**Guidance document on the revised Articles 14 and 15 EPBD**

**Inspection of heating systems and air conditioning systems**

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# INTRODUCTION ARTICLE 14 – HEATING SYSTEMS

Article 14 of **Directive 2010/31/EU on the Energy Performance of Buildings as originally adopted on 19 May 2010**[[1]](#footnote-1) (hereafter referred to as the "former EPBD") established inspection requirements for heating systems with a rating over 20 kW. Member States had to fix inspection frequencies according to the type of the system, effective rated output, costs of inspections and estimated energy savings. Heating systems with an effective rating over 100 kW had to be inspected at least every 2 years. Member States could also allow for reduced inspection frequency in for systems with electronic monitoring and control systems in place. As an alternative to inspections, Article 14 paragraph 4 allowed Member States to opt to take measures to ensure the provision of advice to users concerning the replacement of boilers, other modifications to the heating system and alternative solutions to assess the efficiency and appropriate size of the boiler. The overall impact of this approach had to be equivalent to that arising from inspections.

Article 1 of **Directive (EU) 2018/844 amending Directive 2010/31/EU on the energy performance of buildings**[[2]](#footnote-2) **and Directive 2012/27 on energy efficiency** replaces the provisions concerning inspection in Article 14 of the 2010/31/EU (hereafter referred to as "the revised EPBD").

As per the provisions of the revised EPBD, heating systems or combined heating and ventilation systems of, or under, 70 kW effective rating no longer require inspections. Heating systems or combined heating and ventilation systems with an effective rating over 70 kW should still be inspected at regular intervals. The revised EPBD allows for exemptions for systems under energy efficiency contractual arrangements (or similar), systems operated by a utility or a network operator, systems in non-residential buildings equipped with automated and control systems or systems in residential buildings with specific monitoring and control functionalities.

In addition, the revised EPBD introduces two new requirements. The first requirement is that in combined heating and ventilation systems, the ventilation should also be included in the inspection. Second, systems over 290 kW are required to have Building Automation and Control Systems (if technically and economically feasible).

In summary, the main differences with respect to inspection requirements introduced under the revised EPBD are: 1) the different thresholds for inspections, 2) the inspection of the ventilation system for combined heating and ventilation systems, 3) a greater focus on normal operating conditions and 4) greater role for building automation and control systems (BACS) and electronic monitoring and control systems.

As an alternative to inspections, Article 14(3) of the revised EPBD includes the possibility for Member States to opt to take measures to ensure the provision of advice to users. The provisions of the revised EPBD with regards to alternative measures are similar to those originally laid out in the former EPBD.

However, Member States that choose to apply alternative measures must ensure that they are equivalent to the inspections under the provisions of Article 14 of the revised EPBD (this includes elements such as new thresholds, combined heating and ventilation systems, exemptions, etc.).

Member States have taken different routes in the application of inspections or alternative measures. Fifteen Member States have applied inspections for both types of systems. Six Member States have applied alternative measures for heating systems and inspections for air conditioning systems. Finally, seven Member States have applied alternative measures for both heating and air conditioning systems. The provisions on Article 14 (heating systems) and Article 15 (air conditioning system) are very similar and the guidance could have treated both articles together. However, because the approach in Member States is different, it has been decided to keep Articles 14 and 15 separated for the purposes of this Guidance note.

The aim of this guidance document is to clarify the purpose of the revised provisions in Articles 14 and 15 of the revised EPBD. The note states the views of the Commission services, does not alter the legal effects of the Directive and is without prejudice to the binding interpretation of Articles 14 and 15 as provided by the Court of Justice.

# UNDERSTANDING OF ARTICLE 14 (SCOPE)

## Aim and objectives

The main aim of an inspection is to evaluate the performance of a system. Inspections should also identify issues or problems, propose solutions or improvement measures and log the results of the inspection in a report for future reference.

## Heating and combined heating and ventilation systems - Article 14 (1)

The revised EPBD expands the scope of inspection to also include the ventilation part of combined heating and ventilation systems.

For those Member States which already have inspection regimes in place, the scope of the heating system itself should have already been defined in the context of the transposition. It should include all accessible parts such as: the heat generator, control system and circulation pumps.

The revised EPBD in addition requires the inspection of the ventilation in combined heating and ventilation systems. Since this is a new requirement, Member States will have to define the types of systems that will now be considered as combined heating and ventilation systems.

Systems can be categorised in 4 different types, as follows:

1. Systems where air from the ventilation system is the main heat delivery method. An example of this system would be variable air volume (VAV) systems.
2. Systems where there are one or several air handling units delivering treated fresh air to the heated space(s). The final space heating is done through local delivery units. Both the air handling unit(s) and the local delivery units are connected to the same heat generator. Example of this system would be: air handling unit (AHU) plus fan coils or radiators.
3. Systems where there are one or several air handling units delivering treated fresh air to the heated space(s). The final space heating is done through local delivery units. The air handling unit(s) and the local delivery units are not connected to the same heat generator. An example of this system could be an AHU plus rooftop units (VRV/VRF).
4. Systems where outside air is not preheated using the heating system (for example extract only systems, supply & extract, but without pre-heat).

Type 1 systems would clearly fall within the scope of the revised EPBD. For this type of systems, the ventilation equipment (such as the AHU and final delivery units) are fully involved in the delivery of the heat within the building.

Type 2 systems would also fall within the scope of the revised EPBD. Unlike Type 1 systems, the ventilation part of the system in a Type 2 system would not necessarily take the majority of the heating load. However, the heating consumption related to the treatment of the air is still a substantial part of the energy consumption of a building, especially for modern buildings. Type 2 systems require careful integration between ventilation and heating to adequately provide for the indoor environment in the most efficient manner, particularly under normal operating conditions. Inspection of such systems would offer good opportunities for identifying energy saving opportunities at a reduced cost (low hanging fruit). In conclusion the requirements of the revised EPBD apply (Recital 35 of Directive (EU) 2018/844 helps establish this).

Type 3 systems are similar to Type 2 systems and should therefore also be treated as a combined heating and ventilation system. This is mainly because of the need to adequately integrate the operation of the heating and ventilation systems. Similarly to Type 2 systems, an inspection offers good opportunities for identifying energy savings opportunities with a reduced implementation cost.

However, Type 4 systems do not fall within the scope of the revised EPBD. In this type of system, the heating and ventilation are not connected to one another and their operation may not be integrated and could even be completely independent.

In general Types 1, 2 and 3 are more common in non-residential buildings (such as offices, shopping centres, etc.), whereas type 4 systems are more common in residential buildings.

The revised EPBD does not specify the extent of the inspection with regards to the purely air management and treatment aspects of the system (such as ductwork or air filters). However, it would be good practice that the independent expert still includes them in the inspection at least to a certain degree, based on the accessibility of the system and the energy saving opportunities available. In practice, in a combined heating and ventilation system, the different parts of the system may be located together or in close proximity. Since the inspector is physically visiting the building, the added workload and cost are limited, while the saving opportunities are good.

## Heat pumps and rooftop units

Heat pumps are defined in Article 2(18) of the revised EPBD as "*a machine, a device or installation that transfers heat from natural surroundings such as air, water or ground to buildings or industrial applications by reversing the natural flow of heat such that it flows from a lower to a higher temperature. For reversible heat pumps, it may also move heat from the building to the natural surroundings*". Heat pumps are therefore capable of acting as the generators for both heating and air conditioning systems, although in some applications they may provide only one or the other. Because of this capacity to provide both heating and cooling, heat pumps could fall under the provisions of both Article 14 and Article 15.

If a heat pump is used as the heat generator in a system that provides only heating, then the system should fall under the provisions of Article 14. For example, this would be the situation of a heat pump generating heat for heating and domestic hot water.

If a heat pump is used as the heating or cooling generator in a system that provides both heating and air conditioning, then the system should fall under the provisions of Article 15.

Rooftop units are a special category of heat pumps commonly used in relatively large non-residential buildings. They work as heat pumps with the added capability of providing heating and cooling simultaneously. They should always be considered as falling under the provisions of Article 15.

## Performance under typical or average operating conditions

Recital 26 of the former EPBD indicated that *"regular maintenance and inspection of heating and air-conditioning systems by qualified personnel contributes to maintaining their correct adjustment in accordance with the product specification and in that way ensures optimal performance from an environmental, safety and energy point of view"*. Article 14(1) of the former EPBD provided that the inspection should include an assessment of the boiler sizing compared with the requirements of the building.

However, the revised EPBD refers not only to the boiler, but to the system as a whole and in particular the heat generator. Therefore, under the revised EPBD there is a greater emphasis on normal operating conditions. Recital 36 of Directive (EU) 2018/844 indicates that it makes sense for inspections to focus on real-life use conditions, with varying operating conditions that may require only a part of the nominal output capacity. This is because only a small fraction of the energy consumption in a heating system takes place under conditions approaching design conditions. Instead, the greatest proportion of the energy consumption is when the system is running under part load. Therefore, the objective should be to ensure that the system can perform efficiently and effectively under all conditions.

Article 14(1) of the revised EPBD requires that the inspection of heating systems includes (where relevant), an assessment of the capabilities of the heating system to optimise its performance under typical average operating conditions.

Examples of average operating conditions [To be included at a later stage].

## Building Automation and Control Systems (BACS) – Article 14(4)

To be completed.

## Electronic monitoring and effective control functionalities in residential buildings – Article 14(5)

To be completed.

## Exemption from the requirements laid down in Article 14(1) – Article 14(2) and 14(6)

The former EPBD allowed the possibility for Member States to reduce the frequency of inspections or lighten them as appropriate where electronic monitoring and control systems were in place.

The revised EPBD allows for the introduction of several exemptions if the technical building system is covered by an energy performance contracting (or similar) or is operated by a utility or a network operator – Article 14(2) – or if the heating system has specific control and monitoring features as defined in paragraphs 4 and 5 of Article 14 – Article 14(6).

BACs are a cost-effective way to deliver data for the inspection and enable the systematic digital technical monitoring of systems. However, BACs are part of the assessed technical building system and inspection is carried out by independent third parties as defined by Member States.

Any party carrying out an inspection would have to technically and organizationally rely on the BACS and the contractors support. To carry it out effectively the inspection methods relying on data delivered by BACs should be defined by Member States. Provision of a minimum data set in a standardized format should be mandatory for energy inspections.

***Article 14(2)***

Article 14(2) of the revised EPBD excludes from inspections those technical building systems that are covered by an agreed energy performance criterion or a contractual arrangement specifying an agreed level of energy performance improvements. An energy performance contract as defined in point (27) of Article 2 of Directive 2012/27/EU of the European Parliament and of the Council would fulfil these requirements.

Article 2(27) of Directive 2012/27/EU defines energy performance contracting as 'a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings'.

Those buildings operated by a utility or network operator and that are therefore subject to performance monitoring on the system side may also be exempt.

The exemptions indicated in Article 14(2) only apply if the overall impact of the approach is equivalent to that resulting from the application of inspections indicated in Article 14(1).

The revised EPBD does not indicate how this equivalence should be established. One possibility could be to determine whether the technical building system, as part of the contract or agreement, is already undergoing a regular inspection that is similar in nature to the inspections under Article 14(1). If the technical building system undergoes such inspection, an exemption from the requirements laid down in Article 14(1) could be established. It is safe to assume that most energy performance contracts or agreements already include some level of regular inspection. However, the full extent of such inspections may not be completely in line with the requirements of the revised EPBD.

***Article 14(6)***

Article 14(6) of the revised EPBD introduces exemptions for those buildings that comply with the requirements of Article 14(4) and Article 14(5).

According to Article 14(4), buildings with heating or combined heating and ventilation systems with an effective rated output of over 290 kW must have (wherever technically and economically feasible) BACS installed by 2025.

It is important to note that BACS is a commonly used term in the building industry, generally used to refer to the electronic system that controls the technical building system. The BACS system as described in Article 14(4) includes a series of characteristics not usually found in most systems already installed or available in the market. Therefore the definition of BACS to be introduced in national legislation should clearly address the differences.

Buildings with systems between 70 kW and 290 kW effective rated output are not affected by the requirement to have BACS installed. However, the owners of the building may decide to install a BACS that is in compliance with the requirements set out in Article 14(4). Under these circumstances Member States may decide to exempt them even if they do not reach the 290 kW threshold.

Article 14(5) introduces the possibility for Member States to ensure that residential buildings are equipped with continuous electronic monitoring and effective control functionalities. In a similar scenario to BACS, some of these elements may already be present in the market in some form or other. However, they might not completely fulfil the requirements indicated in Article 14(5). Therefore, the definition of these systems and how they are introduced in national legislation should clearly address the differences.

As indicated in recital 39 of Directive (EU) 2018/844, Member States may choose to continue applying the inspection regimes which are already in place. Nevertheless, the exemptions applicable under Article 14(2) and article 14(6) must still be considered.

## Alternative measures – Article 14(3)

Article 14(3) of the revised EPBD allows Member States to take measures to ensure the provision of advice to users concerning the use of heating systems or combined heating and cooling systems.

Although the provisions on alternative measures as such are not extensively modified, they are subject to the changes in the provisions in the other paragraphs of Article 14.

The introduction of the new threshold (70 kW) in the revised EPBD means that those Member States that decide to apply alternative measures must apply these measures to the systems covered by the new threshold.

To be completed.

# GUIDELINES FOR IMPLEMENTING PROVISIONS ON INSPECTIONS FOR HEATING AND COMBINED HEATING AND VENTILATION SYSTEMS IN ARTICLE 14 OF THE REVISED EPBD

## Ensure correct transposition of Article 14 - Inspections

### Systems to be inspected

The revised EPBD expands the scope of systems to be inspected under the provisions in Article 14(1) to include combined heating and ventilation systems.

Member States have to ensure that the definitions of heating system and of combined heating and ventilation system are correctly transposed in the national legislation.

Member States have to ensure that the definition of such systems also includes the case of heat pumps and to determine whether they fall within the scope of Article 14 or 15 of the revised EPBD (see 2.3 above).

### Effective rated output

Article 14(1) of the revised EPBD establishes the provision for inspections in systems over 70 kW of effective rated output. This is a change from the threshold of 20 kW of boiler’s effective rated output indicated in Article 14(1) of the former EPBD.

This change affects both the output rating (from 20 kW to 70 kW) and also the content of the rating itself. Under the former EPBD the rating made reference only to the boiler, while the rating in the revised EPBD makes reference to the system as a whole. Systems with multiple heat generators (e.g. Type 2 and Type 3 systems as described in 2.2 above) would also fall under the obligation of Article 14 (1) of the revised EPBD, if the overall rating of the multiple heat generators serving the same area or building unit exceeds 70 kW.

Member States in principle have to amend their national legislation and inspection regimes so as to take into account these new ratings. However, as indicated in recital 39 of Directive (EU) 2018/844, Member States may choose to continue applying the inspection regimes which are already in place, including inspections for smaller heating systems (i.e. of a threshold between 20 kW and 70 kW of effective rated output). If Member States decided to continue to operate those schemes, there would be no obligation on Member States to notify those more stringent requirements to the Commission.

### Performance under typical operating conditions

Member States must update the scope of the inspection to include the assessment of the system under typical operating conditions.

Member States have to determine the changes required in the inspection methodology. In particular this should focus on inspection requirements and guidelines. Member States should indicate the new scope of the inspections as well as technical guidelines, requirements, etc.

### Exemptions based on energy contracts or agreements

Member States may update their national legislation to include exemptions for those buildings covered by an agreed energy performance criterion or a contractual arrangement specifying and agreed level of energy performance improvements. Member States may also include exemptions for those buildings operated by a utility network or operator.

If Member States decide to allow for such exemptions, they have to ensure that new legislation addresses the definition of "energy performance criterion" or "contractual arrangement specifying an agreed level of energy performance".

In case Member States decide to include the exemptions indicated under Article 14(2), they must ensure that the overall impact of the approach is equivalent to those of inspections resulting from Article 14(1).

This equivalence should be reported through (To be completed)

### Requirements on BACS

To be completed.

Data logging as a mandatory function.

Quality assurance.

### Voluntary requirements for residential buildings

To be completed.

### Exemptions based on BACS or continuous electronic monitoring and effective control functionalities

The revised EPBD introduces the exemption of inspections to those technical building systems that are in compliance with article 14(4) (BACS) and 14(5) (Voluntary requirements for residential buildings).

Member States must update national legislation to introduce the definition of BACS (as discussed in 3.1.5). Member States may also update national legislation if they choose to introduce voluntary requirements for buildings (as indicated in 3.1.6).

## Ensure transposition of Article 14(3) – Alternative measures

To be completed.

## Other changes

### Step 3 – Establish training needs.

Due to the expanded scope of the revised EPBD Member States evaluate if new training is necessary and whether additional training is needed.

MS could also establish whether this training would require re-accreditation. A calendar for the provision of training should also be prepared.

### Step 4 – Changes in the reporting methodology

MS must evaluate whether the reporting methodology, templates (if any – check CA on this), databases, etc. need to be updated.

### Step 5 – Changes in the database

MS should evaluate the need for updating-upgrading the database of reports and reporting mechanisms.

### Step 6 – Changes to the quality assurance mechanisms

MS should evaluate the need for updating-upgrading the quality assurance process. The content of reports is likely to increase, which may therefore require further resources.

## Best practices for implementation of provisions

To be completed.

H2020 Quantum Project (Quality Management of Building Performance) https://www.quantum-project.eu/about-us/

# INTRODUCTION ARTICLE 15 – AIR CONDITIONING SYSTEMS

Article 15 of **Directive 2010/31/EU on the Energy Performance of Buildings as originally adopted on 19 May 2010**[[3]](#footnote-3)(hereafter referred to as the "former EPBD") established inspection requirements for air conditioning systems with a rating over 20 kW. Member States had to fix inspection frequencies according to the type of the system, effective rated output, costs of inspections and estimated energy savings. Air conditioning systems with an effective rating over 100 kW had to be inspected at least every 2 years. Member States could also allow for reduced inspection frequency in for systems with electronic monitoring and control systems in place. As an alternative to inspections, Article 15 paragraph 4 allowed Member States to opt to take measures to ensure the provision of advice to users concerning the replacement of boilers, other modifications to the air conditioning system and alternative solutions to assess the efficiency and appropriate size of the boiler. The overall impact of this approach had to be equivalent to that arising from inspections.

Article 1 of **Directive (EU) 2018/844 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27 on energy efficiency**[[4]](#footnote-4)replaces the provisions concerning inspection in Article 14 of the 2010/31/EU (hereafter referred to as "the revised EPBD").

As per the provisions of the revised EPBD, air conditioning systems or combined air conditioning and ventilation systems of, or under, 70 kW effective rating no longer require inspections. Air conditioning systems or combined air conditioning and ventilation systems with an effective rating over 70 kW should still be inspected at regular intervals. The revised EPBD allows for exemptions for systems under energy efficiency contractual arrangements (or similar), systems operated by a utility or a network operator, systems in non-residential buildings equipped with automated and control systems or systems in residential buildings with specific monitoring and control functionalities.

In addition, the revised EPBD introduces two new requirements. The first requirement is that in combined air conditioning and ventilation systems, the ventilation should also be included in the inspection. Second, systems over 290 kW are required to have Building Automation and Control Systems (if technically and economically feasible).

In summary, the main differences with respect to inspection requirements introduced under the revised EPBD are: 1) the different thresholds for inspections, 2) the inspection of the ventilation system for combined air conditioning and ventilation systems, 3) a greater focus on normal operating conditions and 4) greater role for building automation and control systems (BACS) and electronic monitoring and control systems.

As an alternative to inspections, Article 15(3) of the revised EPBD includes the possibility for Member States to opt to take measures to ensure the provision of advice to users. The provisions of the revised EPBD with regards to alternative measures are similar to those originally laid out in the former EPBD.

However, Member States that choose to apply alternative measures must ensure that they are equivalent to the inspections under the provisions of Article 15 of the revised EPBD (this includes elements such as new thresholds, combined air conditioning and ventilation systems, exemptions, etc.).

# UNDERSTANDING OF ARTICLE 15 (SCOPE)

## Aim and objectives

The main aim of an inspection is to evaluate the performance of a system. Inspections should also identify issues or problems, propose solutions or improvement measures and log the results of the inspection in a report for future reference.

## Air conditioning and combined air conditioning and ventilation systems - Article 15 (1)

The revised EPBD expands the scope of inspection to also include the ventilation part of combined air conditioning and ventilation systems.

For those Member States which already have inspection regimes in place, the scope of the air conditioning system itself should have already been defined in the context of the transposition. It should include all accessible parts such as: the heat generator, control system and circulation pumps.

The revised EPBD in addition requires the inspection of the ventilation in combined air conditioning and ventilation systems. Since this is a new requirement, Member States will have to define the types of systems that will now be considered as combined air conditioning and ventilation systems.

Systems can be categorised in 4 different types, as follows:

1. Systems where air from the ventilation system is the main heat delivery method. An example of this system would be variable air volume (VAV) systems.
2. Systems where there are one or several air handling units delivering treated fresh air to the heated space(s). The final space air conditioning is done through local delivery units. Both the air handling unit(s) and the local delivery units are connected to the same heat generator. Example of this system would be: air handling unit (AHU) plus fan coils or radiators.
3. Systems where there are one or several air handling units delivering treated fresh air to the heated space(s). The final space air conditioning is done through local delivery units. The air handling unit(s) and the local delivery units are not connected to the same heat generator. An example of this system could be an AHU plus rooftop units (VRV/VRF).
4. Systems where outside air is not preheated using the air conditioning system (for example extract only systems, supply & extract, but without pre-heat).

Type 1 systems would clearly fall within the scope of the revised EPBD. For this type of systems, the ventilation equipment (such as the AHU and final delivery units) are fully involved in the delivery of the heat within the building.

Type 2 systems would also fall within the scope of the revised EPBD. Unlike Type 1 systems, the ventilation part of the system in a Type 2 system would not necessarily take the majority of the cooling load. However, the cooling consumption related to the treatment of the air is still a substantial part of the energy consumption of a building, especially for modern buildings. Type 2 systems require careful integration between ventilation and air conditioning to adequately provide for the indoor environment in the most efficient manner, particularly under normal operating conditions. Inspection of such systems would offer good opportunities for identifying energy saving opportunities at a reduced cost (low hanging fruit). In conclusion the requirements of the revised EPBD apply (Recital 35 of Directive (EU) 2018/844 helps establish this).

Type 3 systems are similar to Type 2 systems and should therefore also be treated as a combined air conditioning and ventilation system. This is mainly because of the need to adequately integrate the operation of the air conditioning and ventilation systems. Similarly to Type 2 systems, an inspection offers good opportunities for identifying energy savings opportunities with a reduced implementation cost.

However, Type 4 systems do not fall within the scope of the revised EPBD. In this type of system, the air conditioning and ventilation are not connected to one another and their operation may not be integrated and could even be completely independent.

In general Types 1, 2 and 3 are more common in non-residential buildings (such as offices, shopping centres, etc.), whereas type 4 systems are more common in residential buildings.

The revised EPBD does not specify the extent of the inspection with regards to the purely air management and treatment aspects of the system (such as ductwork or air filters). However, it would be good practice that the independent expert still includes them in the inspection at least to a certain degree, based on the accessibility of the system and the energy saving opportunities available. In practice, in a combined air conditioning and ventilation system, the different parts of the system may be located together or in close proximity. Since the inspector is physically visiting the building, the added workload and cost are limited, while the saving opportunities are good.

## Heat pumps and rooftop units

Heat pumps are defined in Article 2(18) of the revised EPBD as "*a machine, a device or installation that transfers heat from natural surroundings such as air, water or ground to buildings or industrial applications by reversing the natural flow of heat such that it flows from a lower to a higher temperature. For reversible heat pumps, it may also move heat from the building to the natural surroundings*". Heat pumps are therefore capable of acting as the generators for both heating and air conditioning systems, although in some applications they may provide only one or the other. Because of this capacity to provide both heating and cooling, heat pumps could fall under the provisions of both Article 14 and Article 15.

If a heat pump is used as the heat generator in a system that provides only heating, then the system should fall under the provisions of Article 14. For example, this would be the situation of a heat pump generating heat for heating and domestic hot water.

If a heat pump is used as the heating or cooling generator in a system that provides both heating and air conditioning, then the system should fall under the provisions of Article 15.

Rooftop units are a special category of heat pumps commonly used in relatively large non-residential buildings. They work as heat pumps with the added capability of providing heating and cooling simultaneously. They should always be considered as falling under the provisions of Article 15.

## Performance under typical or average operating conditions

Recital 26 of the former EPBD indicated that "*regular maintenance and inspection of heating and air-conditioning systems by qualified personnel contributes to maintaining their correct adjustment in accordance with the product specification and in that way ensures optimal performance from an environmental, safety and energy point of view*". Article 15(1) of the former EPBD provided that the inspection should include an assessment of the boiler sizing compared with the requirements of the building.

However, the revised EPBD refers not only to the boiler, but to the system as a whole and in particular the heat generator. Therefore, under the revised EPBD there is a greater emphasis on normal operating conditions. Recital 36 of Directive (EU) 2018/844 indicates that it makes sense for inspections to focus on real-life use conditions, with varying operating conditions that may require only a part of the nominal output capacity. This is because only a small fraction of the energy consumption in air conditioning system takes place under conditions approaching design conditions. Instead, the greatest proportion of the energy consumption is when the system is running under part load. Therefore, the objective should be to ensure that the system can perform efficiently and effectively under all conditions.

Article 15(1) of the revised EPBD requires that the inspection of air conditioning systems includes (where relevant), an assessment of the capabilities of the air conditioning system to optimise its performance under typical average operating conditions.

Examples of average operating conditions [To be included at a later stage].

## Building Automation and Control Systems (BACS) – Article 15(4)

To be completed.

## Electronic monitoring and effective control functionalities in residential buildings – Article 15(5)

To be completed.

## Exemption from the requirements laid down in Article 15(1) – Article 15(2) and 14(6)

The former EPBD allowed the possibility for Member States to reduce the frequency of inspections or lighten them as appropriate where electronic monitoring and control systems were in place.

The revised EPBD allows for the introduction of several exemptions if the technical building system is covered by an energy performance contracting (or similar) or is operated by a utility or a network operator – Article 15(2) – or if the air conditioning system has specific control and monitoring features as defined in paragraphs 4 and 5 of Article 15 – Article 15(6).

***Article 15(2)***

Article 15(2) of the revised EPBD excludes from inspections those technical building systems that are covered by an agreed energy performance criterion or a contractual arrangement specifying an agreed level of energy performance improvements. An energy performance contract as defined in point (27) of Article 2 of Directive 2012/27/EU of the European Parliament and of the Council would fulfil these requirements.

Article 2(27) of Directive 2012/27/EU defines energy performance contracting as 'a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings'.

Those buildings operated by a utility or network operator and that are therefore subject to performance monitoring on the system side may also be exempt.

The exemptions indicated in Article 15(2) only apply if the overall impact of the approach is equivalent to that resulting from the application of inspections indicated in Article 15(1).

The revised EPBD does not indicate how this equivalence should be established. One possibility could be to determine whether the technical building system, as part of the contract or agreement, is already undergoing a regular inspection that is similar in nature to the inspections under Article 15(1). If the technical building system undergoes such inspection, an exemption from the requirements laid down in Article 15(1) could be established. It is safe to assume that most energy performance contracts or agreements already include some level of regular inspection. However, the full extent of such inspections may not be completely in line with the requirements of the revised EPBD.

***Article 15(6)***

Article 15(6) of the revised EPBD introduces exemptions for those buildings that comply with the requirements of Article 15(4) and Article 15(5).

According to Article 15(4), buildings with air conditioning or combined air conditioning and ventilation systems with an effective rated output of over 290 kW must have (wherever technically and economically feasible) BACS installed by 2025.

It is important to note that BACS is a commonly used term in the building industry, generally used to refer to the electronic system that controls the technical building system. The BACS system as described in Article 15(4) includes a series of characteristics not usually found in most systems already installed or available in the market. Therefore the definition of BACS to be introduced in national legislation should clearly address the differences.

Buildings with systems between 70 kW and 290 kW effective rated output are not affected by the requirement to have BACS installed. However, the owners of the building may decide to install a BACS that is in compliance with the requirements set out in Article (15). Under these circumstances Member States may decide to exempt them even if they do not reach the 290 kW threshold.

Article 15(5) introduces the possibility for Member States to ensure that residential buildings are equipped with continuous electronic monitoring and effective control functionalities. In a similar scenario to BACS, some of these elements may already be present in the market in some form or other. However, they might not completely fulfil the requirements indicated in Article 15(5). Therefore, the definition of these systems and how they are introduced in national legislation should clearly address the differences.

As indicated in recital 39 of the Directive (EU) 2018/844, Member States may choose to continue applying the inspection regimes which are already in place under the 2010 EPBD. Nevertheless, the exemptions applicable under Article 15(2) and Article 15(6) must still be considered.

## Alternative measures – Article 15(3)

Article 15(3) of the revised EPBD allows Member States to take measures to ensure the provision of advice to users concerning the use of air conditioning systems or combined air conditioning and cooling systems.

Although the provisions on alternative measures as such are not extensively modified, they are subject to the changes in the provisions in the other paragraphs of Article 15.

The introduction of the new threshold (70 kW) in the revised EPBD, means that those Member States that decide to apply alternative measures, must apply these measures to the systems covered by the new threshold.

To be completed.

# GUIDELINES FOR IMPLEMENTING PROVISIONS ON INSPECTIONS FOR AIR CONDITIONING AND COMBINED AIR CONDITIONING AND VENTILATION SYSTEMS IN ARTICLE 15 OF THE REVISED EPBD

## Ensure correct transposition of Article 15 - Inspections

### Systems to be inspected

The revised EPBD expands the scope of systems to be inspected under the provisions in Article 15(1) to include combined air conditioning and ventilation systems.

Member States have to ensure that the definitions of air conditioning system and of combined air conditioning and ventilation system are correctly transposed in the national legislation.

Member States have to ensure that the definition of such systems also includes the case of heat pumps and to determine whether they fall within the scope of Article 14 or 15 of the revised EPBD (see 5.3 above).

### Effective rated output

Article 15(1) of the revised EPBD establishes the provision for inspections in systems over 70 kW of effective rated output. This is a change from the threshold of 20 kW of boiler’s effective rated output indicated in Article 15(1) of the former EPBD.

This change affects both the output rating (from 20 kW to 70 kW) and also the content of the rating itself. Under the former EPBD the rating made reference only to the boiler, while the rating in the revised EPBD makes reference to the system as a whole. Systems with multiple heat generators (e.g. Type 2 and Type 3 systems as described in 2.2 above) would also fall under the obligation of Article 15 (1) of the revised EPBD, if the overall rating of the multiple heat generators serving the same area or building unit exceeds 70 kW.

Member States in principle have to amend their national legislation and inspection regimes so as to take into account these new ratings. However, as indicated in recital 39 of Directive (EU) 2018/844, Member States may choose to continue applying the inspection regimes which are already in place under the 2010 EPBD, including inspections for smaller air conditioning systems (i.e. of a threshold between 20 kW and 70 kW of effective rated output). If Member States decide to continue to operate those schemes, there would be no obligation on Member States to notify those more stringent requirements to the Commission.

### Performance under typical operating conditions

Member States must update the scope of the inspection to include the assessment of the system under typical operating conditions.

Member States have to determine the changes required in the inspection methodology. In particular this should focus on inspection requirements and guidelines. Member States should indicate the new scope of the inspections as well as technical guidelines, requirements, etc.

### Exemptions based on energy contracts or agreements

Member States may update their national legislation to include exemptions for those buildings covered by an agreed energy performance criterion or a contractual arrangement specifying and agreed level of energy performance improvements. Member States may also include exemptions for those buildings operated by a utility network or operator.

If Member States decide to allow for such exemptions, they have to ensure that new legislation addresses the definition of "energy performance criterion" or "contractual arrangement specifying an agreed level of energy performance".

In case Member States decide to include the exemptions indicated under Article 15(2), they must ensure that the overall impact of the approach is equivalent to those of inspections resulting from Article 15(1).

This equivalence should be reported through (To be completed)

### Requirements on BACS

To be completed.

Data logging as a mandatory function.

Quality assurance.

### Voluntary requirements for residential buildings

To be completed.

### Exemptions based on BACS or continuous electronic monitoring and effective control functionalities

The revised EPBD introduces the exemption of inspections to those technical building systems that are in compliance with Article 15(4) (BACS) and 14(5) (Voluntary requirements for residential buildings).

Member States must update national legislation to introduce the definition of BACS (as discussed in 6.1.5). Member States may also update national legislation if they choose to introduce voluntary requirements for buildings (as indicated in 6.1.6).

## Ensure transposition of Article 15(3) – Alternative measures

To be completed.

## Other changes

### Step 3 – Establish training needs.

Due to the expanded scope of the revised EPBD Member States evaluate if new training is necessary and whether additional training is needed.

MS could also establish whether this training would require re-accreditation. A calendar for the provision of training should also be prepared.

### Step 4 – Changes in the reporting methodology

MS must evaluate whether the reporting methodology, templates (if any – check CA on this), databases, etc. need to be updated.

### Step 5 – Changes in the database

MS should evaluate the need for updating-upgrading the database of reports and reporting mechanisms.

### Step 6 – Changes to the quality assurance mechanisms

MS should evaluate the need for updating-upgrading the quality assurance process. The content of reports is likely to increase, which may therefore require further resources.

## Best practices for implementation of provisions

To be completed.

H2020 Quantum Project (Quality Management of Building Performance) https://www.quantum-project.eu/about-us/

The QUANTUM project has developed an approach for an appropriate and cost-effective quality management process to assess and document building and system performance suitable for digital inspections relying on BACs.

The concept has been already been implemented in Germany through AMEV guideline 135 on Technical Monitoring in 2017. The objective of this service is:

* to derive performance indicators for buildings and systems,
* to define a set of operation data to be delivered
* to specify a validation methodology and
* to report on the fulfilment of requirements.

All data has to be provided by components or BACS in a standardized format allowing the assessment and documentation to be carried out by an independent third party. Since BACS are part of the assessed system, any party carrying out a test would have to technically and organizationally rely on the BACS and the contractors support. This is especially critical, since

* the management parts of BACS are often completed long after other systems have been accepted and handed over
* the BACS contractor may have a conflict of interest by supporting the assessment.

Therefore, the provision of a minimum data set in a standardized format as defined in the AMEV Guideline 135 and in QUANTUM should be mandatory for all systems installed, replaced or upgraded. The same process regarding data provision and third-party testing shall be applied to energy inspections.

1. Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings. [↑](#footnote-ref-1)
2. Directive (EU) 2018/844 of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency. [↑](#footnote-ref-2)
3. Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings. [↑](#footnote-ref-3)
4. Directive (EU) 2018/844 of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency. [↑](#footnote-ref-4)