

EPEE CONTRIBUTION TO THE EU CONSULTATION ON THE REVISION OF EPBD

OCTOBER 2015

A. Overall Assessment

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

The EPBD is a good foundation to optimize energy efficiency of buildings, notably by raising awareness and achieving some good results at local level. However, its goals have not been fully achieved, essentially due to the different implementation methods, the different performance calculation methodologies, and the different approaches (strong vs weak) of market surveillance used across Member States. As a result, the EPBD now needs to be further strengthened and its implementation and enforcement need to be improved.

The EPBD has been very successful in:

- Putting energy efficiency of buildings on the political agenda at national level
- Driving the efficiency of the new built sector. National building codes proved to be a powerful instrument
- Contributing to giving a value to energy efficiency investments through the Energy Performance Certificates. Various reports have shown that EPCs have had an impact on the transaction prices and rents of the building stock, mainly in those countries where EPCs have a long tradition and have been well implemented¹

The EPBD has been less successful in:

- Speeding up the renovation rate of the existing building stock. However, one should keep in mind when assessing the impact of the EPBD that the construction sector is strongly sensitive to the economic situation and has been deeply affected by the economic crisis
- Reducing differences in energy savings outcomes between Member States. Market penetration rate of energy efficient technologies indicate that there are still large gaps to be filled. According to figures provided by Waide Strategic Efficiency for example, average sales per capita of Building Automation Technologies in Germany proved to be 80% above EU average²
- Driving cost-effective improvement of the energy performance of buildings

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

¹ *Energy Performance Certificates in buildings and their impact on transaction prices and rents in selected EU countries*, by Bio Intelligence and the Institute for Environmental Policy for the European Commission (DG Energy), April 2013

² *The scope for energy and CO savings in the EU through the use of building automation technology*, 13 June 2014, by Waide Strategic efficiency for the European Copper Institute, page 37

Yes, the EPBD and the national building codes put in place to implement it are helping make buildings more efficient, particularly new buildings. However we believe that an improvement is needed to address the following points:

- The progress on the energy performance of existing buildings has not been adequately encouraged;
- It is a complex and conservative sector, since 2002 changes have been very slow. More political efforts are needed to push the markets.
- Enforcement and market surveillance remain key aspects that require more attention from Member States.

Therefore, ahead of the EPBD review we recommend focusing on:

- Identifying gaps in the implementation and enforcement of the Directive in cooperation with national governments.
- Showcasing successful examples of holistic policies in countries/regions that really drive demand for efficient buildings and renovations.
- Facilitating access to financing. In Poland, for example, growth in the residential energy efficient building market is directly linked to grants.

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

The EPBD has had no impact on the renovation rate, which still remains at around 1%. There are however success stories that demonstrate that higher renovation rates are possible. In the Bottrop city of Germany a modernization rate of 7,82% has been achieved through customized energy counselling below the recommendations of deep renovation and the KfW incentive programmes³. This case story shows that a light renovation approach where incentives are being provided for lighter measures (in this case isolation of the roof and basement ceilings, and investment in a condensing boiler), shows higher renovation rates and effectiveness. Part of the failure of the EPBD to promote renovation might be linked to a too strong focus on deep renovation with detrimental upfront costs and sometime intrusive renovation work. We support the goal of deep renovation but would like to underline that the implementation of a differentiated approach building on the staged deep renovation concept might be an effective way to achieve greater results.

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?

In general we believe that the EPBD has not sufficiently contributed to accelerating investment in improving the energy performance of the EU's building stock mainly because:

³ See Figure 1: Comparativeness of renovation programs for deep versus light renovation on InnovationCity Ruhr, <http://www.icruhr.de/index.php?id=3>

- While progress has been made, it is not sufficient to accelerate investments in improving the energy performance of the EU's building stock.
- When progress was made, it was only thanks to financial incentives at country level. Yet, financial incentives should not be the only reason for progress.
- In general, there has been a poor level and quality of implementation and lack of political ownership.

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

Because of the lack of ambitious targets in the EPBD, investments have not been undertaken in an optimal way to achieve energy reductions.

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?

Our experience clearly shows that the EPBD has put buildings on the political agenda of Member States that did not previously address them. The EPBD therefore has surely positively contributed to reducing the gap in ambition levels among Member States. However, there is still a wide disparity of requirements between Member States. Different calculation methodologies in the different climatic zones do not allow an objective assessment of the ambition levels.

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

The EPBD has addressed only some of the challenges of existing buildings' energy performance. More can be done to improve the energy performance of existing buildings, such as:

- Improve service and maintenance to minimise equipment downtime, while keeping in check repair costs and getting the most from equipment investments;
- Set minimum requirements for Building Control Technologies, currently missing;
- Ensure building automation system and control products are part of renovation requirements. Whenever the envelope structure of the building is improved, controls and/or integrated automated systems should also be installed or improved;
- Establish reliable data on the building stock.

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

According to an [Ecofys report](#) dating from October 2014, about half of the Member States are already using the definition of nZEB. Nonetheless, we believe that more progress is needed to set effective energy performance standards for new buildings.

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

The nZEB targets will most likely not be met on time. This is due to two main reasons:

1. Challenging implementation;
2. Lack of ambition in some Member States in setting the nZEB definition, as shown in an [Ecofys report](#) (October 2014).

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

The inclusion of provisions related to the EPC in the EPBD is a positive development. EPCs are positive for awareness raising even if they are not always successful in an improving energy performance due to lack of market surveillance, lack of knowledge, and lack of financial means. We believe that EPCs could be improved by putting a stronger focus on concrete actions, such as specific renovation, control, maintenance activities including expected effect and payback time.

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

The request to set MEPR at cost-optimal level for building elements (Article 4) has worked well. However, some improvements in the EPBD are needed. We recommend the following actions:

- Extending nZEB-level requirements for existing buildings being renovated and improve national building renovation strategies;
- Regarding HVAC equipment efficiency, Ecodesign rules are quite stringent. To get further efficiency from heating and cooling, the focus should now be put on the system level, rather than higher performance requirements at the equipment level.
- Equipment needs to be properly sized for the needs of the building and its users:
- It also needs to be correctly installed and regularly maintained. Proper sizing, installing and maintenance can increase energy performance by 30% (industry estimate). Such requirements could be added to the EPBD, at least for commercial buildings. These requirements could be linked to the EED Article 8 on energy audits for companies. The audits of their buildings could be combined with a regular maintenance programme. Remote servicing and maintenance can allow for continuous monitoring and any loss of performance would be noticed very quickly.
- A definition of controls systems should be introduced in the EPBD and Building Management System (controls system) should be part of renovation requirements. Whenever the envelope/building of the building is improved, controls and/or integrated automation systems should also be installed or improved. The combination of equipment and controls is crucial to close the gap between designed and actual energy performance of buildings.
- Minimum requirements for control technologies should also be introduced. Controls are part of the energy calculation methodologies in the new EPBD standards (M480) i.e. EN

15232 Energy performance of buildings. However, this must be implemented at an EU Member State level in order to promote better control of performance;

- In addition, introducing a unique, mandatory calculation which will be able to classify technologies by the amount of energy captured to be considered from renewable sources and improving data harmonization could be other ways forward. Currently, energy performance calculation methodologies for establishing minimum energy performance requirements and for energy performance certificates vary from country to country.
- Finally, compliance and market surveillance should be improved.

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)?

Yes, provided that energy efficiency is also properly implemented in the cooling sector, which is expected to increase in the coming years thanks to better insulation of the walls and to demands for thermal control (ref. end of page 7 of “Issue Paper I” of the EU Heating and Cooling Strategy Consultation Forum). Indeed, sustainable cooling (PV connected installations) will be one of the big challenges for the coming years.

14. Are the objectives of the EPBD delivered efficiently?

Not all EPBD objectives are delivered efficiently because of poor implementation.

B. Facilitating enforcement and compliance

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

The compliance with EPBD provisions could be improved through better transposition and implementation; including market surveillance as Member States are still too reluctant (e.g. EPC's are a tool for market surveillance).

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

We think that the definition is not sufficiently clear because it is left to the Member States to define the minimum energy performance requirements that qualify a building as a NZEB. This might explain why only 16 Member States have a final nZEB definition in place (April 2015), and 12 Member States still need to refine the existing definition. As a result, urgent finalization of the standards under M/480 is required, as well as, additional guidance on the cost optimality for NZEB (including potential side effects such as poor indoor air quality).

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

In addition to an unclear definition of the concept of nZEB, we find the pathway toward nZEBs uncertain. There should be greater convergence in national quality control requirements as well as in national definitions with the introduction of some benchmark values in order to facilitate cross-national comparability. The “Energy Efficiency First” principle shall be applied in defining NZEBs, which are in essence low energy demand buildings and a link to EPCs, access to financing and cost-optimal levels shall be made.

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

d. Minimum renewable energy requirements to meet the NZEB target by 2020?

- The European Commission shall establish a unique, mandatory calculation which will be able to classify technologies by the amount of energy captured to be considered from renewable sources.
- This calculation should be harmonised across different legislation: EPBD, Directive on the promotion of the use of energy from renewable sources, and Ecodesign.
- For example, Annex VII of the Directive 2009/28/EC on the promotion of the use of energy from renewable sources establishes a formula to estimate the amount of aerothermal, geothermal or hydrothermal energy captured by Heat Pumps to be considered energy from renewable sources for the purposes of this Directive.
- This calculation should also apply to nZEBs in EPBD to ensure compliance with minimum renewable energy requirements to meet the nZEB target by 2020 and encourage market uptake of energy efficiency technologies.
- Other ways forward include:
 - The development of Key Performance Indicators in order to track progress
 - The development of awareness-raising actions in order to broaden societal support;
 - An increased guidance from the Commission to Member States to ensure that more information is available (e.g. creation of one-stop-shops);
 - Requirements for Member States to improve their sanctions & penalties system (e.g. as is already the case in Flanders Region of Belgium and Ireland); and
 - Incentivising compliance with quality requirements through a link to financing (e.g. as in Lithuania), and through an increased ex ante conditionality for EU funds.

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?

- In order to ensure compliance at local and regional level, some cost-effective measures could be introduced, such as on-site inspections for products and systems focusing on quality and compliance, accompanied by severe sanctions in case of non-compliance. Moreover, to avoid that on-site inspections are just checklist points that do not trigger action, they need to be validated through certification.
- Insufficient market surveillance is one of the main obstacles to the full realization of the energy saving potential of EPBD. It is estimated that between 10% and 20% of the expected savings can be wasted due to non-compliant products on the market.

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

- As the calculation methodologies are different between each Member State - each using different input parameters - it is impossible to compare them. As a result, users might be misled by the buildings' energy-performance indexes (e.g. they might not be able to properly evaluate the associated energy costs).

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?

- In order to simplify the implementation of building regulations, measures such as on-site inspections for products and systems, validated only through certification, should be introduced.
- In general, there is a need for market surveillance.

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

The current available data on the national and regional building stock is not sufficient to give a clear picture of the energy performance of the EU's building stock, as well as the market uptake of different energy efficiency technologies. As a result, there is a need to have a more appropriate data on the building stock, in line with the attempt that was given by BPIE. An analysis of the available EPC data should help in the uptake of innovative and more efficient technologies.

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?

Long-term renovations plans are not yet well developed by member states. As a result, additional assessment and guidance from the European Commission is needed.

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?

Because long-term renovation plans are not yet well developed by member states, EPCs are not yet really fit for renovations.

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?

Yes, binding targets for renovation are missing from the EPBD. An example of a binding target for renovations could be expressed in kWh/m²/Y/building type.

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

We believe the European Commission should provide guidance on this 'staged deep renovation' concept to enable innovative solutions to enter the market and, as such, avoid a lock-in effect. At the moment, this is very unclear and open for interpretation.

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

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

Please see below some of the main reasons explaining the insufficient take-up of the financing available for energy efficiency in buildings:

- Lack of awareness and access conditions are sometimes difficult for the applicant;
- Different cultures and approaches;
- Insufficient initial investments;
- Interest rates in case of a loan (Banks are not open/hesitate to support investments with long term return on investment)
- Inappropriate Eurostat rules on public debt and deficit for energy efficiency investments;
- Lack of aggregators to increase the size of projects;
- Lack of aggregated data and regulatory stability to boost the investors' confidence;
- The "split incentive" dilemma between landlord and tenant.

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

- The barriers hindering investments are: The lack of data;
- The lack of knowhow;
- The lack of clear long-term target setting;
- The lack of reliable EPCs.

Furthermore, there is a need to better understand what is a 'Smart Building'. This work should at least address the following issues:

- Well-designed building
- Energy efficiency comes first
- Right materials and equipment specified and installed
- Connected through the smart grid to its neighbourhood
- Functional, comfortable and healthy indoor environment
- Intrinsic low energy demand
- Cost-effective use of renewable energy sources

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

These subsidies have a lock-in effect of Fossil Fuel technologies hindering innovations and penalizing the uptake of renewables.

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

Please see below our recommendations:

- Today, incentives for energy efficiency and incentives for technologies using renewable energy are treated separately, without taking into account the overall building's consumption and how to reduce demand.
- In reality, the two incentives could be combined into one energy efficiency incentive system, based on a single energy efficiency calculation from external energies.
- In order to do that, the local energy produced from renewable sources should be integrated into the energy efficiency calculation of a single building.

E. Energy Poverty and affordability of housing

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

Yes, these measures include, inter alia:

- Renovation programmes focused on energy poor/low income households;
- The development and the promotion of energy-efficiency services and Energy Performance Contracting.
- Specific funds should be allocated for this purpose and the use of public money for subsidising the consumption of fossil fuel should be abandoned.

When weighed against other options to tackle energy poverty, the above measures also create multiple benefits, inter alia, energy savings, lower energy bills, improved health & comfort and increased productivity.

The INSIGHT-E⁴ (in particular recommendations #3 and #5) and JRC Trump Card⁵ reports provide a set of interesting recommendations on addressing the issue of energy poverty including the need to explicitly define what energy poverty is and highlighting the role of energy efficiency measures in buildings to address it.

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

The issue of energy poverty and affordability of housing affects between 10 and 25% of the European population⁶. The cost of ensuring indoor comfort is an important element of household expenditure and in some cases can be significant, especially for low income households. Although the EPBD does not directly address the issue of energy poverty, building renovations and the implementation of EE measures prioritised towards low income households and the energy poor are the only sustainable and structural solutions to this problem.

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

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?

The best policies at district and city level to increase energy efficiency in buildings are to be found in flexibility:

- A higher uptake of renewables depends on a flexible demand side (demand response);
- Flexibility in buildings can only be achieved by the storage of energy (batteries or thermal storage);
- The uptake of renewables should therefore be balanced with the creation of flexibility (and storage);
- Thermal storage opportunities can be extended by developing thermal grids (micro or macro) and decentralized heat pumps can be connected;
- As a result, EU policies should therefore encourage the establishment of these grids as well as the rewarding of the connection of decentralized contributors.

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

All buildings should be considered in the EPBD. The European Union in reviewing the EPBD should follow the examples set-out by some Member States, such as Italy:

⁴ INSIGHT_E(2015): Energy poverty and vulnerable consumers in the energy sector across the EU: analysis of policies and measures

⁵ JRC (2015): Energy Renovation: The Trump Card for the New Start for Europe

⁶ BPIE (2014) Alleviating Fuel Poverty in the EU http://bpie.eu/fuel_poverty.html

- In Italy, since 31st May 2012, the law mandates that any new building or any existing building undergoing a major renovation (both public and private, residential, non-residential and industrial), shall produce part of its electrical energy, heating, cooling and sanitary hot water from RES (non-fossil fuels).
- In particular, for sanitary hot water, the requirement is a minimum of 50% of the building's use (this is actually mandated from 30th September 2011 and still valid; the rest of the obligations below build on this 50% minimum).
- The sum of electricity, heating and cooling required by the building must be guaranteed by RES as follows:
 - min 20% from RES for building permits issued between 31st May 2012 and 31st December 2013;
 - min 35% from RES for building permits issued between 1st January 2014 and 31st December 2016;
 - min 50% from RES for building permits issued from 1st January 2017;
 - In particular for the electricity production:
 - min 1 kW each 80 mq for building permits issued between 31st May 2012 and 31st December 2013;
 - min 1 kW each 65 mq for building permits issued between 1st January 2014 and 31st December 2016;
 - min 1 kW each 50 mq for building permits issued from 1st January 2017

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

Demand response at the individual building level is not being consistently encouraged for the moment, although EU-level work is being undertaken. We believe that distributed energy generation must be integrated and demand response enabled by intelligent controls and automation. Control systems are at the core of demand response, by activating all devices according to each building's needs. More specifically, demand response could be promoted in the following ways:

- Requesting that products used in buildings have integrated functions allowing either a 'demand-limit' in terms of electricity consumption or a complete switch off feature based on certain conditions communicated by the grid manager.
- Defining a communication standard between grid networks, buildings and products in order to be able to communicate limitations or opportunities in terms of electricity consumption and trigger the 'demand-limit' feature of the products. Communication standards should also define how the products will communicate back their status in terms of electricity consumption.
- Ensuring that grid network operators can give medium term visibility (>24hrs) to the consumers on potential limitations and opportunities in terms of electricity consumption so that adequate measures can be taken (energy storage, product switch off...).

- Ensuring that products incorporating this ‘demand-limit’ feature are included in the evaluation for the Energy Performance Certificates for buildings.
- Potentially creating a ‘demand response’ readiness certification for buildings.

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

- Building automation systems and control products should be part of the renovation requirements.
- Whenever the envelope structure of the building is improved, controls and/or integrated automation systems should be installed or improved as well.
- The combination of equipment and controls is crucial to meet the goals of EPBD.

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

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

Energy planning is a local issue that needs a strong European framework; it needs an integrated approach and must be in line with EU and national long-term decarbonisation goals. Long-term local planning (at city or regional level) needs to be developed in line with the “Energy Efficiency First” principle and trias energetica.

We believe the focus should be on combined heat and power cogeneration (CHP) in parallel with the establishment of thermal grids. Thermal grids are necessary tools to connect building and share surplus energy versus needs. It is important that CHP is balanced with decentralized contributors. Politics should encourage for establishment of these grids as well as rewarding the connection of decentralized contributors.

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?

Cities should be obliged to consider different available solutions in the market place including DHC but also decentralized solutions.

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

The communication on smart technologies has been poor so far. This is probably due to the fact that technologies have not yet fully matured. However we believe that it is important to improve the communication on this subject.

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?

- Yes, smart meters contribute to meeting energy efficiency targets and the proper implementation of the EPBD, but they are not enough because they work autonomously.
- In exchange, intelligent control systems contribute to meeting energy efficiency targets and proper implementation of the EPBD by providing data from all installed equipment.
- This system approach ensures that the input from each equipment is taken into account, measured and then connected to the right action by the occupants.

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?

- Smart buildings are nowadays referred to by decision makers as key for the future, and many R&D and policy programmes use the “smart” qualification. However, a good and common definition of “smart building” is still missing (see our suggested points under Question 35). Today, the most common features of smart buildings are energy efficiency and sustainability, followed by overall user experience, safety and security. As a result, a common definition of what would be a smart building seems necessary.
- Furthermore, a key feature of a smart building is that it gathers data generated by many sensors; data on energy use, equipment performance, occupant behavior etc.
- Hence, a common communication protocol for these sensors, both wired and wireless, needs to be defined and deployed. Similarly, a common open communication protocol between the different equipments used in a building would facilitate integration and interoperability.
- Finally, the connection between controls system and smart grids needs to be defined, as Smart Grids rely on the clear data provided by controls.

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?

In general, several obligations related to buildings and district heating and cooling or to buildings and storage have not yet been put in place:

- Required national heat planning until end of 2015 has not started (e.g. case of Germany);
- Only limited work on state and city level has taken the uptake of combined heat and power co-generation (CHP) until 2020 into account (e.g. Germany has skipped regulation on co-generation);
- The prohibition of investments below the cost effective impact of the technical solution has not been put in place.

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

Some incentives that could help promote efficient district heating and cooling and/or meeting the goals of the EPBD are:

- Clear incentives of utilization of waste/industry surplus heat with strong implementation mechanism at national level;
- Flexibility requirement: uptake of thermal storage and integration of small-scale combined heat and power (CHP) to match peak demand. CHP is not only the most efficient way of generating electricity and producing heat, but if designed with a thermal storage, it is a key enabler for the integration of renewable energy;
- Since the base load of our energy supply is increasingly fluctuating with higher shares of renewables - in Europe mainly wind and solar- CHP with heat storages provide the necessary flexibility to optimize cogeneration of electricity and heat according to the demand of electricity, while still supplying heat when needed. In addition, heat pumps can be added to these thermal grids. Heat pumps can simultaneously supply heating and cooling without using extra energy;
- Focus should be put on the quality of the energy used in buildings (primary energy factor) and when the energy is used (peak times) to determine energy label of buildings;
- Maintain a bonus from a connection of a building to the district energy network in building codes;
- Include in Article 11 of the EPBD a requirement to include in EPCs an assessment of high-efficiency alternative systems as referred to in Article 6.1.

Please see section L for Member States' specific examples.

H. Awareness, information and building data

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?

The quality and quantity of information on the importance of energy efficiency provided to consumers can be judged poor, but the situation could be easily reversed if awareness campaigns through the media were made in order to explain the meaning and positive goals of the energy efficiency frameworks along with transparent explanations of the costs and returns (costs as investments for energy efficiency vs. costs for not implementing energy-efficiency measures; returns both monetary and as societal benefits, e.g. jobs created).

2. national authorities?

Poor

3. regional authorities?

Poor

4. local authorities?

Poor

5. local companies?

Poor

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

- No, an equipment becomes a smart appliance if it has the capability to react to demand response requests. Smart appliances contribute to demand response, but they are not enough because they work autonomously.
- In exchange, intelligent controls systems enable demand response by activating all devices according to the building's needs and providing consumer-friendly data from all installed equipment.
- Unfortunately, consumers do not have enough information on the potential of controls. EPBD can help by providing a clear definition and raising awareness at the member state level.

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?

- Buildings are built for people who are eventually the energy users. Therefore the best way to address this issue is to give people the means to control their energy consumption ensuring their needs are met.
- A good level of control of building services ensures that data on the energy performance of a building and its related renovation work is well managed and made available.

I. Sustainability, competitiveness and skills in the construction sector

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?

- As buildings and the technical systems in them (including the heating and cooling) become smarter and more inter-operable, the skills needed from installers and facility-managers will need to evolve. The sector needs to focus on creating the appropriate training opportunities and requirements.
- Product technology complexity will increase over time. This complexity will specifically increase in the areas of communication and interoperability. Hence, the classical 'mechanical' skills that installers have today will need to be supplemented by new technical and ICT skills. This will require a significant investment in training. Training requirements could be optimized through the adoption of common standards in terms of equipment and building communication.

- Similarly, new features such as the 'demand-limit' in managed demand-response will require careful design and planning, as well as more set-up time during the installation and commissioning of technical systems. Significant training will be required from the product manufacturers to the installers in order to ensure that the expected efficiency benefits will materialize.
- In the longer term, installer certification by independent bodies could be required to ensure the minimum level of skills required.

J. Buildings systems requirements

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, the setting of minimum requirements for technical building systems is missing in the EPBD. These requirements would have contributed to improving buildings' energy performances. Equipment efficiency is based on Ecodesign requirements at product-level. This of course does not include installation and sizing, nor maintenance of the equipment. Currently, Article 8 of the EPBD includes system requirements, however only to be applied so far as they are technically, economically and functionally feasible. The text would better serve its purpose if it is modified to "should be applied taking into account their technical, economical and functional feasibility"
- We acknowledge that systems not covered by the Ecodesign directive may be difficult to set requirements for and also to test as their testing conditions are difficult to control. In addition, systems are often composed of products under the Ecodesign directive and as such a good efficiency foundation is given. However, connected products may not yield expected performance targets or good efficiencies may degrade during usage. Furthermore, Ecodesign requirements do not include installation and sizing, nor maintenance of the equipment. As a result, one requirement could be to have a continuous measurement of the efficiency/ performance to envisage problems and call for maintenance. Considering their significant and positive impact on the operational energy performance of buildings and indoor environment quality, controls and building automation should be included in Annex I paragraph 3.
- In the EPBD, the required inspections of HVAC equipment (art 14) are supposed to evaluate the efficiency of the equipment and the installation, but to our experience this does not lead to efficiency improvements. Also, the article states that no new assessment of the boiler sizing has to be done, if no changes were made to the equipment in the meantime. Moreover, many Member States have chosen not to implement the inspections, but to choose the alternative (art 14.4) to give advice to users on replacements to boilers – we are not aware of any impact of such programmes.
- Furthermore, in Central and Eastern European countries, implementation of the EPBD is only just starting – therefore we have not yet seen any impact.

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?

- Setting minimum requirements for Building Control Technologies integrating all of the factors mentioned above would increase a building's energy performance by ensuring that designed conditions are met in the operation phase. In practice, control technologies are needed to make sure that the interaction between all installed energy saving technologies is optimized.
- A good level of control of building services ensures that energy savings are achieved independently of whether the building is in use or not and that high indoor environment quality is delivered where and when required and at exact levels (i.e. thermal comfort, indoor air quality, lighting and acoustic environment).
- Moreover, the introduction of a definition for Building Control Technologies is also needed in order to raise awareness on their use and potential.
- Finally, cooling should be better addressed considering that it is forecast to increase in the coming decades. In particular, for commercial refrigeration systems, like food retail, no specific requirements for the overall performance of the system is demanded. These systems use up to 2 % of all electricity in the EU. Food retail systems can play a role within demand response as well as they act as heating or cooling suppliers for district energy systems.

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?

- Maintenance is crucial for long time period energy saving projects. In order to identify the damaged technology and stop energy waste, monitoring and controlling are necessary. A proper service and maintenance minimise equipment downtime, while keeping in check repair costs and getting the most from your equipment investments.
- While the energy performance of heating and cooling equipment is individually regulated at equipment level in the Eco-design directive and its implementing measures, the sizing, design and installation are not regulated. The EPBD could bridge this gap by setting a maintenance and servicing requirement for HVAC equipment above a certain size, like the current inspection requirement.
- Regular servicing would ensure that equipment are maximizing their efficiency potential and configurations are done correctly. To ensure correct installation, installers would need to be certified on efficiency and systems interoperability at the building level. If the technical systems are communicating with ICT, such servicing can also be done remotely, which will allow for continuous supervision and can identify energy waste and other malfunctioning quickly.
- Furthermore, regular inspections should be accompanied with inspections for larger systems, which can be made on-line. This would be a 'win' for all parties to ensure preventive maintenance and also easy comparison across the sector on performance. On-line performance meas-

urement is also a pre-requisite to decide on demand response opportunities, e.g. a heat pump will only use extra electricity to store heat if its present efficiency is sufficient to create competitive priced heating.

- Moreover, to avoid that regular inspections are just checklist points that do not trigger action, there should be actual energy performance requirements and the inspections should be supported by continuous monitoring. This would additionally lead to the application Building Management System (BMS), a computer-based controls system installed in buildings that controls and monitors the building's mechanical and electrical equipment such as ventilation, lighting, power systems, fire systems, and security systems.

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

- The requirements on inspections and performance requirements for technical building systems are altogether very vague in the current EPBD. It could be possible to increase systems' efficiency by 20-30% by proper sizing, installation and maintenance of HVAC equipment.
- For owners/occupiers to be properly informed on the potential improvements to the efficiency of their systems, the combination of equipment and controls is crucial. In many cases, even if the equipment is perfect, if the controls system to activate devices and adapt them to the needs of the building doesn't exist, the energy efficiency potential decreases and improvements cannot be identified.
- To make sure owners/occupiers are aware of energy performance improvement potentials, mandatory energy audits of the systems would have to be carried out – such as in the EED Art. 8 for companies. The audits would then include clear recommendations for cost-effective energy efficiency improvements concerning sizing, running, maintenance etc. for technical systems. The audits could be mandated at suitable points of refurbishment, sale, rent etc. of the building.
- Another option would be to inform the owners/occupiers during the inspections.

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

- The current EPBD implementation does not ensure that the replacement/upgrading of the technical building systems is triggered, especially for small and medium sized renovation projects.
- Actual energy performance requirements would trigger for replacement/upgrading of the technical building systems, but this cannot be measured in the absence of a control system. For the moment, 50% of the commercial building have no digital controls (thermostats) and for the rest of the buildings, 50% of the applications are not controlled. This is mainly due to lack of regulation and awareness regarding controls systems.
- Furthermore, to trigger investments, a systematic approach ensuring a pay back on the investment should be put in place.

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?

- As per our experience they have not, but they would be very useful. In light of the F-gas Regulation (517/2014) more widespread mandatory leakage inspections of larger systems containing larger charges could improve energy efficiency of such systems.
- This would probably lead to a win-win situation where old leaking (and probably also inefficient) systems would be replaced in due time to avoid problems with HFC supply.

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?

In the light of the answer above (75) the barriers for uptake of low GWP refrigerants should be assessed (e.g. national building codes on flammable refrigerants especially A2L).

K. Operational management and maintenance

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

- No, it does not, but it should. Indeed, while there are no minimum requirements for control technologies in the current EPBD, controls are part of energy calculation methodologies in the new EPBD standards (M480) i.e. EN 15232 Energy performance of buildings – Impact of Building Automation, Controls and Building Management for all buildings.
- The energy performance of technical systems is closely related to the sizing, design, installation and maintenance of the systems and its equipment. The energy performance of heating and cooling equipment is individually regulated at equipment level in the Eco-design Directive and its implementing measures. However, the sizing, design and installation are not regulated. The EPBD could bridge this gap by setting a maintenance and servicing requirement for HVAC equipment above a certain size, like the current inspection requirement.
- Regular servicing would ensure that equipment are maximizing their efficiency potential and configurations are done correctly. To ensure correct installation, installers would need to be certified on efficiency and systems interoperability at buildings level. If the technical systems are communicating with ICT, such servicing can also be done remotely, which will allow for continuous supervision and can identify energy waste and other malfunctioning quickly.

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

- EPBD does not sufficiently address the gap between designed and actual energy performance of buildings. In order to do that, building automation systems and control products need to be part of renovation requirement.

- Whenever the envelope/building of the building is improved, controls and/or integrated automation systems should be installed or improved as well. The combination of equipment and controls is crucial to close the gap between designed and actual energy performance of buildings.

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

Please refer to the answer above (78).

We call the European Commission to consider, for Articles 14 and 15, the wording proposed by Dr Ian Knight to the concerted action EPBD: “compliance [with inspection requirements] can also be demonstrated through formal involvement in an approved automatic monitoring scheme”⁷. Monitoring schemes could also be used to demonstrate compliance with Articles 6, 7 and 8 which would increase even more their attractiveness for larger building owners.

L. Further Comments

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

We would like to provide some data from specific Member States about the missed opportunities resulting from the lack of incentives in the EPBD (Section G, question 60):

- Poland: although there are three subsidy schemes for heat from renewable energy sources that include support for refurbishment works, the purchase of solar collectors, and the installation of small and micro-RES installations for the needs of residential houses, there is a lack of policies promoting the use of heat pumps. They are excluded from the Stork Program despite the inclusion of geothermal energy.
- Croatia: in Croatia, there are currently no support schemes for RES heating. The Energy Strategy adopted by the Parliament in 2009 obliges the Croatian government to encourage the future use of RES and to achieve a higher percentage of primary use of RES in the heating sector, but no measures have been taken so far.
- Czech Republic: there are two subsidies available for the use of renewables (Subsidy I: Operational Program Business and Innovation for Competitiveness, and Subsidy II: Operational Program Environment), but the only types of energy supported are those that originate from biomass and biogas, leaving heat pumps and geothermal energy out of both financial support schemes.
- Denmark: despite the existence of a tax exemption for the production, processing, possession, receipt and dispatch of renewable energy for heating, there is a lack of a financial framework for the promotion of projects with that purpose.

⁷ Automatic monitoring and legislation to meet EPBD requirements, by Dr Ian Knight for Concerted Action Energy Performance of Buildings, June 2013 , page 4.

- Hungary: the Environment and Energy Operational Program (EEOP) refers to RES-H infrastructure development by the means of tenders with the aim of “Modernizing the district heating sector by utilizing renewable energy sources”. However, the programs have been terminated due to exhausted funds. New programs under the 2014-2020 financing period were expected to be launched in the course of 2014, but no none focusing on renewable energy sources or energy efficiency have been issued so far.
- Romania: the Romanian Environmental Fund provides subsidies to legal entities and natural persons for the installation of heating systems using renewable energy sources. However, there has been no call for applications since 2011, since the budget for 2012 has been used for financing projects on the waiting list from 2011. Due to a lack of funds, no new call for applications took place in 2013 or 2014. However, the Ministry of the Environment and Climate Change announced that the subsidy program should be continued and a new call for applications can be expected in 2015.