



AIE's contribution to the EU consultation on the review of the EPBD

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?

The Energy Performance of Buildings Directive has been key in making improvements at the European level, but the situation is very different from one Member State to another. Moreover many countries have implemented the Directive only recently or are still in process.

The Directive has set ambitious goals for new buildings but there is still a huge potential in existing buildings that now needs to be tackled: the majority of buildings in 2050 are already constructed given the low construction rate and their very long lifetime.

In a revised EPBD for 2030, we ask for two main focuses:

- a) more effective monitoring and attention on automation, active control systems and technical installations** in new and deep-renovated buildings, enabling simultaneously high functionality (digitalization) and cost-effective energy saving (PV, storage, metering, control systems, technical integrations, end-user information systems etc)
- b) more focus on existing buildings**, harmonized with the EED.

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

Yes, by making mandatory energy requirements both for new and renovated buildings, EPBD has helped the market to accelerate the efforts made in improving energy efficiency.

However, there is a need to go beyond thermal performance and cover all energy issues and not just insulation. To do so, specific measures need to be taken to facilitate the installation of automation and active control systems.



Especially EPBD has **increased awareness of energy performance**, which will increase demand of energy efficient solutions.

The use of primary energy factors have made electrical heating almost impossible, so buildings with electrical heating have to be really energy efficient in other ways (e.g. really good U-values). The AIE asks for technology neutral energy supply requirements in a revised directive. This is even more important as we move on to building codes based on nZEB and beyond.

Technology neutral requirements can easily be achieved by removing the PEF, and let energy requirements solely revolve around matters that the building owner can influence on.

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

It is difficult to ascertain any change in renovation rates that would be attributable to the EPBD. Even if EPBD probably helped to increase renovation, but not as widely as expected, refurbishment rate is still very low and there are very different situations depending on the type of building considered (residential, commercial, public, private...). In Finland e.g. renovation rates haven't really increased. People aren't that interested in the EPC's energy classes of old buildings'.

Yet when renovating a building, energy performance is not the main objective. Energy prices are too low to stimulate that. People are rather pursuing a better quality and comfort, and consumption reductions is a plus but not decisive.

In order to accelerate and increase the renovation rate and energy performance, EPBD now needs to strengthen its energy requirements in particular regarding the active role of the building.

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?

The investments in renovations haven't increased. The investments in construction of new buildings have increased a little, because some of the owners are interested in energy classes (EPC) and voluntary eco-certificates (LEED, BREEAM). However the cost of new buildings according to the energy requirements has become more expensive.

Moreover the current economic crisis in Europe doesn't stimulate both public and private investors.

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

The main benefit of the directive is that the awareness has increased. When the awareness and consequently the knowledge rises, also the demand for solutions rises. After a while the solutions then become cost-effective. Therefore we need to support first cost effective renovations and systems with a short payback time.

And only then, wider renovations needing important investments with a long return on investment time can be supported.



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, because the ambition level is different in the different member states. It seems that rich and big countries are more ambitious than the poor ones.

Moreover it would be very hard to set common EU requirements given the diverse situations Member States are facing: climate, national regulations, different energy prices on different energy carriers; different cost-optimum requirement levels in different MS ...

The EU should define the main targets, and then Member States should define their own specific requirements to reach these targets.

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

Yes, but the future directive must **avoid today's discrimination of use of electricity in buildings**, for heating and other purposes. This problem is because of the introduction of a primary energy conversion factor (PEF) for electricity in defining the nZEB target and building code requirements. This discriminates electrical products and systems, compared to fossil fuel products and systems.

We strongly urge the revised EPBD to **focus on final energy use in buildings**, and also **promote emission free energy carriers at end-user side** like electricity, heat and hydrogen.

The revised EPBD should be strict on use of fossil fuel combustion at the end user side.

The standardization is unfinished. Some of the standards are really complex and hard to understand (e.g. overarching standard). It's shame that the standardization is so late. Almost all the member states have made their own way to approach the issue and make their own ways to calculate. Now the methods in member states differ much and cannot easily be compared.

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

Yes, even if it seems a little early to say and the definition of NZEB's is not always clear in each Member State. In most countries, e.g. Germany, Finland, Norway, Sweden and UK, the national definition of NZEB isn't ready.

When the directive is effectively transposed in all Member States, some Member States are moving faster than others.

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

One of the aims we see of EPC's is the **awareness rising about energy usage and consumer behavior**. It then stimulates the demand for efficiency measures in buildings. However the use of the primary energy conversion factor in EPCs distorts the reality in quite a few EU countries.

Because of that, public opinion does not trust or value the Energy Performance Certificates anymore (especially for existing buildings); their impact is thus very limited or even inexistent. One way to restore



trust would be to **measure real-time energy consumption** rather than having theoretical calculations which do not reflect the real situation and result in a non-value for house owners.

EPBD doesn't take the CO² emissions at all into account, which can result in buildings using fossil fuel that can have a better certificate value than building using e.g. heat pumps with electricity. So EPBD leads to conflict with the EU's emission targets.

In addition the Primary energy conversion factor for electricity (mentioned in EPBD) creates discrimination for electric solutions, not just in existing buildings but also in new buildings. E.g. in a lot of countries electric heating has become nearly impossible in new buildings, even when as in Finland it is their main way of heating and electricity production in Finland is at 80% CO₂ neutral, in Norway it's about 99% CO₂ neutral (hydro power), in France?????????.

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

The main achievements of EPBD are:

- New mandatory standards: only mandatory standards can help boost the market;
- EPBD tackles both existing and new buildings.
- Awareness

But the EPBD revision needs to tackle the following issues:

- EPBD should not only focus on energy performance, but also on energy production changes and on how to better integrate the building into the grid. The model is moving from a centralized production to local production sources. It should favor the use of storage combined with renewable energy sources local production;
- Energy performance requirements are too low for existing buildings and need to be strengthened;
- Financing schemes needs to be tackled to drive investment and most cost-effective technologies need to be supported first;
- Individual metering and energy measurement should be included in EPBD;
- Avoid the use of a primary energy conversion factor for electricity only, keep focus on final energy
- Standardization is late
- It's important that the building directives and regulations don't try to control the whole energy policy of EU (e.g. too strict renewable energy regulation in EPBD).

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)?

The EU has established targets for the climate and energy policy. The targets have been followed up by a comprehensive regulatory framework.

However as mentioned supra, the harmonized EU regulation discriminates the use of electricity in the end-user market. The problem is the use of conversion factors for electricity in several EU directives and regulations (such as EPBD). The EU requires that, when calculating total energy use at end-user level, the electricity consumption is multiplied by a conversion factor. Consumers are indeed misled when they choose products based on current energy labeling. This is problematic because it **prevents the realization of long-term emissions targets, increases the EU's dependence on energy imports, and disregards consumer interests.**

The AIE is aware that the EC recognizes the problem and will contribute to the launched study on this specific issue.



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 methodology of the calculation of performance can be defined at European level, but the calculations should be made at national level because of different climate, building types etc.

The envelop of a building depends on the climate in each country and should thus be considered at the national level, but **more focus and benefits of measurement, automation and active control systems inside the building should be emphasized at the European level.**

Equally the measurement of individual consumption should be set as compulsory at European level so as to raise consumer awareness.

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

It has brought in necessary measurements such as DEC and EPCs which in some quarters are thought of as unnecessary administrative burdens but as further evidence in this submission shows both measures help improve building energy efficiency.

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

EPCs have been quite hard to understand and therefore burdensome to private persons to get.

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.

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

Yes, EPBD definition of NZEBs is clear enough. However Member States develop their own understanding and interpretation according to their specific climate conditions and building regulations.

However, EU regulation could also include a **common EU definition of cost-effective solutions**.

“energy from renewable sources produced on-site or nearby”: the definition of “on-site” and “nearby” isn’t clear.

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

Yes

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?

In Finland it is mandatory to inspect regularly the oil heating systems and also the chimneys of the fireplaces. The system has worked well, so regular inspections of other systems in buildings could be useful too. The inspection cycle should be long enough, e.g. 5 years.

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

We need to **move towards measured energy performance** in order to improve energy efficiency during the use phase and improve operation of the building. Theoretical calculation methodologies do not reflect real consumptions and give a wrong picture.

As previously mentioned, the use of the primary energy conversion factor for electricity in calculations is moreover giving a wrong picture and misleading the consumers when making choices/ selections and decisions.



E.g. in Finland, house owners are concerned about the mandatory certificates for homes because of the use of the primary energy conversion factor for electricity going against electric heating (majority of the houses are heated with electric heating) and classifying the majority of the homes in class E, while electricity production in Finland is at 80% CO₂ neutral! In Norway it's about 99% CO₂ neutral (hydro power), France.....

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?

MEASURES TO MEASURE!

EPBD should give a common framework and a calculation methodology to measure real energy consumptions. If we want higher energy requirements, we need to improve and have more monitoring and measurement requirements.

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?

No, today there is national data available, but formats and presentation differ a lot from one MS to another and the quality needs to be improved. Regional data is not available in many MS.

Data quality could also be improved / harmonized by introducing guidelines in EED national action plans.

There is a need to build a European database to have comparable data between MS, as well as local data including: building stock, in type, age and energy performance level, number of renovations, investment needed to bring buildings to the cost-optimum energy performance level, technologies that engender energy savings...



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?

First of all, the Commission needs to verify and assess that measures included in national strategies are actually **implemented**, which is not always the case, ex:

-French obligation to renovate commercial buildings by 2020 appears in the national strategy but has never been applied;

-France explains it meets the EED obligation of a 3% renovation rate of State buildings. But the obligation is met only because the overall surface of the State building stock is reduced, not because it was renovated. No energy performance improvements are made.

The Commission also needs to make sure the national strategies tackle **all types of buildings** (housing, commercial, industrial, public and private...) and focus on a **stable financial framework** to boost investments.

Secondly, the **Danish national building renovation strategy** is a nice example of an efficient strategy reducing energy consumption in existing buildings. This strategy is mainly targeting efficiency improvements in conjunction with retrofits/ renovation i.e. ensure the highest possible level of efficiency improvements whenever retrofits /renovation are taking place.

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?

Their effect is probably limited to the newly erected buildings or upon large-scale upgrades or renovations of a building.

However in existing buildings and certainly in the residential buildings, the public opinion does not trust or value the Energy Performance Certificates (especially for existing buildings) because of the PEF (*); their impact is thus very limited or even inexistent. One way to restore trust would be to measure real-time energy consumption rather than having theoretical calculations which do not reflect the real situation and result in a non-value for house owners.

() The PEF = Primary energy conversion factor for electricity (mentioned in EPBD) creates discrimination for electric solutions, not just in existing buildings but also in new buildings. The use of the primary energy factor in EPCs distorts the reality. EPCs should therefore be based on real measured energy consumption, not calculated in theory.*



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?

Binding targets are **absolutely necessary** to increase the renovation rate, which did not increase much even after the implementation of EPBD. To reach the 2050 targets, there is a need to do more.

Member States should also define how the targets are going to be met, and include **binding renovation targets for all public buildings**. This policy should come with incentives for pioneer actors willing to do more and go further: carrot and stick policy framework.

Binding targets could be set up and regularly revised with a first focus on big commercial buildings (more financial and technical capacity to organize renovations), then smaller commercial buildings, then big housing etc...

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, 3 different mandatory frameworks are needed in the EPBD:

- minimum requirements for thermal efficiency;
- minimum requirements for active energy efficiency and energy used in the building;
- Individual measurement and control of consumption should be mandatory.

Different kind of meters and indicators would help.

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

There are different national ways to implement EPCs and probably with different national support schemes. But it is **not really relevant to compare and harmonize EPCs Europe-wide**.

The purpose of EPC is to make it easier for end-users to make informed decisions in the building market.

In several MS the EPC “punish” electrical products and systems because of the PEF (consumption of electricity multiplied by a primary energy conversion factor). As a consequence, electrical solutions for heating and cooling get a poor energy rating, whilst systems with the same final energy consumption in the form of fossil fuels get a better rating.

This is very unfortunate; it motivates consumers to choose energy purchase products that run on fossil energy instead of electricity, and regardless of whether this can increase both the energy bill for consumers and greenhouse gas emissions.

We strongly urge the revised EPC to **focus on final energy use in buildings**.

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

Not clear enough.



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?

No, but it is too early to say, it has only been implemented recently.

For the reasons mentioned supra, the public opinion does not trust or value the Energy Performance Certificates anymore (especially for existing buildings). To restore trust and better inform and raise awareness, EPCs should not only focus on the envelop but also on measurement of real consumptions and on the promotion of the big potential of technical installations and active control systems.

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?

In principle yes, but it is only possible to use EPCs when buildings are put on the market i.e. when rented or sold.

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?

There is a great **lack of information, public and companies’ awareness of the support schemes** already created. It is urgent not only to reinforce the financial support in place, but also **to better communicate on this support at national and local levels.**

Regarding the existing support schemes, the insufficient take-up is partly due to the fact that it supports renovations with a long payback time, too long to interest investors. There is a need to first support highly profitable technologies and systems **first with a short return on investment time**, and only then support deep renovations. All energy efficiency related investment costs need **therefore** to be separated.

The demand needs to be facilitated/created which will happen if consumers are better informed on both the energy efficiency measures and the access to finance. Information campaigns on easy to implement and short return on investment will stimulate the market.



Last but not least a stable long term financial framework is needed (see infra).

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

Energy prices are still too low to consider investing in energy savings.

Investments, especially when investing in developing technologies, first need **stability**. Investors need to have trust in the policies in place and will favor a long term vision which is reassuring. Changing policy frameworks greatly reduce investments: people and companies will not invest in renovation now, if they are not sure the legal framework is not going to change in the future after their investment has been made.

The cheap pricing for CO2 maintains buildings with highly carbonizing technology. That causes long payback times for investments. **Sufficient pricing for CO2** will open the lock for investments.

Other issues limiting investments are:

- the owner / tenant issue: whose responsibility is it to renovate, and to whom it benefits.
- bureaucracy: investments, support schemes, and verification need to be made as simple as possible.
- lack of awareness and trust: the credibility of the potential energy savings, and thus the payback time, is still too low. There is a need to demonstrate technologies work.

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

For citizens:

- Reduced VAT and income tax reduction for renovation works
- 0% interest loans for renovation work

For Member States:

- Third party financing / ESCO system
- Guarantee fund for low rate loans
- Subsidies

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

It goes against the EU climate targets by giving an unfair cheaper price to highly carbonized technologies. Subsidies should be directed to renewable production sources, energy storage, and energy efficiency which have already been identified as a priority by the Commission.

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?

We don't know how but it would be important to solve.



41. Was

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

No, there is a need to do more at the European level to raise the consumer awareness and demand.

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 a very important tool in supporting renovation, however there is a need to clarify their legal and financial status in many Member States. The EU should encourage the use of energy performance contracts, especially for public bodies and local authorities.

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.

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

No, this is an important issue, but shouldn't be included in EPBD.

EPBD should concentrate on energy performance.

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?

An obligation for the meters to display **real time consumption** and compare it with similar houses to raise awareness amongst users would be a cheap and most useful way to increase energy efficiency.

Also both at district and city level, the **combination of renewable energy sources with energy storage systems and energy management technologies** should be promoted.

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?

Further to the minimum requirements of EPBD, the cost of new buildings has yet increased significantly. Adding more targets or specific requirements for new buildings would make new buildings too costly.

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

The public sector has been put aside because of a lack of public money for investments, especially from local authorities. However it is of high importance that investments in public buildings are made as it represents a very important share of the building stock and public buildings should be exemplary.

Priority has been given to new buildings; but we now need to focus on existing buildings because most of them will still be there in 2050.

And today national public policies tend to focus on residential buildings, while it would be politically, financially and technically easier to start by facilitating commercial buildings renovation which have always led the way in terms of technology.

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

No, EPBD now needs to support and promote the development of **local storage systems**, which will help developing self-consumption and also create new services to reduce the impact of renewable production on the grid.



The electricity usage for heating in new buildings has decreased due the high primary conversion factor for electricity.

EPBD has not had a great impact on domestic usage of electricity (lighting, domestic appliances etc.) because these devices are calculated in energy performance of buildings based on the building size. In Finland demand response is not yet in the regulations...

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

No, embedded energy has not been taken into account.

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

No, nothing is done at the individual level to foster demand response: as long as there is no individual metering and measurement which requires the use of a smart meter, demand response will not take off.

Demand response is still in an experimental phase. **Internet of things technologies development needs to be supported in order to see demand response stimulated (see infra).**

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, BAC's and energy management technologies, which are also cheaper and have a short payback time. **A prior inspection of the existing technical systems in buildings should be added to ensure the highest and best efficiency level when renovating.**

Obligations should first apply to commercial buildings before they are applied to housing in order to be accepted.

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?

Renewable energy is really important. The energy should be produced where it is most efficient. All the buildings shouldn't be forced to produce renewable energy, and renewable energy produced "on-site" or "nearby" shouldn't be more valuable or better for the buildings energy class than renewable energy produced a bit further away.

An obligation for the meters to display real time consumption and compare it with similar houses to raise awareness amongst users would be a cheap and most useful way to increase energy efficiency.

Also both at district and city level, the combination of renewable energy sources with energy storage systems and energy management technologies should be promoted.

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 have unfortunately very limited offerings for the moment. The technology is present and also continuously improving.

What is needed are regulatory actions ensuring smart meters not only for billing, but as a **tool for utilizing investments in order to meter and control energy consumption on end-user side**. What is important is how the data is accessible in an anonymous way to provide services increasing the energy performance.

Example in Denmark: ELHUB: an IT centralized metering data system.

There are very different definitions of smart meters between Member States: they all have different functionalities. But smart meters are not vital to have information on energy consumption.

Individual meters for all energy carriers (including heat) in multi apartment buildings and commercial buildings are absolutely needed so that users are more informed and act responsibly (bouncing effect after a renovation)



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?

There is a need for **more and better awareness campaigns**, with a focus on the multibenefits of energy efficient consumption and consumer behavior (financial savings, ‘self’ control of its own consumption, reliable and modern technology) beyond the energy savings.

2. national authorities?

There is a need for **more and better awareness campaigns**, with a focus on the multibenefits 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 multi 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 **contact points** in the region for administrative, technical and financial advice.

4. local authorities?

See 3.

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

No, not really.

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?

Data needs to be anonymous, and it needs to be accessible to every company offering services that could increase energy efficiency with it, with the approval of the customer.



The EU should make sure data does not distort competition by giving an advantage to companies collecting the data and having access to them and using them to provide other services.

Finally, there is a need for data standards and verification, so that people and service providers can trust the data collected.

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

No, EPC are relevant at national level. National databases however would be very useful.

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?

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



If the consumers are **better aware and informed** of the possibilities through information campaigns, the interest and demand for energy efficiency measures will increase. The AIE knows that the up-skilling of the electricians will then also automatically happen.

Equally if technical professionals are **involved as soon as possible** in the construction/renovation project to consider the potential in technical building systems, the investment will then occur in the best efficiency improvements. Today too often, the investment is spent in the building envelop resulting in no money left for the technical building systems.

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

No, only energy is addressed.

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, definitely. In particular for renovation, the main focus (of architects) goes to the building envelop and the insulation.

However the existing technologies and technical building systems can easily generate 10-20% energy savings based on addressing the active part of the installations. Moreover electro technical installations become progressively less suited to the higher standards of functionality, security and safety required by today's society.

A new article to include proper monitoring and maintenance of the technical installations and energy management systems by skilled contractors will equally improve the general reliability of the installation!

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



In the existing building stock electrical installations and systems are often outdated and not suited to implement all new technologies. Moreover in a renovation project the electrical system is often not the first thing that is being looked at. But the backbone to implement smart technology in a safe way would be to first verify the compliance and conformity of the electrical system.

To not specifically address the promotion and stimulation of active control systems, automation, energy management systems would definitely impede a full implementation of the energy savings potential in Europe. **Today's electro technical and electrical technologies allow the measurement, displaying and monitoring of the energy use by type of energy and thus are able to rapidly change the consumers' behavior.**

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?

As mentioned supra, in the existing building stock electrical installations and systems are often outdated and not suited to implement all new technologies. But the backbone to implement smart technology in a safe way would be to **first regularly verify the compliance and conformity of the electrical system.**

There is a need to increase regular inspections of heating/cooling, but also of ventilation. It is not just a question of energy performance, but also a question of safety, air quality and health.

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

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

Yes, the installations are less suited or not conform to today's standards of functionality, security and safety.

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.

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?

No. Energy consumption that is multiplied with energy factors is mainly used to demonstrate the energy performance of buildings. This value does not illustrate the actual energy performance of buildings and is therefore very far from the real energy usage of the building.



No, the EPBD focuses on design and installation. Its revision absolutely needs to tackle the operation stage by providing a specific framework for mandatory and regular maintenance.

Automation and energy management systems should also be on the picture as they are a key tool to improve energy efficiency on the long term in operation.

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

Measuring actual consumption is key if we want to effectively reduce energy consumption and move towards NZEBs. However it is very hard to implement because of the impact the user has on its own consumption. Many Member States are working on this and try to find a proper answer, but the EPBD should tackle this issue to come up with a common European response.

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

No, the EPBD focuses on design and installation. Its revision absolutely needs to tackle the operation stage by providing a specific framework for mandatory and regular maintenance.

Automation and energy management systems should also be on the picture as they are a key tool to improve energy efficiency on the long term in operation.