

EHI position on the review of the Energy Performance of Buildings Directive

This paper presents the views of the European Heating Industry on the review of the Energy Performance of Buildings Directive (EPBD).

- Buildings must contribute to achieving our medium and long-term climate goals. The EPBD should establish an EU target for the reduction of greenhouse gas emissions from the building sector of 60% by 2030, in line with the prescriptions of the Renovation Wave and the Climate Target Plan.
- As space and water heating account for 80% of energy consumption in residential buildings, any new definition or requirement to be set for deep and staged-deep renovations should include and prioritise actions on heating systems, notably the installation of efficient technologies and the progressive switch to renewable and decarbonised energy sources.
- The replacement of old and inefficient heaters with modern and highly efficient appliances is critical and should be accelerated by introducing an annual replacement target of at least 6% in the EPBD and its Long-Term Renovation Strategies (art. 2a). This should be coupled with adequate financial support. All energy efficient and renewable-based heating technologies as well as all energy carriers are needed to maximise system integration and cut emissions in hard-to-decarbonise buildings, considering also local and buildings' specificities, as well as users' needs and possibilities. Such approach must be reflected in the incentives regime for heating appliances.
- New requirements, such as mandatory minimum energy performance standards (MEPS) and possible building renovation passports (BRPs) should necessarily address the heating dimension of buildings and prioritise the most cost-effective and technically feasible measures, starting from those addressing heating systems.
- Increasing building owners' and users' awareness about the (in)efficiency of their installed appliances and available alternatives is key. Hence, the crucial role of installers should be further enhanced by the Directive, along with the introduction of a label of the installed stock, and regular checks of residential heating systems (below 70 kW) should be re-introduced in art. 14.
- Heat emitters, including low-temperature, should keep being regulated under the EPBD, national building codes and related standards, not as an Ecodesign product group. This is because their efficiency/performance is strictly related to several influencing parameters, which are building-based. Considering emitters within such system approach is important for performance optimisation, in line with the current EPBD art. 8.
- Ensure coherence across the Fit for 55 package: the review of climate and energy legislation, as well as of the ecodesign and energy label regulations for space and water heaters, should contribute to achieving a faster replacement of old and inefficient heaters to support the reduction of CO2 emissions from buildings.

Key messages

Set a 60% target for greenhouse gas emissions reduction from European buildings by 2030: buildings must actively contribute to achieving the 2030 and 2050 climate objectives.

Attaining our targets for CO₂ emissions reductions in 2030 and carbon neutrality in 2050 means that our economy and society must become more energy efficient and favor the use of decarbonised energies. Most energy savings by 2030 will need to come from buildings¹ and the forthcoming review of the Energy Performance of Buildings Directive (EPBD) is a crucial opportunity to make it happen.

At the same time, a diverse mix of renewable and low carbon energy sources will need to be deployed to decarbonise the remaining energy needs of our building stock, most of which will be directed to satisfy our heating (and cooling) needs.

To ensure buildings actively contribute to our renewed climate goals and that their emissions are effectively cut, while leaving enough flexibility to determine the most appropriate decarbonisation options at national, local, and even at single building level, it is important to set an emissions reductions target for the building sector. The level should be set at 60% (compared to 2015 levels), as already indicated in the Renovation Wave² and in the Climate Target Plan³.

Prioritise heating decarbonisation as part of building renovations, through the installation of efficient technologies and the progressive switch to renewable and decarbonised energy sources.

The building sector is the single largest source of energy consumption in the EU, representing 40% of final energy consumption and 36% of CO₂ emissions⁴. As heating and hot water production takes up the largest share (about 80%) of a building's total energy consumption, it clearly represents one of the primary areas for action when it comes to buildings' decarbonisation.

Therefore, any holistic renovation of buildings should necessarily include improvements on their heating systems; and any new definition of *'deep'* or *'staged-deep'* renovation should be formulated in a way to ensure that such improvements are always considered and implemented, as part of the required renovation measures.

In practice, this means replacing old and inefficient appliances with modern and highly efficient ones, that can also accommodate more sustainable energy sources, such as decarbonised and renewable electricity and gases (e.g. bio- and synth- methane, hydrogen), as well as other renewables (solar energy, biomass...). The uptake of efficient heating solutions brings energy savings to European households immediately, while slashing CO₂ emissions: condensing boilers already allow to reach around 20% energy savings and 35% CO₂ savings compared to non-condensing technologies, while heat pumps can produce 3 to 5 times more heat than the electricity they use. All these technologies are compatible with a net-zero emissions scenario thanks to the use of decarbonised and renewable energies.

¹ Stepping up Europe's 2030 climate ambition, European Commission, COM(2020) 562 final, p. 20.

² A Renovation Wave for Europe, European Commission, 2020, p. 1.

³ Impact Assessment accompanying the Climate Target Plan 2030, SWD(2020) 176 final.

⁴ A Renovation Wave for Europe, European Commission, 2020, p. 23.

Accelerate the replacement of old and inefficient heaters across Europe with modern and highly efficient appliances, by introducing a replacement target of at least 6%/ year.

Almost 60% of heating systems installed in Europe today are old and inefficient. Appliances are on average 25 years old and, if they were labelled today, they would end up in class D or below. Such a high share is mainly due to very low replacement rates, which currently stagnate around 4% per year, and make it hard to reduce the bulk of buildings' emissions, resulting indeed from heating purposes.

In fact, even a replacement rate of 5% per year, previously indicated as necessary to cut overall Europe's CO₂ emissions by 40% in 2030⁵, would not be enough to deliver on the new climate ambition and on the new 55% target. Hence, higher replacement rates are urgently needed, and these should be ensured through the introduction in the EPBD of a replacement target of at least 6%. This would ensure that the heating stock in buildings is progressively modernised and decarbonised through the installation of highly efficient technologies and the increasing deployment of renewables and other carbon neutral energy sources.

It is in any case very important to ensure that the replacement is accompanied by adequate financial support, e.g.: scrappage schemes, the funding of which may be ensured by using revenues from the extended EU Emission Trading System (ETS). Such support schemes can be progressive and dedicate higher funding to low and middle-income households. In this way, establishing such a target would also help fight and alleviate energy poverty, in line with the EU promise "Leave no one behind".

When replacement of heaters are made, it is important to ensure that the overall performance of the heating system is optimised, via appropriate rules at member state level. According to the existing EPBD art. 8, these rules touch upon the proper installation, appropriate dimensioning, adjustment and control of heating systems. Such systems are to be considered comprehensive of all their components, meaning the heat generator, heat emitters, as well as all the parts in between (e.g.: piping systems, heating interface unit, thermostatic valves etc.).

In light of this, it is important that heat emitters, including low-temperature emitters, keep being regulated under the EPBD, national building codes as well as related standards (and not as a separate product group under Ecodesign). This is because their efficiency/performance is strictly related to a number of influence parameters, including heating and/or cooling load, transmission and distribution losses, control accuracy and dynamic behaviour etc. Heating water temperature is not an emitter-specific feature, but a design and operation feature of a heating system in correlation to the designed building and its heat and/or cooling load (see Annex).

As buildings are hard to decarbonise, it is important to make the most of all technologies (multi-technology) and of all energy carriers (multi-vector approach); such approach must be reflected in the incentives' regime.

Buildings are a hard-to-decarbonise sector, and this is mainly due to their high heterogeneity, which depends on their specific conditions (age, use etc.), location (climatic zones, energy infrastructure) as well as on owners'/users' needs and possibilities (individual preferences and financial capabilities).

As buildings are different, heating solutions are several and highly diverse too, and all of them should be promoted and then deployed according to relevant circumstances affecting users, buildings and the overall energy system in which they are placed. This means that, for example, effective electrification via heat pumps could be the most appropriate solution for some buildings, while the use of hybrids

⁵ EU pathways to a decarbonised building sector, ECOFYS, 2016.

(themselves a key technology to electrify buildings), thermally driven heat pumps or condensing boilers, that can already accommodate biomethane and shares of hydrogen – even 100% – could represent the best options in other cases.

It is thus crucial to make the most of all efficient solutions and support their further development, so that the best option to any building can be selected at any time, depending on all relevant conditions. Consistently, it is essential to ensure that different technologies contributing to buildings' decarbonisation, across different energy carriers, are eligible for incentives to cover their upfront costs and support their uptake in European buildings. Considering the new climate ambition for 2030 and the long-term goal of climate neutrality, we need to use and promote all technologies that are efficient and compatible with renewable and decarbonised energy sources. Hence, in conjunction with new energy labelling rules for heating equipment, the energy label regulation art 7.2 should be amended. The goal should be to ensure that Member States have flexibility to support heating technologies that contribute to national plans for decarbonisation, in line with the Treaty on the Functioning of the EU.

Indeed, the current setup of art. 7.2 and the structure of the energy label ranking for heaters – combining several energy carriers into one scale – should be adapted, to reflect diversity of national choices of energy carriers and recent developments in fuel-based technologies. This is especially relevant for heaters: they are a broad group, all falling under the same label. Yet, they are not easily substitutable with one another: e.g.: each washing machine can be substituted with another one; this is not the case for heaters. Substitution depends on the existence of adequate grid connections, piping and space available in a building, as well as heating demand and climate conditions.

Ensure any new standards or requirements, such as mandatory minimum energy performance standards (MEPS) and possible building renovation passports (BRPs), cover and prioritise actions on buildings' heating systems.

Consistently with what stated above, any new requirements for buildings to be set in the EPBD, such as MEPS and BRPs, should necessarily tackle the heating dimension of buildings. This means ensuring that buildings performance is improved through key actions on the heating side, such as the replacement of obsolete heaters with modern technologies, capable of slashing CO2 emissions.

MEPS in particular, if well implemented, can indeed represent a good tool to improve buildings' energy efficiency and identify a roadmap for actions. An important element for their success is that they should take into account the different initial conditions and potential of the building stock. Being MEPS minimum requirements, they should primarily support the renovation of the worst performing buildings and ensure that the most appropriate and cost-effective improvements are implemented. Considering the impact of space and water heating on buildings' energy consumption, and the relative ease of replacing heating systems compared to other measures, MEPS should necessarily comprise a chapter to address the heating dimension and require the replacement of old and inefficient heaters whenever relevant, while allowing for flexibility in determining the most appropriate solutions to any building, considering:

1. A user perspective, as a variety of heating technologies (multi-technology) and energy carriers allow to achieve decarbonisation in the most affordable and convenient way for their building and local circumstances.
2. A building perspective, for which a multi-technology approach is needed to cope with the fact that buildings and heating needs are different across Europe.

3. A system perspective, where multi-technology is key to address the current sizing of grids and local availability of renewable energy sources.

Finally, it is important to ensure MEPS do not entail excessive costs for tenants and owners, thus prioritising those measures that have short payback times, and envisaging adequate financial support mechanisms. Moreover, incentives should be made available to and legally possible for building owners to support all measures needed to reach the relevant MEPS required, including in particular for heating systems' replacement. Appropriate trigger points should be identified, so owners may plan ahead the investment and works needed to comply with the MEPS.

Regarding BRPs, it is equally essential that they include and prioritise actions on buildings' heating systems, also considering the modularity of technologies, that allow them to adapt to different levels of insulations, thus maximizing energy efficiency at any stage of a building lifetime.

Increase the awareness of owners and users about the (in)efficiency of their heating appliances and available alternatives, to drive the decarbonisation of buildings.

An essential prerequisite to trigger renovation actions, as well as much needed measures to upgrade buildings' heating systems, is to enhance consumers' information and awareness. When it comes to tackling the heating dimension, the role of installers is essential, as they directly liaise with building owners/users to inform them about the performance of their installed appliances and, most importantly, about available alternatives to replace inefficient heating systems, thus helping them reduce their energy consumption and energy bills.

The revised EPBD should, in line with the recently published proposal for the review of the Renewable Energy Directive (RED)⁶, further enhance the role of installers to ensure that enough trained and qualified installers are available to handle the Renovation Wave and advise consumers on the best options for their specific situation.

Consumers' information should also be ensured via regular checks of heating appliances, which should be reintroduced also for domestic heating systems below 70 kW, in article 14 of the EPBD. Keeping the current threshold would indeed exclude a significant number of appliances from the scope of the existing obligation, thus drastically reducing the number of occasions in which consumers can receive information about the (in)efficiency of their heaters and, possibly, take action to upgrade them. Modern appliances capable of remote performance monitoring may not need such regular checks, thereby they should not be subject to them.

Another great way of providing information to end users is to deliver them a label for installed heating appliances. Such visual document, to be based on the current energy label, would provide very easy, intuitive and well recognisable information regarding the efficiency or age of a heating appliance. Moreover, people would easily compare their old appliances with new products on the market, thanks to the energy label. The delivery of the label may be linked with the regular checks of heaters mentioned above. Similar initiatives are being promoted by the H2020 project HARP⁷ and have already been implemented in several Member States⁸.

⁶ Proposal for Proposal for a Directive amending Directive (EU) 2018/2001 of the European Parliament and of the Council, as regards the promotion of energy from renewable sources, p. 34.

⁷ <https://heating-retrofit.eu/>

⁸ This is the case in Germany, where a labelling of installed heating boilers has been in place since 2016, as a voluntary scheme, and has become compulsory – for all boilers manufactured in 1994 or beforehand – since 2017. More **information**

Ensure coherence across the 'Fit for 55' package.

The provisions envisaged for the EPBD review should be coherent and complementary to other relevant measures under the 'Fit for 55' package:

- In the energy efficiency directive (EED):
 - Ensure the comprehensive assessment of efficient heating and cooling (Chapter V) supports the replacement of old and inefficient heaters, consistently with the 6% annual replacement target, to be ideally established in the EPBD and reflected in the EED, along with the 60% emissions reductions target for buildings by 2030.
 - Make sure the early retrofit of heating appliances can keep on contributing to the annual energy savings obligation (Chapter III), as long as it allows to achieve energy savings and to reduce consumption of fossil fuels. In particular, the use of efficient appliances that can also accommodate decarbonised and renewable fuels (e.g.: green hydrogen, bio- and synthetic methane) should be further promoted.
 - Ensure public buildings (Chapter II) play an exemplary role and fulfill their new and extended obligations by upgrading their heating systems through the installation of modern and highly efficient heating technologies.
 - Introduce the labelling of the installed heating stock among the measures to enhance consumers awareness and empowerment (Chapter IV).
- In the renewable energy directive (RED):
 - Ensure the targets for renewables in heating and cooling, buildings, as well as the overall target for the sector can be achieved through the deployment of green gases/fuels, and make sure their use is also promoted in the building sector.
 - Make sure that the installations of solutions that are ready for green gases and hydrogen is supported by the Directive, along with the promotion of renewable-based heating systems.
 - Acknowledge the renewable energy captured by all heat pumps technologies.
- In ecodesign and energy label:
 - Introduce an energy label that differentiates energy performance between products of the same product family; maximises the potential of incentives, matching national decarbonisation strategies and choice of energy carriers; considers the greening of energy carriers, including green gaseous and liquid fuels; incentivises smartness and digitalisation to empower the consumer and optimise sector coupling and actual energy use.
 - Promote the use of hydrogen and other renewable and decarbonised gases for heating.
 - Keep promoting heat pumps on the energy label scale.
 - Promote hybrids by creating a product category for them.
- In the EU Emission Trading System (ETS) and in the Energy Taxation Directive (ETD):
 - Put a price on CO2 emissions from buildings
 - Carefully balance distributional effects and tackle energy poverty: earmark revenues from CO2 pricing to support people replace old and inefficient heaters with efficient and renewable-compatible equipment
 - Attribute lower price / taxation level for low-carbon and renewable energy sources.

(in German) at: <https://www.deutschland-machts-effizient.de/KAENEF/Redaktion/DE/Publikation/2019/flyer-heizungsanlagen.html>.

Annex: EHI proposal for low-temperature emitters to be regulated under the EPBD

In its comments sent to the European Commission following the Consultation Forum of 13 July 2021, the European Heating Industry has put forward arguments against the introduction of low-temperature (LT) emitters in the Ecodesign and Energy Labelling Working Plan. The EHI considers that they should continuously be regulated under the Energy Performance of Buildings Directive (EPBD)/national building codes as well as related standards – not as a separate product group under Ecodesign. The present annex contains a proposal from the EHI on how this should be done in the EPBD.

There is no physical basis for defining a water-based heat emitter for different temperature classes, such as low-, middle-, or high-temperature classes, because all water-based heat emitters emit heat whenever the water temperature is higher than the room temperature (ambient temperature).

Heating water temperature is not an emitter-specific feature, but a design and operation feature of a heating system in correlation to the designed building and its heat and/or cooling load. That is, the design temperatures of the heating system are based on decisions made in the design of the building and the heating system (EPBD requirements) and there is no basis for artificial efficiency classifications and definition of heat emitters.

The water temperature is controlled in operation according to the heating demand of the building (including the transmission losses throughout the room or heating space and the distribution losses from the heat generator to the heat emitter), either according to a heating curve (conventional system) or dynamically (digitalized heating network). Heating water temperatures are lower during the heating season and rarely correspond to design temperatures. This is in correlation with the energy demand of the distribution system (i.e., pumps) and/or the heat losses of the storage.

From the point of view of heat production, it is of course advantageous for the heating system to be dimensioned for low temperatures. On the other hand, low temperatures are relative values. For example, the difference between the heat source temperature of the heat pump and the water temperature of the heating system is of great importance for the COP value of the heat pump: High heat source temperatures such as ventilation exhaust air temperature (always around 20°C) are significantly better for COP than outdoor air during the winter time. This fact can also be utilized in the design of the heating system and in the selection of design temperatures.

Due to the situation that the efficiency/performance of the emitter system is depending on a lot of influence parameters, we would propose to handle the issue inside or in the context (guidance document for the transposition of the EPBD, and/or EPBD standard EN 15316-2 “Energy performance of buildings - Method for calculation of system energy requirements and system efficiencies - Part 2: Space emission systems (heating and cooling)”) of the EPBD. Below are some examples of the influencing parameters for the emitter system and/or other parts of the system.

- Heat and or Cooling Load
- Transmission losses
- Distribution losses
- Energy demand for the distribution
- Energy storage heat losses

- Control accuracy and dynamic behaviour
- Heat output at low design temperature
- Heat outputs at low water flow rates
- Percentage of radiant heat output
- Auxiliary energy demand

The EPBD standard EN 15316-2 already provides the calculation method as well as a comparison of the energy performance of emitters.

The following proposal is focused on hydronic systems only.

The design shall be made in accordance to the needed requirements for the customized building. Therefore, the design temperature for the heating system shall be as low as possible. In addition, it should leave flexibility for local legislation to adapt to their specific climate conditions.

The following systems are **not** covered: district heating and cooling, air-conditioning systems, waste heat, infrared heating systems, electrical heating systems, products according to EN 419 "Gas-fired overhead luminous radiant heaters for non-domestic use", EN 416 "Gas-fired overhead radiant tube heaters and radiant tube heater systems for non-domestic use "and EN 17175 "Gas-fired overhead radiant strip heaters and multi-burner continuous radiant tube heater systems for non-domestic use "

For those systems not covered by this proposal the EPBD must define similar requirements. These requirements must be discussed with the relevant industry.

About EHI, the Association of the European Heating Industry

EHI represents 90% of the European market for heat and hot water generation, heating controls and heat emitters, 75% of the hydronic heat pump market, 80% of the biomass central heating market (pellets, wood) and 70% of the solar thermal market. EHI Members produce advanced technologies for heating in buildings, including: heating systems, burners, boilers, heat pumps, components and system integrators, radiators, surface heating & cooling and renewable energy systems. In doing so, they employ about 120,000 people in Europe and invest over a billion Euros per year in energy efficiency. www.ehi.eu