

Brussels, 30 October 2015

Public Consultation on the Evaluation of the Energy Performance of Buildings Directive (EPBD)

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A. Overall Assessment

Currently, about 35% of the EU's buildings are above 50 years old. Buildings are responsible for 40% of energy consumption and 36% of CO₂ emissions in the EU, and consume, on average, about 25 litres of heating oil per square metre per year. Some buildings even require up to 60 litres.

The Energy Performance of Buildings Directive (EPBD) aims to:

1. Improve the energy performance of buildings in the EU, taking into account outdoor climatic and Local conditions, as well as indoor environment requirements and cost-effectiveness.
2. Require Member States to set energy performance standards for buildings,
3. Require Member States to issue buildings with energy performance certificates, and
4. Require Member States to ensure that, by the end of 2020, all new buildings are “nearly zero energy” buildings

It sets out concrete ways of achieving the great untapped potential for energy savings in buildings and reducing the large differences in results that exist in energy saving outcomes between Member States.

1. How successful has the EPBD been in achieving its goals?

Improvements have been made, especially regarding the design of buildings on a European level. However, there is still a need to evaluate the real targeted energy consumption actual user profile of new buildings. Also, the building stock within and between member states is very heterogeneous: the needs for renovating buildings is much greater in some parts of EU than others.

The need for renovating buildings is still very important. -More focus should be placed on short payback time renovations. The integration of renewable energies is also not sufficient.

The review of the directive should ensure a high level of integration of innovation in the market and drive the Directive towards “connected buildings”.

2. Has it helped to improve energy efficiency in buildings?

According to Eurostat data although building numbers and surfaces increased over the last 10 years, the energy consumption in EU buildings that was increasing up to 2006 returned to the 2000 level in 2012

However if this is the case for the overall energy consumption, this is not the case for the electricity consumption which grew more than 20% over the period.

This illustrates the need to go beyond thermal performance and to cover all actual energy uses.

3. Has it helped to increase renovation (more than 25% of the surface of the building envelope) rates?

Increase yes, but not as much as intended. In general when houses are ready for basic renovation, energy efficiency is more on the agenda now than in the past. On the other hand limit values on energy efficiency may also postpone some renovations. Furthermore the EPBD provides a lot of exceptions e.g. Art. 4 2, Art. 9 6 or Art. 12 6 which MS like to refer to, when implementing the EPBD in national law.

The following points may improve the contribution to renovation:

- Building renovation strategies: there is room for improving the existing strategies and all countries have not yet adopted them
- Energy certificates: there is still need for better visibility, databases need to be developed on a national base and consumer trust must be increased.
- Public procurement: energy efficiency is not yet systematically integrated into public procurement processes
- One should mention that smaller renovations, such as active energy especially for tertiary, can also contribute to energy savings.

4. In your view, has the EPBD sufficiently contributed to accelerating investment in improving the energy performance of the EU's building stock? Why/Why not?

Energy efficiency in new buildings is on a quite high level. In the coming years we will start to see clear results also from the NZEB buildings. For older buildings the situation is more heterogeneous: the variation on energy performance is very large. Step by step renovations, based on the merit order of the solutions defined on the payback time, should be promoted. The interest of building owners' and tenants' when it comes to energy performance is still problematic.

5. Overall, do you think that the EPBD is contributing to cost-effective improvements in energy performance? Why/Why not?

Yes, thanks to the EPBD, the discussion on cost effective improvements has risen to a new level in the building sector.

Yes, for new buildings, clearly there have been improvements. For existing buildings, however, the situation is more complicated due to the heterogeneous nature of the building stock.

The issue of payback time is not taken into account in the regulation. Step by step renovations, based on the merit order of the solutions defined on the payback time, should be promoted.

6. Do you think that the aim of ensuring the same level of ambition across the EU in setting minimum energy performance requirements within the EPBD has been met? Why/Why not?

No, it is very hard to compare buildings across Europe due to large differences in climate, calculation methodologies for energy performance and ambition levels.

7. Has the EPBD effectively addressed the challenges of existing buildings' energy performance?

The challenges on energy performance for existing buildings are multidimensional. The building stock is very heterogeneous, some need improvements in energy performance and others still have fairly good level of performance. The high focus on building structures and on deep renovation which needs significant initial investments (typically 300 € - 900 € per m²) is resulting in a strong barrier (high investment and long pay back) more focus should be given to implementing automation and control solutions on the building stock as lower up front investments (typically 30€ per m²) can give pay back as quick as two to three years.

There is a need for more information on energy efficient renovation and how to get funding for these renovations. Through Energy Performance Certificates, the EPBD raised the issue of energy performance of existing buildings. However, this did not trigger really actions to improve the performance. How to incentivize and perhaps even mandate improvement actions of worst performing buildings should be looked at.

8. Has the EPBD set effective energy performance standards for new buildings?

Yes, it has.

In addition, a Life Cycle Assessment approach, based on real measurements of energy consumption, should consolidate the progress made and ensure a continuous improvement in energy efficiency.

9. Will the 'nearly zero-energy buildings' targets be met? Why/Why not??

They will be met only if the goals are set on a national level. We expect to see large differences regarding the level of ambition between member countries. The real consumptions need to be measured in order to learn and adapt the regulation when gaps are observed between theory and practice. Storage and load shifting capabilities through demand response should be considered. With progress in storage technologies, demand response and developments in renewables technology, the building is not always the right perimeter to address the issue; district level and building exchanges at district level should also be considered.

10. How successful has the inclusion of Energy Performance Certificates in the EPBD been? Have the certificates contributed to improvements in energy performance of buildings?

Properly made certificates have a positive effect on sensitizing consumers through information, however are not automatically leading to investments in and therefore improvements of the energy performance. Unfortunately, in some member states there are large variations in the quality of the certificates on the market. There is a lot of misunderstanding around certificates: the purpose of the certificate is to help compare buildings between each other and it should be based on the features of the building and standardised user profile. In addition, there is a need to calculate targeted energy consumption based on the actual user profile and to measure the real energy consumption.

The certificate is based on estimation, mainly taking into account the building structure. It is often far from the reality in terms of real use. Most often the recommendations for improvements are rather generic than tailor made to the specific building. There is still need for better visibility, and consumer trust should be increased. Discrepancies between the energy consumption of the Energy Performance Certificate (conventional, 5 energy uses only (heating, hot water, lighting, ventilation and auxiliaries)) and the actual energy invoiced (including maintenance) is an issue for the understanding of the certificate by the consumers.

11. What has worked well in the EPBD? What needs to be improved?

The general intention worked well. The directive has lifted the discussion on energy efficiency to a new level and the update of building standards to include EE. NZEB buildings is also a step in the right direction, but future buildings need to adapt better to the change in energy production from centralised energy production to renewable and distributed energy (demand control). For existing buildings, we need new financing schemes to be developed according to the best schemes in Europe. Moving towards connected buildings because of the potentials; redesigned energy market (cue: Energy Union) has to be included in all the sub-directives (EED, EPBD, Ecodesign etc.)

Three examples of improvements:

- Give power to the energy user on his whole energy use scope
- Consider all building segments, both residential and non-residential
- Get synergies between energy efficiency, flexibility demand-response, CO2 emissions reduction

Energy efficiency technology, demand response services and grid flexibility –smart grids are three no regret options)

Building energy management systems are able to optimize supply and demand according to price signals sent to consumers, but also to foster energy cooperation between buildings at district level. Mandatory measurements need to be cost effective.

Market surveillance and inspections should be improved, including on heating and air conditioning installations. Mandatory maintenance of the technical equipment where relevant (boilers, heat pumps, ventilation) could be beneficial.

12. Is the EPBD helping to contribute to the goals of EU climate and energy policy (Reduce greenhouse gas emissions by at least 40%; increasing the share of renewable energy to at least 27%; increasing energy efficiency by at least 27%; reform of the EU emission trading system)?

To reach the three goals of EU energy climate policy energy efficiency technologies, demand response services and smart electricity distribution grids are three no regret options with a positive business case and they are instrumental in order to lower as much as possible the cost of renewable sources' integration.

This should be taken into account for the building in the energy performance and specifically use of technologies (automation, control, communication) which are the basis of this flexibility should be the core in the EPBD.

In general, the EPBD needs to be more integrated with future trends and technology, such as the Internet of Things (IoT).

13. Is it in line with subsidiarity? What should continue to be tackled at EU level and what could be achieved better at national level?

The EPBD sets the ground rules. But due to various climate and local building standards and regulations several issues need to be kept on a national level.

14. Are the objectives of the EPBD delivered efficiently?

Building owners, and building managers are now more sensitive to energy efficiency.

It is however essential to become more accurate, fact based, in order to ensure permanent improvement of energy efficiency of buildings. The specific point of renovation can also be better tackled.

Verification on new buildings are easy thanks to mandatory permits to be obtained from the authorities.

However, for renovations, there are not sufficient controls-verifications and the regulation is not known by owners.

15. Has the EPBD created any unnecessary administrative burdens? If so, please provide examples

On local government level there is unfortunately a large variation in the interpretation of the building standards and regulations from federal state to federal state or even city to city, which is problematic for the construction sector. Administrative burden is created, for example due to the transposition in France for industries who want to place innovative technologies on the market. The review should provide a strong disposition for MS to ensure that the innovations can be easily taken into account.

16. Has the EPBD created any unnecessary regulatory burdens? If so, please provide examples

B. Facilitating enforcement and compliance

Compliance is recognised as being of critical importance in achieving the full energy efficiency and carbon savings potential of buildings. Strong local and regional verification of compliance with national building codes is required in order to reassure consumers of the quality of buildings.

The 2010 recast EPBD introduced targets for Near Zero-Energy Buildings (NZEBS) and more ambitious minimum energy performance requirements for new buildings. The EPBD defines NZEBs as a building that has a very high energy performance as determined in accordance to Annex I of the directive. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby. The EPBD sets the target for Member States to ensure that by 31 December 2020, all new buildings are nearly zero-energy buildings, and after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings.

The EPBD also considerably reinforced the provisions for existing buildings, broadening the scope to all existing buildings (removing the 1000 m² threshold). It set and applied minimum energy performance requirements for the renovation of parts of the building envelope (roof, walls, etc.) with a view to achieving cost-optimal levels. It also set and applied minimum energy performance requirements for technical building systems (large ventilation systems, air conditioning, heating, domestic hot water system or combination of these) whenever they are installed, replaced or upgraded. It applied minimum energy performance requirements to all types of building works. The EPBD introduced a benchmarking system (the 'cost-optimal methodology' which calculates the energy performance level which leads to the lowest cost during the estimates economic lifecycle) to improve the level of ambition of the energy efficiency requirements contained in national or regional building codes while ensuring that these obtain the best value for money and that they are regularly reviewed.

A key aspect to be examined as part of the EPBD evaluation is how proper enforcement of the energy efficiency requirements in regional and national building codes is ensured.

17. Is compliance with the provisions of the EPBD adequate?

Yes, it is.

18. Is the definition of NZEBs in the EPBD sufficiently clear?

The definition of NZEB in the EPBD leaves sufficient room for a successful operation of national implementation. The downside is that at a European level it can become difficult to compare results.

19. Is the NZEB target in the EPBD sufficiently clear to be met?

Yes, it is.

20. If not, what, in your view, are the missing factors that would ensure compliance with:

- a. Minimum energy performance requirements in new buildings?
- b. Minimum energy performance in major renovations of existing buildings?
- c. Minimum energy performance for the replacing/retrofitting parts of the building envelope (roof, wall, window, etc.) and replacing/upgrading/installing technical building systems (heating, hot water, cooling, etc.)?
- d. Minimum renewable energy requirements to meet the NZEB target by 2020?
- e. Certification of the energy performance of buildings, including tailor-made recommendations for the improvement of the energy performance of buildings?
- f. Regular inspections of heating and air conditioning systems?

21. Do you think the cost-optimum methodology gives sufficient evidence regarding the actual cost of renovating buildings on top of the additional cost for Near Zero-Energy Buildings?

For existing buildings the cost-optimum methodology is the right path to go. In most cases existing buildings will never reach the NZEB level.

22. Are there any cost-effective measures for ensuring compliance at local and regional level that could be replicated and used to improve compliance on a larger scale?

23. What do you think of the various ways of calculating building energy performance at national/regional level? Please include examples.

The calculation method should be harmonised however take into account national and regional characteristics (for example climate data, specific requirements etc.). To ensure that the comparison of the certificates is maintained the used methodology must be based on calculation. But measured data is needed to improve energy efficiency during usage.

24. What measures are missing that could simplify the implementation of building regulations to make sure that buildings meet the required high energy performance levels?

Measured data are needed in order to improve energy efficiency during usage.

C. Energy Performance Certificates (EPCs) and stimulating energy efficient renovation of the building stock

Building energy efficiency has been increasing at 1.4% per year. This relatively low rate is owed largely to low renovation rates. To reap the benefits of energy efficiency and the use of renewables in buildings, the biggest challenge is to accelerate and finance upfront investments and speed up the renovation rate of the existing stock to above 2% annually. The aim of EPCs is to transform the building sector by setting ambitious energy efficiency standards and incentivise investment in renovating buildings to improve their energy efficiency, and facilitate a single market in and the free circulation of highly specialised workers, solutions and technologies and investments in energy efficiency and renewables in buildings. These aims have been identified as drivers for investment in renovation. In addition, the Energy Efficiency Directive (2012/27/EU, 'the EED') required Member States to establish, by April 2014, a long-term strategy for mobilising investment in the renovation of the national building stock.

25. Are the available data on the national/regional building stock sufficient to give a clear picture of the energy performance of the EU's building stock, as well as the market uptake of energy efficiency technologies and the improvement of the energy performance of buildings in the EU?

Available data on actual energy consumption as well as contribution of the different uses for different types of building and with proper indicators are not sufficiently available. There is a need for different indicators for different purposes.

26. Are the long-term national renovation strategies adopted sufficient to stimulate the renovation of national building stock? What examples of best practice could be promoted across the EU and how?

In many countries, the renovation of the national building stock has even not started. The Finnish renovation strategy enables owners to take small steps to increase the energy efficiency in buildings. The UK promotes the Green Deal Program. In Austria there is the "Sanierungsscheck" (renovation cheque). In France, the strategy is defined but there is a lack of economic solutions and not sufficient focus on the owner and tenant side to stimulate the demand for renovation.

For buildings with consumption over 1 GWh per year, regular (e.g. yearly) Energy Performance Certificates shall be the result of a proper energy audit i.e. EN 16247 as defined in the Energy Efficiency Directive and shall represent an integral part of an energy management system i.e. EN ISO 50001 (complemented by energy audits i.e. EN 16247). In this regard, Building Information Modelling (BIM) shall act as data support tool. This would result in long term national renovation strategy with a cost effective mindset for identifying the lower hanging fruits of Energy Conservation Measures (e.g. control functions, building automation and continuous monitoring) i.e. small upfront investments with short payback period.

27. Have EPCs played a role in increasing the rate of renovation, the extent of renovation, or both? For instance, are EPC recommendations being defined as the most effective packages of measures to move the performance of buildings and/or their envelopes to higher energy classes?

Yes, but a sufficiently broad support and common understanding of the certificate is missing. There is still need for better visibility and consumer trust must be increased. Trust is clearly still an issue and while the public generally understands the basic concept of the Energy Performance Certificate, the details are not understood. Most often the recommendations for improvement are rather generic than tailor made to the specific building and cost calculations of even simple pay backs not given. Properly made certificates have a positive effect on sensitizing consumers through information, however are not automatically leading to investments in and therefore improvements of the energy performance.

28. Is setting a minimum renovation target for Member States to undertake (e.g. each year; percentage of building stock) important and requires further attention in the context of meeting the goals of the EPBD?

The target should better be expressed in term of global energy savings in the building sector leaving to member states the choice of the means best suited to local situation (refer to question 6 for illustration of different energy use and performance in the member states).

29. Are obligations or binding targets for renovation or any other mandatory measure (e.g. mandatory minimum thermal efficiency standards for rental properties) missing from the EPBD to ensure that the directive meets its goals? If, yes, what kind of obligations and targets?

For buildings with an energy consumption of over 1 GWh per year, the Energy Performance Certificate should be the result of a real energy audit (energy audit as defined in the EED)

Note:

- 1GWh per year is equivalent to 250 people consuming each 4000 KWh per year
 - 250 people is the threshold of EED for energy audit and 4000 KWh per year is the average annual electricity consumption per employee in the tertiary sector
 - 1GWh annual consumption leads to an energy bill in the range of 150 000 € per year
- Mandatory maintenance of heating, air conditioning and ventilation installations would help to improve and maintain energy performance improvements over time.

30. Are EPCs designed in a way that makes it easy to compare and harmonise them across EU Member States?

As buildings are not moving and as energy use is diversified over EU countries, the comparison between the different Energy Performance Certificates is not the main issue. It appears more important to be well understood by non-energy experts.

31. Do you think that the 'staged deep renovation' concept is clear enough in the EPBD?

No. Staged deep renovation is not mentioned in the EPBD text. There are different definitions on the same issue in EED and EPBD. Step by step renovations, based on the merit order of the solutions defined on the payback time, should be promoted in EPBD.

The staged deep renovation concept is a long term process which currently is misunderstood, especially by non energy experts. Currently, the wording in EPBD's text only contains "major renovation". It shall be explained that there are lower hanging fruits with small upfront investments and short payback periods which in a staged renovation process would represent the first steps towards a high energy performance building/NZEB/PEB.

The staged renovation process requires a comprehensive plan that based on Life Cycle Costs Analysis (or Simple Payback Periods) determines the short, medium and long term actions which if applied successively would lead to a continuous improvement of the energy performance of buildings. For continuous improvement of the actual energy performance, the staged renovation process can easily be integrated in an energy management system i.e. EN ISO 50001. In this regard, Building Information Modelling (BIM) shall act as data support tool.

32. Have EPCs raised awareness among building owners and tenants of cost-efficient ways of improving the energy performance of the buildings and, as a consequence, help to increase renovation rates across the EU?

Awareness on energy issues has been raised but we do not think that the impact on the renovation rate is really significant. The recommendation part of the certificate would need to be reinforced and made really specific to the building assessed, while today it is too generic.

33. Should EPCs have been made mandatory for all buildings (a roofed construction having walls, for which energy is used to condition the indoor climate), independent of whether they are rented out or sold or not?

A Life Cycle approach for the building, as is for example the case in France, would boost the global energy efficiency improvement. The effectiveness of energy efficiency should also be considered.

D. Financing energy efficiency and renewable energy in buildings and creation of markets

The EU has been supporting the improvement of the energy performance of buildings for many years with a range of financial support programmes. As almost 90% of building floor space in the EU is privately owned and more than 40% of residential buildings date from before 1960, most financing has to come from private sources. The Energy Efficiency Financial Institution Group (EEFIG), an expert group set up by the European Commission and United Nations Environment Programme Finance Initiative, published their final report in February 2015. The report identified the need to engage with multiple stakeholder groups and scale up the use of several financial instruments as part of a clear and enforced 'carrot and stick' legislative framework. The group also made a strong case for combining public funds with private sector investment to address risks and achieve the scale of financing needed.

34. What are the main reasons for the insufficient take-up of the financing available for energy efficiency in buildings?

Energy efficiency is not the number one driving force when it comes to start renovating. However, energy efficiency aspects should be taken on board for any renovation works. A lack of information and the bureaucracy are also reasons for the slow take-up. Indeed, in all sectors, private and public, financing solutions are lacking.

35. What non-financing barriers are there that hinder investments, and how can they be overcome?

Owner / tenant issue

36. What are the best financing tools the EU could offer to help citizens and Member States facilitate deep renovations?

ESCO-system for private houses, incentive taxation, subsidies are good tools. The revenue from carbon taxation and ETS should be firstly invested to finance energy efficiency. A local management of this revenue (municipalities, regions) could give visibility and acceptance.

37. What role do current national subsidies for fossil fuels have in supporting energy efficient buildings?

It slows down the uptake of new energy efficient technologies.

38. Have energy efficiency and renewable energy projects been combined to maximise their financing? How can the EU help?

39. How is investment in high-performing buildings stimulated and what is being undertaken to gradually phase out the worst performing buildings? Is it sufficient?

Publicly owned buildings should show good examples by phasing out /deeply renovating the worst performing buildings and through improving energy efficiency in all public buildings.

40. What is being undertaken to solve the problem of 'split incentives' (between the owner and the tenant) that hampers deep renovations? Is it sufficient?

There is no satisfactory solution for this problem today.

41. Was

a) the scaling-up of existing funds sufficient to meet the goals of the EPBD?

At a European level we doubt that it will be sufficient.

b) the creation of aggregated facilities (through standardisation of Energy Performance Contracts and clarification of regulatory, fiscal and accounting issues) sufficient to meet the goals of the EPBD?

Energy Performance Contracts are still not enough used and there are needs to clarify the regulatory, fiscal and accounting practices in a number of member states to develop this model. Local guidelines should be made available to local public authorities to encourage them to use performance contracting.

E. Energy poverty and affordability of housing

Energy poverty affects living conditions and health. It has many causes, including a combination of low income and general poverty conditions, energy-inefficient homes and a housing tenure system that fails to encourage energy efficiency. For example, in Britain, 9,300 people died prematurely due to the cold during the winters of 2012 and 2013.

The Energy Union has identified a combination of measures, mainly in the social field and within the competence of authorities at national, regional and local levels, as the only effective way of tackling energy poverty. When phasing out regulated prices, Member States need to propose a mechanism to protect vulnerable consumers, which could preferably be provided through the general welfare system. If provided through the energy market, it could be implemented through schemes, such as a solidarity tariff or in the form of a discount on energy bills. The UK Government is preparing a programme under which doctors will be able to prescribe boilers, insulation and double glazing to fuel-poor patients suffering from health conditions exacerbated by cold homes.

42. What measures have been taken in the housing sector to address energy poverty?

Decreasing energy bills through energy efficiency has a social impact; however energy policies and social policies should not be mixed and should be dealt with separately.

Making energy costs and energy savings potential apparent to energy users (possibly in real time) is a good practice which should not be restricted based on the basis of social criteria.

43. Should have further measures tackling energy poverty been included in the EPBD?

44. Has tackling energy poverty been a requirements when constructing new buildings and renovating existing buildings in Member States?

45. Are energy costs for heating and air conditioning being made available to interested buyers/tenants?

Yes.

F. Ensuring new highly efficient buildings using a higher share of renewable energy

Directive 2009/28/EC on the promotion of the use of energy from renewable sources ('the RES Directive') requires Member States to introduce in their building regulations and codes appropriate measures to increase the share of all types of renewable energy in buildings. One possible measure is Demand Response, which is a set of time-dependent programme activities and tariffs that seek to reduce electricity usage and provide control systems that encourage load shedding or load shifting at times when the electricity grid is near capacity or electricity prices are high. Demand Response helps to manage building electricity costs and to improve the reliability of the electricity grid.

By December 2014, Member States must, in their building regulations and codes, require the use of minimum levels of energy from renewable sources in new buildings and in existing buildings that are subject to major renovation. These provisions are complementary to the Near Zero-Energy Building (NZEB) requirements in the EPBD, which set clear obligations to reduce the primary energy consumption of buildings and recommend that the resulting nearly-zero or very low amount of energy needed should be covered to a very significant extent by energy from renewable sources. The Roadmap to a Resource-Efficient Europe (COM (2011) 571) proposed that buildings should be renovated and constructed with greater resource efficiency. While the Energy Efficiency Directive ('the EED') and the EPBD have an impact on building and construction activities they are not designed to provide an overall life-cycle approach. For newly-built NZEBs, from a life cycle perspective, the share of embedded energy is almost as great as the share of energy consumed in the building's use phase.

46. What are the best policies at district and city level to increase energy efficiency in buildings? Have specific targets on renewable energies in buildings been included?

For new buildings: NZEB.

47. On the basis of existing experience, are provisions on targets or specific requirements for new buildings, beyond the current NZEB targets, missing in the EPBD which could help achieve the energy efficiency 2030 target? If so, in what types of targets or requirements?

For the technology to develop, it is important to ensure technology neutrality and not to favour any specific technology. As far as renewable electricity is concerned, connectivity of the building with its environment and capacity to exchange data with the grid and with other buildings in the same district is missing and should be introduced.

48. Which building sectors have been addressed as a priority (public/private, residential/non-residential, industry, heating & cooling)?

Most Member States have addressed the residential sector with the biggest focus on new built. The non-residential sector was considered by most Member States as a whole without treating all the particular building types. It shall be stressed out that the entire building stock is important. Priority should be given to the easiest implementation methods, to the lowest upfront investment and to the shortest payback to show attractiveness. Pragmatically speaking, any modification of the activity in the building (specifically in non-residential buildings) should be the opportunity to re-assess energy performance and to improve it.

49. Has having no EU set targets (indicative or binding) for the sustainable public procurement of NZEB buildings by public authorities affected the development of NZEBs?

50. Has the EPBD framework improved the self-consumption of electricity in buildings?

It is not today considered in the EPBD, but it could be considered in the CO2 performance of the building. Self-consumption, storage, demand response, capacity to exchange energy with building in the district should be included in a concept larger than the NZEB of the 2010 EPBD. The building owner should remain the decision maker regarding his energy production and usage.

51. Does the EPBD address the issue of embedded energy? If so, in what way?

No it does not.

52. Is demand response being stimulated at the individual building level and if so, how?

Demand response is still in a very early phase. The uptake of the technology is slowed down by fixed prices on electrical energy. With smart meters we now have the possibility to shift to hourly based energy prices. Furthermore we need to see the revolution of internet of things in houses to see the take off of demand response.

For example, the benefit of synergies between energy efficiency, flexibility and demand-response must be captured:

Energy efficiency technology, demand response services and grid flexibility –smart grids are three no regret options.

Building energy management systems are able to optimise supply and demand according to price signals sent to consumers, but also to foster energy cooperation between buildings at district level.

53. What obligations are missing at EU level and national level, and at regional and local level to meet the goals of the EPBD?

Obligations should not only focus on the envelope, but also consider active energy efficiency and energy management technologies, which are also cheaper with a short payback time.

Moreover, the use of heat recovery as a waste energy technology should be considered as renewable energy as is for example the case in French regulation.

G. Links between the EPBD and district and city levels, smart cities, and heating and cooling networks

The EPBD focuses on reducing energy demand and increasing energy efficiency and the share of renewable energy consumption in buildings (mainly on-site or nearby).

Alongside this, reducing transport needs, promoting active mobility, public transport and e-mobility in cities are important policy levers for achieving long-term European policy objectives in the field of climate change, energy and transport. Targeted use of information and communications technology will enable smart solutions that bring together different physical infrastructures and operational technologies. This would facilitate a better quality of services at lower cost, enabling better maintenance planning, for example, and approaches to investment that are focused on real needs.

When examining energy efficiency and renewable energy supply, the considerations at district and city level are different from those at building level. Heating and cooling networks can play an important role in improving the energy performance of buildings, but are also dependent on advance planning and adequate implementation (both at city and district level). Solutions for local renewables, co-generation and storage have in many cases proven to be more cost-effective at district level than at the level of individual buildings.

The EPBD is an instrument that could be used to address the differences at district and city level, and help Member States to develop a comprehensive strategy

54. What are the best policies at district and city level for increasing energy efficiency and use of renewable energy in buildings?

A mandatory enforcement to use one or another technology should be avoided. The market needs to be open for new technologies. Awareness campaigns, subsidies, local incentives can be of help. End-users should remain the first deciders, and should be encouraged to collaborate from the most local to the global level, first in their building then at district level up to the city level. At city level, a construction bonus for renewables or energy efficiency would be a positive signal to incentivise in a voluntary way.

55. Are there any separate (new) obligations set at city and district level missing from the EPBD which would help increase energy efficiency and use of renewable energy in buildings?

No, EPBD is the instrument and provides enough. Member states have to use it properly.

56. How has the information exchange on smart technologies which contribute to compliance of the EPBD, been promoted in cities?

There are several platforms.

57. Are smart meters and their functionalities contributing to meeting energy efficiency targets and the proper implementation of the EPBD? Are other targeted meters for heat, gas and water have specific provisions such as those for electric meters needed?

Smart Meters are being rolled out in 16 Member States of the EU. The benefit of these meters so far is limited due among other to the inflexibility of tariffs for energy.

At least two functionalities will contribute to meeting EE targets:

- (a) information provision about consumption or generation to consumers and
- (b) multiple/dynamic tariffs that enable Demand Response.

ESMIG's "Empower Demand" report I (see <http://esmig.eu/resource/empower-demand-report-phase-i>) shows that informative consumption reports are effective but real-time information provision reaches the highest scores. It is important that consumers are aware of the benefits Smart Meters can bring, so communication campaigns to inform building owners and users are essential.

With the Internet of things, we will see a greater benefit from smart meters. Smart meters for electricity and hot water are very straightforward, but heat meters can be complicated in multi apartment buildings.

The main issue is how the data are made accessible in an anonymous way to enable the emergence of services for energy efficiency improvement.

58. Has the promotion of smart cities, smart buildings, sustainable transport solutions, smart mobility, and similar initiatives been linked with the EPBD and its aims? If so, how?

Several R&D programs are running at a national level in EU. For example the INKA program in Finland.

59. Have obligations been set at a national/regional level in relation to buildings and district heating and cooling, or in relation to buildings and storage? Why/Why not?

No. Technology neutrality has to be ensured.

60. What incentives are missing, that would help promote efficient district heating and cooling or meeting the goals of the EPBD?

CHP power plants are very competitive even without subsidies.

61. Have cost-optimal policies been devised that improve the performance of buildings so that they use less heating and cooling, while ensuring a decarbonised energy supply?

To avoid negative consequences, the quality of indoor conditions is of equal importance. However, the EPBD does not address this issue. One indicator expressed in CO₂ emissions could helpfully be used, in addition to the kWh indicator (article 9).

62. Does the EPBD and its definition of NZEB reflect the requirements that could derive from the energy systems of nearly zero-emissions districts and cities?

No, the EPBD does not provide requirements that lead to considering buildings in their environment. Net zero emission district is not the sum of nZEB, as balancing, shared storage and other means can contribute to a optimized use of energy. Demand response at district level is a key element. The EPBD should make Demand Response possible with requirements on technologies necessary to enable the building to participate to it.

H. Awareness, information and building data

Public information and awareness play a key role in improving energy efficiency in privately-owned buildings. There is a need for clear and accessible information for citizens, professionals and authorities to enable them to evaluate the energy performance of buildings. If this information is provided in similar formats it would make it easier to compare energy performance and, in particular, help identify best practice solutions, as almost 90% of building floor space in the EU is privately owned (and over 40% of residential buildings were built before 1960). The following questions focus on your experience of the information provided and your suggestions for improving the information flow.

63. What do you think of the quantity and quality of information on the importance of energy efficiency provided to consumers by:

1. The European Commission?

National information campaigns are worth doing with global messages; however when it comes to detailed and specific information the local authorities and companies are best placed to be the most efficient.

2. National authorities?

There is a need for more and better awareness campaigns, with a focus on the benefits of energy efficient consumption and consumer behavior (financial savings, 'self' control of its own consumption, reliable and modern technology) beyond the energy savings. Information campaigns should also focus on the national incentives and subsidies.

3. Regional authorities?

There is a need for more and better awareness campaigns, with a focus on the benefits of energy efficient consumption and consumer behavior (financial savings, 'self' control of its own

consumption, reliable and modern technology) beyond the energy savings. Information campaigns should also indicate clear neutral contact points in the region for administrative, technical and financial advice.

4. Local authorities?

5. Local companies?

64. Has the directive promoted information on opportunities for consumer-friendly smart meters and interoperable energy efficient appliances?

No, it has not. Besides the fact that Smart Meters need to have consumer focused functionalities (see our answer on question 57), it is important that additional smart technology is made available to monitor energy usage and use consumption and tariff data to manage energy consumption and generation inside buildings. Building Energy Management Systems can use the data produced by Smart Meters to optimize energy usage and stay below consumption limits that might be set by energy distribution or service companies. Building owners should be informed about the minimum requirements (selection of available standards and definition of companion standards) in order to reach interoperability between Smart Meters, Building Energy Management Systems and Smart Appliances.

65. What relevant building data has been collected at EU and Member State level, and city and district level? Who has access to this data?

Overall average data are needed for reporting at national or EU level; however to drive change by benchmarking, it is necessary to promote databases with individual anonymized figures. The EPBD should ensure that energy-related data are managed by independent actors, made anonymous and accessible to private and public energy efficiency actors. This framework is necessary for fair competition, transparency and protection of the consumers.

66. How can data on the energy performance of a building and its related renovation work, across its life cycle, best be managed and made available?

A building passport consolidating these data over the life of the building may be helpful; it should be started for new buildings, be updated at any change of energy performance and made available as EPC when the building is rented or sold. These information should be linked to the development of the BIM.

67. Has building data harmonisation been achieved?

Data harmonization should be first ensured at national level (and is already defined in some Member States).

68. Is there a need for a central EU database of EPCs and qualified experts?

As the climate and the habits are different from one member state to another, the added value of such a central database may be limited. One should nevertheless ensure that each member state implements a national database.

I. Sustainability, competitiveness and skills in the construction sector

The construction sector plays an important role in the European economy, generating almost 10% of GDP and providing 20 million jobs, mainly in micro- and small businesses. Designers, architects, builders, inspectors and certifiers, financiers, and national and regional supervisory authorities need to have the necessary skills and qualifications to ensure buildings are built effectively and using renewable energies. The sector is still largely craft-based, and there is huge scope for efficiency gains and more user-friendly retrofitting services as part of more industrial approaches, and through financial/planning/construction/maintenance package solutions based on strategic partnerships between SMEs and financing providers.

Through the EU's BUILD UP Skills initiative, between 2011 and 2013, energy efficiency skills needs and gaps for blue collar workers in the construction sector were identified in 30 countries (EU, Norway and the

Former Yugoslav Republic of Macedonia). Each of these countries has produced a detailed status quo analysis with the participation of all main public and private stakeholders. From 2013 the BUILD UP Skills initiative has focused on the implementation of the national status quo analysis by setting up national training and qualification programmes for blue collar workers. These programmes have been put in place in 21 EU countries. With the launch of Horizon 2020, a new topic (EE4) on construction skills is now targeting training needs for both blue and white collar workers. Five projects focusing on skills in the construction sector will run until 2018.

The competitiveness of construction companies is an important issue, not only for growth and employment, but also to ensure the sustainability of the sector. The sector could contribute significantly to job creation by increasing its activity in promising areas such as the renovation of buildings. Construction and use of buildings in the EU account for about half of all extracted materials and energy consumption. 5—10% of total energy consumption across the EU is related to the production of construction products. The goal of the European Commission is to help the sector become more competitive, resource-efficient and sustainable. The EPBD is an instrument that could help work towards this goal.

69. How does the construction sector cost-effectively demonstrate and check compliance with the EPBD while also upgrading the skill and knowledge of tradespeople and professionals?

In some Member States (for example Austria) there are initiatives where different sectors within the building sector, for example plumbers (heating system) and electricians work together and learn from each other to get the best possible results.

The construction sector provides training to professionals but generally there is no link between the EPBD and skills. The EPBD revision needs to tackle the issue of the quality of installation works. One way of doing this would be to set up an obligation to verify that materials and systems have been properly installed and ensure energy efficiency (commissioning).

70. Would it have been useful to extend Eurocodes to include energy performance in buildings and other relevant aspects? If so, why?

No, it would not.

71. Are energy, materials, waste and water use addressed in the EPBD?

J. Buildings systems requirements

The EPBD requires Member States to set minimum energy performance requirements for technical building systems (means technical equipment for the heating, cooling, ventilation, hot water, and lightning or for a combination thereof, of a building or building unit) in existing buildings. National provisions should not target specific products only (e.g. boilers) but should instead address building systems while also taking into consideration the building as a whole. Whilst the Ecodesign Directive governs the placing on the market of individual products, the EPBD sets requirements for their energy-efficient performance as part of the technical systems serving a building. The EPBD also requires regular inspections of heating and air conditioning systems. While the Directive does not specify what would be regarded as a 'regular inspection', it is the view of the European Commission services that inspections carried out at least every 7–8 years would be considered acceptable, whereas anything less frequent than every 10 years is likely to be problematic.

72. Based on existing experience, do you think the setting of minimum requirements in the EPBD for technical building systems is missing? Would have technical building systems minimum requirements contributed to the improvement of buildings' energy performances?

Yes. For example, lighting systems: The Ecodesign Directive puts demands on lighting equipment/products. This is fine, but the biggest saving potential is actually in the lighting systems, with presence control, daylight control, constant light control, etc.

The implementation of these systems is very low without any demands. Similar issues exist with other systems. There are a great many antiquated heating systems that should/could be replaced by new technologies (also renewables). This would have a significant effect. Any requirements in EPBD must ensure coherence with regulations on products (for example 814/2013/UE on heating equipment).

73. Based on existing experience, do you think in the EPBD minimum requirements for technical buildings systems focusing on other factors than heating, air condition, large ventilation systems and domestic hot water e.g. certain building categories, building size, etc., is missing?

Yes, it exists but it is not sufficient and not sufficiently applied (for example, in France only 1 % of air conditioning installations are inspected). There is a lack of surveillance and a need to increase regular inspections of boilers and heating heat pumps, but ventilation. It is not just a question of energy performance, but also a question of safety, air quality and health.

74. Based on existing experience, do you think in the EPBD requirements is missing for regular inspections of the technical building systems to ensure:

a. that systems' performance is maintained during their lifetime?

Yes.

b. that owners/occupiers are properly informed about the potential improvements to the efficiency of their systems?

For building with consumption over 1 GWh per year, the Energy Performance Certificate would benefit if it were the result of an energy audit (as defined in the Energy Efficiency Directive) on regular basis (every 4 years).

c. that replacement/upgrading of the technical building systems is triggered?

Yes, it exists but it is not sufficiently applied. Before any renovation project of any type, an inspection of the building systems should be done to evaluate the opportunity to embed the replacement or upgrading of the systems. If technical systems are not renovated at the project stage, they will not be in the next decade (except the stand-alone systems). It is too costly and provokes too much annoyance such as opening floors, walls, ceilings and dust etc.

75. Have inspections required by the EPBD, been incorporated into or more tightly linked to other inspection/certification/energy auditing activities and schemes under other EU or national directives?

In France, it is already the case for boilers but not for air conditioning installations and ventilation.

76. Are the requirements for building elements set by Member States optimised to avoid market barriers limiting the installation of building products complying with EU requirements/standards e.g., under eco-design requirements?

No, they are not optimised. In France, for example, RT 2012 and RT for existing buildings do not refer to eco design data. Also, there is a problem with some EPBD harmonized standards, which do not take eco design standards into account.

K. Operational management and maintenance

After the completion of development and/or renovation works, buildings still use energy in a way that impacts building occupants and operators (e.g. via energy costs). Ongoing operation is a key part of a building's life cycle and is related to the goal of building NZEBs by 2020.

77. Based on existing experience, does the EPBD promote the key ways to ensure that buildings meet stringent efficiency targets in their operation?

Article 8 of the EPBD should not only encourage the usage of technical building systems, including building automation and controls, but should make these mandatory it at least for a set of buildings.

As automation control systems or a house energy management systems can lead to savings from 20% to 47%, buildings with an energy consumption greater than 1 GWh per year should be

equipped with building automation and control technology which should be maintained on a regular basis (same basis as for HVAC systems).

Owners or operators of building stock consuming in total more than 5 GWh should be incentivized to put in place an energy management system such as ISO 50001.

For buildings with a consumption of over 1 GWh per year, the Energy Performance Certificates should be the result of an energy audit (energy audit as defined in the EED) on a regular basis (every 4 years).

78. Based on existing experience, does the EPBD promote the best way to close the gap between designed and actual energy performance of buildings?

There is a lot of misunderstanding that the purpose of the certificate is to help the comparison between buildings and it should be based on the features of the building and standardized user profile. In addition there is a need to calculate targeted energy consumption based on the actual user profile and to measure the real energy consumption.

79. Based on existing experience, are the provisions provided by the EPBD to stimulate a proactive, innovative maintenance market effective?

More focus should be given to on this in the future.

L. Further Comments

Please include any further comments that have not been covered in the consultation



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