (Germany,



Belgium (Flanders) and France) and the initial experiences are proving to be very promising. They show that building owners are getting practical, tailored and independent advice and guidance on the best steps to take to achieve the full energy efficiency potential of their buildings within a defined timeline and in line with available financial resources, personal needs and expectations. The better planning of works that preparing a BRP entails should also lead to higher quality of executed works. The iBRoad project, mentioned above, is undertaking a detailed and in-depth analysis of all issues surrounding BRPs and is seeking to further promote the concept in a higher number of countries.

The use of such tools shows building owners that the improved energy performance that they expect after undertaking specifically planned works to their building, will be achieved. As such, it can also be an important supporting document for green mortgages and other financial support measures, thus linking it to national support schemes. As a BRP contains a record of the building and the works that have been previously undertaken, it brings added value to the property at the point of sale as the new owner has reliable evidence of the condition of the building and of the stage it has reached on its way to achieving its full energy performance potential.

Building renovation passports are worked out in conjunction with building owners, encouraging the uptake of energy improvements at the best moments in the life of the building (trigger points). They describe the best, most realistic and cost-effective way for a building to be brought up to its full energy performance potential. This means that effective use of BRPs will lead to an increase in the rate and depth of energy renovations across the EU and, crucially, will help to raise the quality of works, including encouraging better coordination between well-trained and accredited professionals, reducing budgetary and temporal risks.

What benefits will arise from the introduction and use of Building Renovation Passports in the market?

The benefits that will arise will mainly accrue to the building owner, but they will, by extension, be instrumental in ensuring that all the known multiple benefits that ambitious energy renovations bring will also accrue for individuals and for society at large. They can be described as follows:

1. Preparing a tailored BRP for a building makes the decision-making for building owners easier and increases their confidence that promised levels of performance will be achieved after the works
2. The building owner receives independent, structured advice on the sequencing of the best steps to take to achieve the full energy efficiency potential of their building
3. The information asymmetry usually associated with construction works is greatly reduced as all parties to a project can be given access to the same information
4. The use of a BRP empowers building owners by giving them a central role in the planning and personalisation of works to their building
5. The use of a BRP can give extra confidence to financial institutions, leading to the availability of greater financing for energy renovation

How to support the deployment of BRPs?

Stakeholders can continue to promote the concept and use of BRPs and can, in the opinion of EuroACE, specifically undertake the following actions:

1. Collect and document good examples from the market where BRPs are already in use and deliver them to decision-takers at all levels of governance, especially at EU and national levels
2. On that basis encourage the Commission to positively evaluate the use of BRPs in its assessment so that it encourages and endorses the uptake of the use of BRPs within the EU
3. Recall that a BRP is best created as a digital document in order to get buy-in from consumers and to deliver data in a 21st Century format that is sufficiently appealing and accessible. Additionally, it makes sense to consider the articulation between the EPC and the BRP in a first step as well as, later, with the smart readiness indicator (SRI) and building log books.
4. Interact with Member State administrations encouraging them to introduce BRP schemes as an option in their LTRS and follow-up on this point in the implementation phase to ensure the wide uptake and roll-out of BRPs, possibly through financing mechanisms included in Article 7 of the EED.

Resources and references for this Chapter:

BPIE, Report "Building Renovation Passports: consumer's journey to a better home", 2017
Outlining current experiences
http://bpie.eu/publication/building-renovation-passports-consumers-journey-to-a-better-home/

BPIE, Report "EPCs across the EU: a mapping of national approaches", October 2014
Exploring the various national approaches that have been taken to the use of EPCs in the market
http://bpie.eu/publication/energy-performance-certificates-across-the-eu/

iBRoad website – an EU funded project looking at how BRPs can overcome barriers to energy renovation works and looking at experiences from many Member States
https://ibroad-project.eu/news/the-concept-of-the-individual-building-renovation-roadmap/

Findings on non-effective advice included in EPCs can be accessed here
http://bpie.eu/publications/understanding-potential-user-needs/

P2E Experience website (in French) – an initiative that is analysing French experiences with BRPs
http://www.experience-p2e.org/

Dr. Martin Pehnt, "Integrating individual renovation plans and long-term perspectives into building policy instruments: an analysis of mechanisms and approaches", research paper presented at the eceee Summer Study, 2015
https://www.eceee.org/library/conference_proceedings/eceee_Summer_Studies/2015/6-policies-and-programmes-towards-a-zero-energy-building-stock/integrating-individual-renovation-plans-and-long-term-perspectives-into-building-policy-instruments-an-analysis-of-mechanisms-and-approaches/2015/6-104-15_Pehnt.pdf

BPIE Event on BRPs supported by the iBRoad Project and the Renovate Europe Campaign:
http://bpie.eu/event/13522/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Chapter 4

FINANCING ENERGY RENOVATIONS THE LINK TO IMPROVED PERFORMANCE

A key objective of the Commission, when planning the revision of the Directive, was to further improve access to financing for energy renovation projects and to give Member States the opportunity to tie existing and new financial measures to improved performance after renovation works.

In fact, one initiative that accompanied the Clean Energy for All Europeans legislative package that is intended to have a strong positive impact on financing for energy efficiency is the Smart Financing for Smart Buildings initiative (see link at end of this Chapter). Although the initiative is not targeted only at the buildings sector, the title demonstrates the importance that the Commission and the EU Institutions give to the topic of Energy Efficiency in buildings.

What has changed?

In the period since the 2010 recast of the EPBD, a great effort to better understand the dynamics of financing for energy efficiency has been successfully undertaken in the EU, particularly through the work of the Energy Efficiency Financial Institutions Group (EEFIG). Among the outputs of the EEFIG is an EU-wide database containing thousands of examples of real energy renovation projects. The database is known as DEEP (De-risking Energy Efficiency Platform) and it provides a valuable resource for demonstrating that energy renovation is affordable in today's world.

The amended EPBD takes advantage of the knowledge that has been accrued and introduces several key ways in which the financing of energy efficiency works can be improved. The main changes that have been incorporated are:

1. Under Article 2a (3) on LTRS, Member States are required to actively facilitate actions that will support the mobilisation of investments in energy renovation works:
   a. The aggregation of projects under single or multiple ownership, to make them more attractive to investors
   b. Reducing the perceived risk of energy efficiency financing
   c. Using public funds to leverage private investment

d. Guidance to show how investments can be made to improve the public building stock
e. The provision of better advice in the market, such as one-stop shops

2. Also, under Article 2a (4) on LTRS, the European Commission is required to collect and disseminate to public authorities across the EU, information on best practices in the field of financing public and private investment into energy renovation works.
3. A new provision has been added to Article 10 on *Financial Incentives and Market Barriers* that requires Member States to link their financial measures to the targeted or achieved energy savings

mechanisms proposed are ones that have proven to be viable in the market. For example, the use of one-stop shops to provide reliable, independent advice to building owners on the financing options available to them has stimulated renovation works in countries such as France, and the creation of an aggregated offer to the market from a group of companies acting together in Denmark (BetterHome) has seen an increase in demand for more holistic renovation projects.

Collecting and sharing best practices will also be crucially important as the data increases on the low-risk, high quality results of properly planned and executed energy renovation works.

DENMARK

The BetterHome Initiative

BetterHome is an industry-driven one-stop-shop model, which has proven successful in boosting demand for holistic energy renovations in Denmark. The model was launched in 2014 and it was profitable after just three years, with 200 projects in 2016 and is expected to continue its growth. Understanding that renovating a building is a big commitment, this model creates a burden-free experience for the building owner and offers a service that goes beyond replacing building components. The success of the home-owner-centric business model can be explained by the advanced service-oriented role of the installers. BetterHome trains and guides the installers on how to approach the customer, from the first contact to the finalisation of the process. In support, BetterHome also simplifies and structures the renovation process for the installer, through supportive and innovative digital tools, enabling a better outcome for all involved.

Why is this important?

To achieve the vision of a highly energy efficient and decarbonised building stock by 2050, a significant increase in the rate and depth of energy renovations will be needed. This will not happen without ensuring that:

1. Projects are investment-ready through measures such as bundling
2. Access to financing from multiple private sources including high-street banks, pension houses and investment funds is easily available

The amended EPBD will address many of the concerns around the need for financing and the

Finally, linking the availability of financing to the energy savings targeted, such as occurs in the German KfW Scheme, will also stimulate the market to better estimate and measure the energy savings that can be achieved. It will also act as a catalyst for the improvement of the quality of energy performance certificates (or similar equivalent documents) as the financial institutions begin to rely on such documents for their decisions on granting loans to customers. A very promising initiative that is exploring this issue is the EeMAP Project due for completion in 2019, that will see an offer of green mortgages being rolled out across the EU.

What benefits will arise from linking financing to targeted or achieved energy performance after energy renovation works?

Once the new provisions are transposed and implemented across the Member States, there should be a noticeable increase in confidence among investors and banks in the quality and reliability of energy renovation works. This will, in turn, lead to a greater range of offers in the financial markets and thus ease the flow of funds to energy renovation projects. It will also increase the value of properties and reduce exposure to brown discounts during property-related transactions.

The impact will therefore be to increase the rate and depth of energy renovations and the quality of the works. EuroACE looks to the Member States to continue to pay attention to the whole area of financing for energy renovation and to ensure that communication efforts around the availability and terms on which favourable financing can be purchased is continuously pursued, not just at the launch of new approaches or programmes.

As mentioned above, there are several good reasons to link financing to energy performance:

1. Certainty is introduced into a market where uncertainty has been too prevalent in the past. This certainty can be further enhanced through the setting of binding milestones for 2030 and 2040 in the LTRS (see Chapter 2)
2. The reliance by financial institutions on documentary evidence of the improvement of energy performance will, by itself, lead to an improvement in the quality of the documentation
3. As the data from more and more projects is gathered and tabulated, the reliability of forecasting the energy performance will increase. The same data can be used to improve the processes that go into energy renovation programmes and projects
4. The increased attention that financial institutions will pay to the quality of the outcome of works will catalyse an improvement in the quality of the works themselves as contractors will be concerned to maintain a good reputation

What role should stakeholders play?

Stakeholders from all along the value chain can play a role by taking responsibility for their part in the process, ensuring that their inputs are of the highest quality. Key to the success of the new provisions is the need to report and record all the information relating to a project and to capture it for injection into the feedback loop that will lead to continuous improvement of the energy renovation process.

In this respect, the role that existing and planned national databases of energy performance certificates can play could possibly be expanded. Creating mechanisms through which stakeholders can securely and confidentially upload results from projects in which they are involved would rapidly increase the quantity of data available. This could, in turn, further boost confidence that targeted savings are being achieved.

EuroACE believes that stakeholders are well placed to cooperate with Member State authorities that are now required to collect and share best practice examples, in a manner that will rapidly lead to a significant improvement in the quality and resulting performance of energy renovation works. That cooperation will be extended beyond the traditional construction value chain, involving mainly technical issues related to the project, to cooperation with public authorities, banks and financial institutions on recording outcomes and tagging energy efficiency investments, to build a body of evidence and knowledge with the potential to readily transform the energy renovation market.

Stakeholders can also raise their voices to ensure that the forthcoming EU Budget and Multi-Annual Financial Framework (MFF) dedicates adequate resources to climate-related actions, especially energy efficiency in buildings. They can point out that these EU resources are best used to achieve EU objectives such as those set out in the amended EPBD. The emerging reality for public funds is that they are increasingly tested against climate-related realities and are increasingly referred to as sustainable finance. Energy renovation, with its multiple benefits across all

THE CZECH REPUBLIC

In the Czech Republic, national funds arising from the revenues earned under the EU Emissions Trading Scheme have been successfully deployed over many years to boost energy renovation. It is a shining example of how national climate-related funds can be wisely spent.

ROMANIA

In Romania, there has been some good use of EU Funds through programmes aimed at energy renovation of buildings. One example relates to privately owned buildings:

http://bpie.eu/news/romania-receives-eu-funding-for-improving-the-energy-efficiency-of-its-building-stock/

And another to both publicly and privately owned buildings:

https://www.publenef-toolbox.eu/cases/marathon-2020-community-bucharest-district-1-be-first-energy-efficient-community-romania-2020

three pillars of sustainable development is a sector ideally placed to absorb these funds. Recognition by Member States that their building stock represents a critical infrastructure for the viability and vitality of its economy should lead to the sector being treated as a strategic priority leading to the easier allocation of funding for the sector from national and EU budgets.

Resources and references

BPIE, Factsheet "Attracting Investment in Building Renovation", 2017
http://bpie.eu/publication/attracting-investment-in-building-renovation/

eeMAP Project on creating green mortgages across the EU
http://energyefficientmortgages.eu/

European Investment Bank, Smart Financing for Smart Buildings Initiative, February 2018
https://ec.europa.eu/info/news/smart-finance-smart-buildings-investing-energy-efficiency-buildings-2018-feb-07_en

Energy Efficiency Financial Institutions Group (EEFIG)
Joint initiative of the European Commission and UNEP Finance, whose reports have transformed institutional understanding of how to finance energy efficiency projects
http://www.eefig.com/

DEEP Database
Pioneering database that gathers information on energy efficiency projects in the buildings and industrial sectors. The information that it holds demonstrates that energy efficiency investments are affordable in today's world
https://deep.eefig.eu/

BetterHome
Initiative of four Danish companies that have voluntarily come together to make a holistic renovation offer to the Danish market. It could be replicated elsewhere
https://www.betterhome.today/ (in Danish)

Citynvest project report containing description and analysis of financing models used by cities:
http://citynvest.eu/sites/default/files/library-documents/20151202_WP2_Final_Report-V1.5.PDF

Chapter 5

SMART AND TECHNOLOGY EQUIPPED BUILDINGS

The amended EPBD contains a significant change to the way that technical building systems (TBS) and building automation and control systems (BACS) are treated. They are crucial to the overall energy performance of buildings and must be installed and maintained to remain highly efficient and precisely controlled under dynamically varying demands. The main function of these TBS is to provide heating, cooling, ventilation, hot water and built-in lighting in buildings. Their interactions with the building envelope and their operation and maintenance over time have a big effect on overall energy use, on occupant well-being and comfort and on our chances of achieving long-term decarbonisation goals.

What has changed?

1. **Increased transparency and compliance**: The requirements for documenting and sharing information on the performance of TBS have been strengthened in Article 8(9) to ensure that whenever a TBS is installed, replaced or upgraded, a new assessment of its overall energy performance is made and handed over to the building owner. The aim is to facilitate the verification of compliance with the minimum energy performance requirements that shall be laid down at national level under Article 8(1). It will also enhance the owners understanding of the TBS and how best to manage them to achieve the highest possible energy efficiency improvement and to optimise comfort, well-being and health. However, in order to provide a complete picture, EuroACE recommends that the overall energy performance of the complete altered system should be assessed and not just the altered part of the TBS in question
2. **Stimulate market uptake of smart technologies with a meaningful smart readiness indicator**: The European Commission is required, under Article 8(10) and (11) and Annex Ia to establish an optional common European approach for rating the smart readiness of buildings before 31st December 2019. It must be prepared in consultation with stakeholders
3. **New, updated definition**: The definition of TBS in Article 2(3) has been expanded to mention built-in lighting and to include on-site electricity generation and BACS for which a specific definition is added in Article 2(3a). EuroACE recalls that Member States may also include, in their national definitions and energy performance calculations, other energy-using technical building systems, such as lifts and escalators that are not included in the amended EPBD.
4. **Roll-out of no-regret basic functionalities**: A requirement to install, where technically and economically feasible[3], self-regulating devices to regulate individual room temperature levels in all new buildings and in existing buildings when the heating system is replaced, is added in Article 8(1)
5. **Inspections of heating and cooling systems**: The thresholds for the inspection of the accessible parts of heating, cooling and ventilation systems (or combinations of these systems) have been increased in Articles 14 and 15 meaning that a potentially large number of systems being inspected today, will no longer be required to be regularly inspected. EuroACE encourages Member States where inspections are currently required below the new threshold,

[3] Recital 21 of the amended EPBD gives an example of economic feasibility stating that if the cost of replacing the self-regulating devices is less than 10% of the cost of the replaced heat generator, then it is economically feasible to replace the self-regulating devices

to maintain those inspection regimes for their territory in accordance with the text of Recital 39. This will mean that more building owners get reliable information on the performance of their systems

6. **Provisions to ensure that investments in buildings deliver expected energy, health and comfort benefits under real-life building operation conditions**: Articles 14(1) and 15(1) introduce a requirement for inspections when assessing the efficiency of heating and cooling systems to include an assessment of the capabilities of the systems to optimise their performance under typical or average operating conditions as defined in Recital 36, which gives a background explanation of what is meant by such part-load operating conditions. This assessment can easily be performed via a check list of installed TBS – an approach already used in some Member States
7. **TBS explicitly covered by energy performance contracts** that are operated by a utility or network operator, are exempted from the inspection requirements of the amended EPBD
8. **Alternative measures to inspections**: Member States that choose the alternative of providing advice to building owners about the replacement of all or part of their TBS are now required to document, for the European Commission, the equivalence of the alternative to inspections prior to introducing advice programmes in their jurisdiction. EuroACE recommends that Member States ensure that a robust methodology is used to properly measure energy performance before and after the introduction of such programmes in order to be able to accurately quantify their impact
9. **Mandatory roll-out of BACS in larger non-residential buildings by 2025**: Member States must set requirements to ensure that by 2025, large non-residential buildings, whether new or existing, are equipped with BACS that are able to deliver certain key functionalities as listed in Article 14(4)
10. **Roll-out of electronic performance monitoring and effective control functionalities in large residential buildings: For large residential buildings**, Member States have the option to set requirements for the installation of continuous electronic monitoring that informs building owners when the efficiency of the TBS has fallen significantly

and when system maintenance is needed. Member States may also ensure that they are equipped with effective control functionalities that ensures optimum generation, distribution, storage and use of energy such as dynamic balancing.

11. **Giving the choice to end-users between inspections or automation and control functionalities**: A provision is introduced into Articles 14(6) and 15(6) exempting buildings that are equipped with BACS or continuous electronic monitoring from the inspection requirements.

Why is this important?

The use of TBS and BACS in buildings has slowly increased in recent years but the potential remains very high, considering the positive synergies with increased building envelope performance and the accelerating digitalisation of our economy. At the same time, basic control functionalities that help to deliver significant energy savings, health and comfort benefits are still missing in most buildings, despite short pay-back times. It was therefore essential to revise and update the provisions of the EPBD to reflect this technical progress and market failures to simplify the task of transposition and implementation through new provisions in Articles 8, 14 and 15.

The efficiency of TBS can drop significantly when they are not properly serviced, maintained and optimised under typical usage conditions. The amended EPBD, increases the thresholds for inspections of heating and cooling systems, but it remains a fact that it is beneficial for owners of smaller systems to regularly inspect them in order to detect technical problems and inefficiencies faster. More comprehensive building management systems can auto-detect such issues and communicate remotely to control centres for fast and automated service and repair.

Several studies demonstrate that the final energy demand of buildings can be reduced significantly by optimising TBS (ECOFYS 2017) in addition to investments on the envelope. Yet this potential is largely untapped. In addition, in large buildings, the energy performance of TBS over time can drop significantly when they are not properly serviced and maintained. Finally, there is a need to match theoretical energy performance with actual energy performance. The ability of TBS to optimise under real life conditions, or typical usage conditions, is crucial in this regard.

The amended EPBD aims at harvesting these potential benefits by introducing basic control functionalities such as mandatory individual room temperature control when the heat generator is replaced, increasing transparency and accelerating the roll-out of BACS and electronic monitoring and control functionalities in large buildings. The revisions also make it more likely that the potential of TBS and BACS to increase energy performance in our buildings is exploited to the benefit of occupants.

The increased emphasis that successive changes to building regulations have brought to improving the energy performance of buildings means that it is more important than ever to enhance the synergies between active and passive approaches to improving energy performance. It is now possible, thanks to the increased performance of buildings, to go further than creating comfortable and healthy indoor environments to enhance the potential for buildings to interact with energy grids and to function as key energy storage hubs at district or regional levels.

EuroACE believes that the starting point for a Smart or Smart-ready building is that it is first highly energy efficient, meaning that it has a very good envelope with efficient equipment and controls. This is consistent with the vision for 2050 for the building stock that is included in the LTRS (see Chapter 2). The introduction of the Smart Readiness indicator (SRI) will add value by providing a reliable description of the systems in the building and how they can support the building occupant in controlling indoor conditions and how ready the building is to act as a key component in the overall energy system.

What will the impact on current practices be?

The changes to the inspection regimes in Article 14 and 15 of the amended EPBD may mean that much fewer buildings will have their TBS inspected. This arises because the thresholds for inspections have been significantly increased. EuroACE advises that Member States that have inspection regimes for smaller buildings in place, keep them in place so as to keep the number of buildings inspected high.

On the other hand, EuroACE welcomes the introduction of mandatory BACS for larger non-residential buildings as it will encourage their wider and more rapid deployment in the market. In this respect, EuroACE anticipates that the benefits of using BACS will become more widely appreciated and that they will be used, in due course, in smaller non-residential buildings too.

Finally, the introduction of the SRI will add value, particularly for non-residential buildings, where interactions with the grid can frequently be a sizeable cost reducer or an income stream.

What benefits will arise from increased attention on TBS and BACS?

The opportunity to better manage energy flows and to better control indoor environments within highly performing buildings will deliver greater comfort, better living, studying and working conditions and lower costs when the systems are properly and regularly adjusted. The resulting increased productivity and well-being will boost profitability and our economy. TBS and the easy control of them can also add other benefits of comfort, security and safety for consumers.

The synergies that can be developed between passive (largely envelope) systems and active (largely equipment) systems will mean that the full potential of buildings to act as consumers, producers and storage points of the energy system can be fully exploited and that the theoretical and actual energy performances match i.e. these synergies should lead to benefits such as a reduction in the gaps that are observed between calculated and real operating energy performance. As new business models emerge in the market the quality of TBS and BACS will also improve, providing even more energy savings.

What role should stakeholders play?

As the developments in TBS and BACS are accelerating, there is a responsibility on stakeholders to inform and raise awareness among consumers, building managers and policy-makers of the functionalities, capabilities and cost-effectiveness of the various solutions in the market. In doing so, it will be important, in the eyes of EuroACE and its members, to constantly recall that TBS and BACS operate at their most efficient when they are installed in combination with highly performing building envelopes and when they are subject to continuous commissioning, inspections and maintenance.

National stakeholders should also ask Member States to take up the option to introduce requirements for the installation of continuous electronic monitoring in large residential buildings, emphasising the benefits in terms of increased economic activity, more reliable data and energy savings that would result.

Member State authorities will have a role to play in informing and raising awareness in the market about the new mandatory requirements for large non-residential buildings in respect of the installation, proper commissioning and maintenance of BACS ahead of the 2025 deadline.

Resources and references

BPIE, Report "Smart Buildings Decoded. A concept Beyond the Buzzword", June 2017
What a smart building really is and what multiple benefits arise from ensuring buildings are truly smart
http://bpie.eu/publication/smart-buildings-decoded-a-concept-beyond-the-buzzword/

Smart Energy Europe
A source of various papers on the smartness of buildings and on demand response
http://www.smarten.eu/position-papers-reports/

Ecofys for Danfoss, Report "Optimising the energy use of technical buildings systems – unleashing the power of the EPBD's Article 8", March 2017
https://www.ecofys.com/en/publications/optimising-the-energy-use-of-technical-building-systems/

Transsolar Sas for Eurima, Reference House Study, January 2017
The interaction of technologies in buildings
https://www.eurima.org/uploads/ModuleXtender/Publications/162/Ref_House_Study_HeatingColling_small_08_02_2017.pdf

Chapter 6

HOW TO DESCRIBE THE ENERGY PERFORMANCE OF A BUILDING

Putting energy efficiency first in methodologies based on Annex I requirements

Several changes have been introduced into Annex I of the amended EPBD, which describes what must be included in the methodologies that the Member States use when describing the energy performance of their buildings. The changes should affect current practices in positive ways, including better use of European standards, increased transparency and lower discrepancies between Member State methodologies across the EU. They also aim to clarify how Member States can account for the use of renewable energy sources (RES) linked to a building.

What has changed?

The impact of the revisions to the text of Annex I may not become fully evident in the short term, but they should reinforce the objective of the Directive, as stated in Recital 43, to reduce the energy needed to meet the energy demand associated with the typical use of buildings. The revisions mean that there will be an emphasis on calculating the primary energy use of the building after reflecting the typical energy needs of the building. The new approach should mean that Member States may encourage the use of on-site RES to reduce the demand of a building on the energy grids, but this should always be in conjunction with seeking energy savings from the building, its equipment and controls. Such an approach is in line with the definition of a nearly zero-energy building (nZEB).

The notable changes to Annex I are:

1. A specific requirement is added that requires Member States to ensure that the optimal energy performance of the building envelope is pursued in their national methodologies. This is a good provision as it underpins the fact that reducing the overall energy demand is the most effective strategy to optimise the energy performance of a building and to deliver benefits to occupants. It is widely accepted that TBS and BACS are most efficient in combination with highly performing building envelopes
2. A link is made between the energy needs of a building for space heating, space cooling,

domestic hot water, built-in lighting, ventilation and other TBS and the creation of comfortable conditions in the building, as defined at national and/or regional levels

3. The common metric for expressing the energy performance of a building and for the purpose of energy performance certification and compliance with minimum energy performance requirements, must be primary energy use expressed in kWh/m^2/year, but Member States have the option to define additional numeric indicators in line with CEN/ISO Standards. Expert opinion, including from the European Council for an Energy Efficient Economy (eceee), emphasises that using multiple indicators to describe the energy performance of a building is necessary to provide an accurate picture of the impact of various measures on energy performance
4. The treatment of RES, whether it is on the building, on-site or distant must be accounted for on a non-discriminatory basis in the chosen calculation methodology. This reinforces the principle that the share of RES used by the building can be counted as if it increases the energy performance of the building – a long-standing feature of the EPBD. Notwithstanding this, EuroACE recalls that all the multiple benefits of energy renovation cannot be achieved by simply switching the energy supply of a building to RES. This is particularly the case for thermal comfort which is best achieved by reducing thermal transfers through the envelope
5. Taking into account the positive influence of several factors that influence the energy performance of a building, including local solar exposure conditions (a proxy for energy balance) is no longer optional. Calculation methodologies must take these into account from now on (Annex I, paragraph 4, first sentence).

What approach to describing the energy performance of a building does the revised Annex I lead to?

In order to reliably report against the objectives of the EPBD, it is necessary to first of all know what the energy needs of the building are. By this, we mean the amount of energy (regardless of its source) that must be used in order to provide the right comfort and health conditions inside the building for the activities that are carried out there. Within the amended EPBD these are restricted to the energy needed for heating, cooling, ventilation, hot water, built-in lighting and other TBS.

Therefore, the best methodology is one that first calculates the energy needs of the building and then states how those needs are fulfilled through energy supply and what share of the supply arises

from RES (regardless of its type or location). Then the result can be translated into a primary energy use expressed in kWh/m²/year, by applying the correct primary energy factor to each and every source of energy supplying the building.

The resulting number will be compliant with Annex I and will closely reflect the typical energy use of the building. It will also be possible to determine what share of the energy supply is fulfilled by RES and consequently enable authorities to assess how close the building is to the nationally defined nZEB level and its subsequent evolution over time.

What is important to consider in the Annex?

Given that the long-term objective stated by the amended EPBD is to transform the existing building stock into a nearly-zero energy building stock by 2050 (Recital (9) and Article 2a, paragraph 1) and given that it is very important to maintain continuity between earlier versions of the EPBD, it is essential to ensure that the calculation methodology fulfils that role by putting the reduction of energy demand first, as required by the definition of a nearly Zero Energy Building (nZEB,) before accounting for any RES produced or used in or around the building. This approach aligns well with the efforts of the European Commission to ensure that the energy efficiency first principle is applied in all energy-related policies and legislation.

In accordance with the nZEB definition, reducing energy demand first through passive (envelope) and active (TBS and BACS) measures is a first step, and the step that has the most impact on health, comfort and well-being in buildings. To this end, Member States often have to revise or refine their building codes on these aspects and EuroACE holds that further development of standards in these areas is necessary. If the deployment of RES is used as a proxy for reducing energy demand, then the rightful expectations of owners with regard to these multiple individual benefits will not materialise and confidence in the objectives of the amended EPBD will be undermined.

Similarly, the calculation of the efficiency of heating and/or cooling generators must take account of the fact that innovative (hence the most highly energy efficient) generators of heating and/or cooling operate, for the majority of their running time, at part load conditions. Not taking this aspect into account can lead to an inaccurate calculation.

If the revisions to Annex I lead to substantial changes in the methodologies that have been used up to this time by individual Member States, then all comparisons over time may become meaningless. Notwithstanding this, EuroACE recognises that more refined calculation approaches are needed for nZEB to reach robust outcomes. This means that measuring progress over time and over the different iterations of the EPBD will probably be difficult, if not impossible, opening a need to consider the introduction of aggregated energy performance indicators.

Therefore, the adopted changes should be read, on an aggregated level, as providing a means to clarify and/or simplify the task of Member States in calculating the energy performance of their buildings.

What role should stakeholders play?

It will be helpful if Member State authorities consult expert, market-based stakeholders before introducing any changes to the current methodologies for describing the energy performance of buildings applied in their countries. Such a consultation would ensure that compliance with changes introduced by the amended EPBD and their impact on current practices are fully understood before changes are made. It would also allow for an open debate on how best to interpret the changes and minimise any difficulties that changes may bring.

Private stakeholders must be ready to play a positive role in ensuring that any revisions to national methodologies have positive impacts on the market and on current practices.

Sources and references for this Chapter

eceee, Note on Annex I, December 2017
Explains the rationale behind the best methodology in detail
https://www.eceee.org/policy-areas/Buildings/cut-energy-needs-first/

Transsolar Sas for Eurima, Reference House Study, January 2017
Recalls the benefits of reducing needs first in a holistic approach to renovation
https://www.eurima.org/uploads/ModuleXtender/Publications/162/Ref_House_Study_HeatingColling_small_08_02_2017.pdf

European Commission, Recommendation 2016/1318, "Guidelines for the promotion of nZEB and best practices to ensure that, by 2020, all new buildings are nZEB", July 2016
https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016H1318&from=EN

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