Discussion document – preparation of the delegated act of the smart readiness indicator

Meeting of the Expert Group on the Energy Performance of Buildings Directive

14 February 2020

1. Introduction

This document has been prepared by the Commission services in view of the meeting of the Expert Group on the Energy Performance of Buildings Directive[1] (EPBD) taking place on 14 February 2020 in Brussels. It aims to clarify certain aspects related to the preparation of the delegated Act for the establishment of the smart readiness indicator (SRI) under the EPBD to seek inputs from Member States representatives.

As indicated in the agenda[2], the meeting will include a discussion to progress on the preparation of the SRI delegated Act, including the establishment of the definition and calculation methodology of the SRI.

The aim of this document is to outline the possible contents of the SRI delegated Act, to be discussed at the Expert Group meeting. It builds on the discussion document sent prior to the meeting of the Expert Group on 6 November 2019, on discussions that took place during that meeting, and on written comments received afterwards.

The document is structured as follows:

- section 2 outlines, and comments on, the main issues raised by Member States on the draft SRI delegated Act,
- section 3 outlines the proposed contents of the SRI delegated Act, including modifications made based on the comments from Member States.

Disclaimer: all elements presented in this document reflect the current state of understanding and are tentative.

[1] DIRECTIVE 2010/31/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 19 May 2010 on the energy performance of buildings.

[2] Sent with the invitation to the meeting on 27 January 2020.

2. Main issues raised by Member States on the draft SRI Acts

Member States raised the following issues:

- Several Member States mentioned that the approach proposed on optionality did not leave sufficient flexibility to Member States,
- Several Member States pointed to the important role that the non-committal national testing phase could play, and suggested further detail related arrangements,
- Several Member States suggested to leave the framework given by the draft Acts for the methodology and for the implementation modalities more open for adaptation.

In order to address those points and other remarks made by Member States, the draft Acts have been updated. Those updates appear in track changes in what follows.

3. Proposed contents of the SRI delegated act

The proposed structure of the SRI delegated Regulation is unchanged[3] - except that an additional article on the entry into force (Article 13) has been added and that the title and scope of Article 8 has been adapted:

0. Recitals – provide introductory information on the context and scope of the initiative.
1. Subject matter and scope – clarifies the objectives and scope of the act.
2. Definitions – definitions of the different concepts referred to in the act.
3. Smart readiness indicator – gives the definition of the smart readiness indicator.
4. Methodology for calculating the smart readiness of a building – describes the smart readiness scores calculation methodology.
5. Smart readiness indicator rating – explains how the results of the calculation of smart readiness scores transforms into a rating.
6. Optionality of the scheme – clarifies what optionality of the scheme means for those Member States that will opt in.
7. Content of the smart readiness indicator – describes what information should be conveyed by the SRI to end users.
8. smart readiness indicator experts – provisions on the qualification and accreditation of SRI experts.
9. Issue of the SRI certificate and terms and conditions of its use - clarifies the requirements that apply to the issue and use of SRI certificates.

[3] Please note that one Member State suggested to move Article 6 (Optionality of the scheme); Article 7 (Content of the SRI); Article 8 (SRI experts); Article 9 (Issue of the SRI certificate); Article 10 (Independent control system); Article 11 (SRI platform) from the delegated Regulation to the implementing Regulation.

10. Independent control system of the smart readiness indicator scheme - provisions related to the control of the SRI scheme.
11. Smart readiness indicator platform – establishes a platform for discussing best practices on the SRI and subsequent evolutions of the SRI framework.
12. Review – provides a timeline for the review of the delegated act.
13. Entry into force – clarifies the time-lag between publication and entry into force.

The following sub-sections detail the possible contents of the items above.

3.1 Recitals

The recitals of the delegated act would cover the following points:

(1) Directive 2010/31/EU of the European Parliament and of the Council ('EPBD') is the main legislation, together with Directive 2009/125/EC of the European Parliament and of the Council and Regulation (EU) 2017/1369 of the European Parliament and of the Council, addressing energy efficiency in buildings in the context of the 2030 energy efficiency targets. The EPBD has two complementary objectives, namely to accelerate the renovation of existing buildings by 2050 and to support the modernisation of all buildings with smart technologies and a clearer link to clean mobility.

(2) In the context a strong digitalisation trend and of the rapid development of related markets, the agendas of the Digital Single Market and the Energy Union should be aligned and should serve common goals. Modernisation and digitalisation of buildings thanks to smart building technologies and information and communication technologies, including automation and smart appliances, can drive energy efficiency in buildings, improve living and working conditions of building users, place consumers at the centre of the energy market, and support the transition to smarter, renewable-intensive grids, in line with the Clean Energy for all Europeans Package.

(3) Smart technologies in buildings can help consumers reap the benefits of the clean energy transition, which comes with new opportunities, like smarter metering of energy, use of on-site renewable energy, or self-consumption of energy, in line with the provisions of Directive 2012/27/EU, Directive (EU) 2018/2001 and Directive (EU) 2019/944.

(4) Ensuring awareness of building users, owners and consumers about the benefits and impacts of smart technologies in buildings, and about the level of smart readiness of buildings, would be beneficial in the context of the digital and clean energy transition.

(5) Under Directive 2010/31/EU the Commission should establish an optional common Union scheme for rating the smart readiness of buildings.

(6) Article 8(10) of Directive 2010/31/EU provides that in accordance with the procedure referred to in Article 23 the Commission must adopt a delegated act to establish an

optional common Union scheme for rating the smart readiness of buildings and the methodology by which it is to be calculated.

(7) Article 8(11) of Directive 2010/31/EU provides that the Commission, after having consulted the relevant stakeholders, must adopt an implementing act detailing the technical modalities for the effective implementation of the optional scheme for rating the smart readiness of buildings referred to in Article 8(10) of Directive 2010/31/EU.

(8) The delegated act and implementing act adopted under Article 8(10) and Article 8(11) of Directive 2010/31/EU complement each other. The delegated act establishes the smart readiness indicator scheme and sets common EU methodological foundations for rating smart readiness of buildings, while the implementing act clarifies how the scheme should be implemented most effectively in the EU.

(9) The smart readiness indicator should be used to measure the capacity of buildings to use information and communication technologies and electronic systems to adapt the operation of buildings to the needs of the occupants and the grid and to improve the energy efficiency and overall performance of buildings. The smart readiness indicator should raise awareness amongst building owners and occupants of the value behind building automation and electronic monitoring of technical building systems.

(10) The smart readiness indicator should contribute to creating a level-playing field for smart technologies and systems for buildings traded across the Union and installed in buildings in different Member States, consistently with EU policies that frame the development and distribution of products that can be part of such technologies and systems, in particular ecodesign and energy labelling regulations.

(11) Establishing a way to compare the capability of a building to adapt its operation to the needs of the occupant and of the grid will give valuable information to occupants and consumers, and will provide an incentive to improve the smart readiness of buildings, allowing occupants and consumers to actively participate in improving their energy consumption and participate in demand-side response of the energy market.

(12) In order to ensure the consistent and transparent rating of smart readiness of buildings in the Union, the establishment of the smart readiness indicator scheme should establish a common definition of the smart readiness indicator and a common methodology by which the smart readiness indicator is to be calculated.

(13) The rating of smart readiness of buildings should comply with the common general framework for rating the smart readiness of buildings set out in Annex Ia of the EPBD.

(14) The smart readiness indicator scheme is without prejudice to the obligations concerning Energy Performance Certificates under the EPBD.

(15) A European Union-wide smart readiness rating scheme will allow for a consistent comparison between buildings across the 27 Member States while offering high quality assessment and international acceptance.

(16) The smart readiness indicator scheme will raise awareness about the benefits of smart technologies in buildings, be clear for consumers and motivate them to invest in smart building technologies and support the uptake of technology innovation in the building sector. It will also stimulate innovation in the building sector, by creating a demand-driven market push for smarter, advanced solutions and systems in buildings.

(17) The smart readiness indicator scheme will improve policy linkages between energy, buildings and other policy segments, in particular the Digital Single Market, and thereby contribute to the integration of the buildings sector into future energy systems and markets.

(18) In order to ensure acceptability, usability and consistency of the smart readiness indicator scheme, the Commission has developed, in collaboration with a wide range of stakeholders and in liaison with Member States, a methodological framework for rating smart readiness of buildings.

(19) The methodological framework for rating smart readiness of buildings set out in the regulation complies with the requirements given in Article 8(10) and Annex Ia of the EPBD.

(20) The methodological framework for rating smart readiness of buildings set out in the regulation ensures a degree of consistency in rating of smart readiness of buildings across the EU, while leaving enough flexibility to adapt the calculation to specific conditions.

(21) It is important to establish adequate control mechanisms on the implementation of the smart readiness indicator scheme.

(22) Where relevant, self-assessment of smart readiness (i.e. assessment by the owner, by the facility manager or any other party linked to the building), supported by open guidance and tools, should be made possible.

(23) To avoid duplication of efforts and costs between the smart readiness indicator scheme and existing mandatory schemes, the methodology for rating the smart readiness of buildings allows Member States, if they wish, to connect, or integrate, the smart readiness indicator scheme with national energy performance certification schemes and other schemes established under Directive 2010/31/EU.

(24) Common EU rating, contents, and format for the smart readiness indicator will contribute to the European recognition of the scheme and to its visibility and effectiveness.

(25) The smart readiness indicator is designed to reflect the smart readiness of buildings and their systems and should be used in complementarity with and not as a replacement of other tools that characterise other aspects of buildings, for instance energy performance or sustainability.

(26) The smart readiness indicator is not an indicator for the energy performance of buildings. Building owners should be informed that the smart readiness as reflected in the smart readiness indicator and the energy performance of buildings as expressed by energy performance certificates are different issues, which therefore have to be addressed by different types of measures, though smart readiness can help enhance energy performance.

(27) The benefits for consumers, building users and owners will be maximized when available instruments for rating buildings are used in combination, ensuring that the consumers, building users and owners can gain a holistic vision of their buildings and understand better how they can improve overall performance.

(28) The smart readiness indicator can be used for both existing buildings and new building projects. Where they are available, digital models of buildings (e.g. building information models or digital twins) can facilitate the calculation of smart readiness.

(29) The smart readiness indicator calculation framework can be used for all types of buildings and building units covered by the Energy Performance of Buildings Directive.

(30) Advanced smart technologies in buildings generally translate into additional benefits for building owners and users, for instance in terms of energy savings or comfort and well-being improvement.

(31) In the scope of the more general trend towards digitalisation, in particular in the energy sector, improving smart readiness of buildings, including through artificial intelligence and cloud-based services, is desirable.

(32) The smart readiness indicator reflects the potential for smartness of a building or building unit based on the capabilities of the systems installed. Whether this potential for smartness is realised or not may depend on factors that are not reflected in the calculation of the smart readiness indicator.

(33) In order to fully realise the potential for smartness of a building or building unit as reflected in the smart readiness indicator, it is desirable that systems are well-maintained and used in an optimal manner. In this context, skilled and well-trained professionals (e.g. facility managers) for managing system operation and maintenance have an important role to play.

(34) The implementation modalities of the smart readiness indicator scheme should seek to make it accessible to a large number of citizens of the European Union and should allow for implementing the scheme internationally.

(35) The assessment of smart readiness of buildings and building units as part of the smart readiness indicator scheme in view of issuing a smart readiness indicator certificate should be carried out in by qualified and / or accredited experts.

(36) Where Member States consider it appropriate, experts accredited for the energy performance certification of buildings and for the inspection of heating, air-conditioning and combined heating / air-conditioning and ventilation systems under Directive 2010/31/EU could be considered to be also competent to assess the smart readiness of buildings or building units.

(37) Increased digitisation and connectivity in buildings increases cybersecurity risks, thus making buildings and their systems more vulnerable to cyber threats. The smart readiness indicator should contribute to informing building owners and users, and raise their awareness, about those risks.

3.2 Article 1: subject matter and scope

This first article will clarify the objectives and scope of the act:

- The Regulation establishes an optional common Union scheme for rating the smart readiness of buildings that is called the smart readiness indicator scheme.
- The Regulation establishes the definition of the smart readiness indicator and a common methodological framework by which smart readiness scores of buildings or building units are to be calculated and smart readiness rating of buildings or building units is to be derived.
- The Regulation provides a framework for the issue of smart readiness indicator certificates of buildings located on the territory of a Member State.

3.3 Article 2: definitions

This second article will give definitions of the concepts referred to in the Regulation:

- ‘smart readiness’ refers to capabilities of buildings that can be taken into account to rate smart readiness, in line with Article 8(10) of Directive 2010/31/EU.
- ‘building’ means a roofed construction having walls, for which energy is used to condition the indoor climate.
- ‘building unit’ means a section, floor or apartment within a building which is designed or altered to be used separately.

- 'economic operator' means a natural or legal person who owns or occupies a building or building unit located on the territory of a Member State and requests a smart readiness indicator certificate for that building.
- ‘smart readiness rating’ is the rating of the building or building unit according to the methodology set out in this Regulation.
- ‘smart readiness score’ refers to the score obtained by a building or building unit within the calculation of the smart readiness indicator.
- ‘system’ means a system that can be found in a building and that is relevant to the scope of the smart readiness indicator as set out by Directive 2010/31/EU, including but not limited to technical building systems as defined by Article 2 of Directive 2010/31/EU.
- ‘controlled ventilation’ means a ventilation system with air flow rates that are controlled based on settings chosen by the user and / or other parameters on the indoor environment (e.g. indoor air quality, thermal comfort).
- ‘key smart readiness capability’ refers to the three key functionalities referred to in point 2 of Annex Ia of Directive 2010/31/EU.
- ‘impact criterion’ means a key impact that smart-ready services are designed to achieve, as set out in this Regulation.
- ‘technical domain’ means a collection of smart-ready services which, together, realize an integrated and consistent part of the services expected from the building or building unit (e.g. heating).
- ‘connectivity’ refers to the ability of systems to exchange data with each other and to the ability of the building or building unit to exchange data, with e.g. the grid or other buildings.
- ‘interoperability’ is the ability of systems to interact towards common goals by means of exchange of information and data.
- ‘cybersecurity’ means the activities necessary to protect network and information systems, the users of such systems, and other persons affected by cyber threat.
- ‘data protection’ means protection of personal data within the meaning of Regulation (EU) 2016/679.
- ‘smart readiness indicator certificate’ means a certificate recognised by a Member State or by a legal person designated by it, which indicates the smart readiness of a building or building unit, calculated according to the methodology set out in this Regulation.
- ‘platform’ means, in the context of this Regulation, a setting in which interested parties (e.g. Member States representatives, stakeholders) can meet and exchange.

- ‘smart-ready service’ means a function or an aggregation of functions delivered by one or more technical components or systems. A smart-ready service makes use of smart-ready technologies and orchestrates them into higher-level functions.
- ‘smart-ready technology’ means a technological enabler for one or more smart-ready services, e.g. bus systems, communication protocols or building automation.
- ‘functionality level’ means the level of smart readiness of a smart-ready service.
- ‘weighting factor’ means a parameter that is used in the calculation of the smart readiness indicator to express the importance of a given technical domain or impact criterion in that calculation.
- ‘energy balance’ means the method by which certain weighting factors may be adapted based on the climate zone of the building.

3.4 Article 3: smart readiness indicator

This article will give the definition of the smart readiness indicator[4]:

- The smart readiness indicator is designed for rating and communicating the smart readiness of buildings and building units to economic operators and other interested parties.
- The smart readiness indicator allows the assessment the capabilities of a building or building unit to adapt its operation to the needs of the occupant and of the grid and to improve its energy efficiency and overall performance. The smart readiness indicator covers features for enhanced energy savings, benchmarking and flexibility, enhanced functionalities and capabilities from more interconnected and intelligent devices.
- The smart readiness indicator includes the smart readiness rating of the building or building unit in question and a set of smart readiness scores that reflect the smart readiness of buildings, building units and systems along predefined key capabilities, impact criteria and technical domains.
- The smart readiness indicator may include additional information on connectivity, interoperability, and cybersecurity of systems, and on data protection.

3.5 Article 4: methodology for calculating the smart readiness of a building

This fourth article will outline the methodology for calculating the smart readiness indicator, with reference to annexes where the methodology will be described in detail.

[4] One Member State stressed the need to fully agree on the definition of the SRI and to discuss it also in the EPB Committee.

- The methodology for calculating the smart readiness indicator aims at calculating the smart readiness scores of a building or building unit and is based on the assessment of smart-ready services present in the building or building unit.
- The calculation of the smart readiness scores is based on a common Union methodological framework, set out in Annexes I to VI to the delegated Regulation, which complies with the requirements given in Article 8(10) and Annex Ia to Directive 2010/30/EU.
- Annexes I to VI to the Regulation detail the standard calculation methodology for calculating the smart readiness indicator. Annex VII details how this standard calculation methodology may be adapted, in particular by making a link to energy performance calculations in the scope of energy performance certification.
- The methodology for calculating the smart readiness indicator is to be used in accordance with the conditions set out in this Regulation, in particular regarding the qualification of experts.

3.6 Article 5: smart readiness indicator rating

This article describes how the smart readiness rating is determined, based on smart readiness scores, referring to the annexes:

- The smart readiness rating of a building or building unit is based on the smart readiness scores calculated for the building or building unit.
- The smart readiness rating is determined on the basis of smart readiness scores according to the provisions of Annex VIII to the Regulation.

3.7 Article 6: optionality of the scheme

This article describes the optionality of the scheme:

- The smart readiness indicator scheme is an optional common Union scheme.
- It is for Member States to decide whether they implement the smart readiness indicator on their national territory, or parts thereof.
- Member States may choose to apply the scheme to certain categories of buildings.
- Member States that decide to implement the smart readiness indicator scheme on their national territory, or parts thereof, notify the Commission ahead of launching the scheme.

3.8 Article 7: content of the smart readiness indicator

This article describes the content of the smart readiness indicator:

- The smart readiness indicator of a building or building unit is communicated to economic operators in a certificate that shows the smart readiness of the building or building unit.
- The smart readiness indicator certificate includes the information specified in Annex IX to the Regulation.

3.9 Article 8: smart readiness indicator experts

This article clarifies the requirements that apply to experts in charge of the assessment of the smart readiness of buildings or building units:

- Member States that decide to implement the smart readiness indicator ensure that the assessment of smart readiness of buildings or building units in view of issuing a smart readiness certificate is carried out by qualified and / or accredited experts, whether operating in a self-employed capacity or employed by public bodies or private enterprises.
- Member States define the requirements on qualification and / or accreditation that apply to experts that carry out the assessment of building units or building units, ensuring those requirements take into account the competence of such experts.
- Member States may decide that experts accredited or qualified for issuing energy performance certificates and / or for carrying out inspection of heating, air-conditioning, combined heating / air-conditioning and ventilation systems under Directive 2010/31/EU are also competent for issuing smart readiness indicator certificates. In that case, Member States may decide upon additional requirements, in particular in relation to training.
- Member States make available to the public information on qualifications of experts in charge of smart readiness assessment.
- Where relevant, Member States are encouraged to make available to the public either regularly updated lists of qualified and / or accredited experts or regularly updated lists of accredited companies which offer the services of such experts. Member States may use for this purpose the same means as for experts for energy performance certification and inspections under Directive 2010/31/EU.

3.10 Article 9: issue of the smart readiness indicator certificate and terms and conditions of its use

This article clarifies the conditions under which SRI certificates are issued and used:

- Any economic operator may apply to the experts referred to in Article 3 of this Regulation for a smart readiness indicator assessment and certificate for a building or building unit.

- The building or building unit is assessed according to the methodology set out in this Regulation.
- The expert ensures the reliability of the information collected for the assessment of the smart readiness of the building or building unit and for the issue of the smart readiness indicator certificate.
- The smart readiness indicator certificate is used by the economic operator to inform building users and other interested parties about the smart readiness of the building or building unit, including by displaying the smart readiness indicator certificate or by using information from the smart readiness indicator certificate in communication material related to the building or building unit. Such information is in line with the requirements of Annex IX to this Regulation on the contents of smart readiness indicator certificates.
- The smart readiness indicator certificate includes the elements listed in Annex IX to this Regulation.
- A smart readiness indicator certificate is valid for maximum 10 years.

3.11 Article 10: independent control system of the smart readiness indicator scheme

This article clarifies the requirements that apply to independent control of the SRI scheme and to control of the use of SRI certificates:

- Member States that decide to implement the smart readiness indicator scheme ensure that an independent control system for smart readiness indicator certificates is established and decide upon the characteristics of this independent control system.
- This independent control system ensures the validity and adequate use of the smart readiness indicator certificates issued on the Member State's territory. Where relevant, Member States may rely on independent control systems already in place, for instance those for energy performance certification schemes.

3.12 Article 11: smart readiness indicator platform

This article includes provisions on the establishment of a platform for the smart readiness indicator:

- The Commission will establish a smart readiness indicator platform (SRI platform).
- The SRI platform will contribute to the promotion of the smart readiness indicator scheme in the EU. It provides the Commission and Member States with support on the implementation of the smart readiness indicator scheme and it issues recommendations on possible evolutions of the methodological framework for calculating the smart readiness indicator.

- The Commission will ensure that, in the conduct of the activities of the SRI platform, it maintains a balanced participation of all relevant interested parties, such as Member States' administrations, competent bodies, stakeholder associations of the buildings sector and consumer organisations.
- The Commission will establish the rules of procedures of the SRI platform, including the frequency of the meetings of the platform.

3.13 Article 12: Review

This Article clarifies the requirements on the review of the Regulation:

- The Commission, after consultation of the experts designated in accordance with Article 23 of Directive 2010/31/EU, will review this Regulation by 1 January 2026.

3.14 Article 13: Entry into force

- This Regulation shall enter into force on the XXth day following its publication in the Official Journal of the European Union.

3.15 Annex I: calculation of smart readiness indicator scores

This annex describes the process for calculating smart readiness scores:

- The smart readiness of a building or building unit reflects the capabilities of the building or building unit to adapt its operation to the needs of the occupants and the grid, and to improve its energy efficiency and overall performance.
- The smart readiness of a building or building unit is determined on the basis of the assessment of smart-ready services present in the building or building unit and their functionality level.
- The smart readiness of a building or building unit is expressed by a rating that derives from a total smart readiness score expressed as a percentage and that represents the ratio between the smart readiness of the building or building unit compared to the maximum smart readiness that it could reach.
- The calculation of the smart readiness scores is based on pre-defined weighting factors in line with Annexes III, V and VII, the value of which may depend on climatic conditions and other relevant aspects (e.g. type of building).
- For expressing the smart readiness of a building or building unit, the methodology also allows the use of disaggregated smart readiness scores expressed as a percentage. The disaggregated scores can express smart readiness for one or more of the following:
    i. three key smart readiness capabilities as highlighted in Annex Ia, point 2 of the EPBD:

a. energy performance and operation;

b. response to the needs of the occupants; and

c. energy flexibility.

ii. the smart readiness impact criteria as defined in Annex II to the Regulation;

iii. the smart readiness technical domains as defined in annex IV to the Regulation.

- The calculation of the smart readiness scores of a building or building unit relies on the assessment of the smart-ready services that are present and on their functionality level. The assessment aims at determining with sufficient reliability what services are present and if so, for each service, what its functionality level is. The smart-ready services that can be present in a building are listed in a pre-defined smart-ready service catalogue as set out in Annex VI and are organised in pre-defined technical domains as set out in Annex IV.
- The calculation of smart readiness scores is made according to the following protocol:

(a) In accordance with the catalogue of smart-ready services as set out in Annex VI to the Regulation, for each technical domain as set out in Annex IV to the Regulation, smart-ready services that are present are assessed and, for each one, the functionality level is determined according to the catalogue of smart-ready services.

(b) In accordance with the catalogue of smart-ready services, and for each smart readiness impact criterion as set out in Annex II, the impact criterion score of each technical domain is determined, as follows: $I(d, ic) = \sum_{i=1}^{N_d} I_{ic}(FL(S_{i,d}))$, where:

i. d is the number of the technical domain in question, $d \in \mathbb{N}$

ii. ic is the number of the impact criterion in question, $ic \in \mathbb{N}$

iii. N_d is the total number of services in technical domain d, $N_d \in \mathbb{N}$

iv. $S_{i,d}$ is service i of technical domain d, $i \in \mathbb{N}, 1 \leq i \leq NS_d$,

v. $FL(S_{i,d})$ is the functionality level of service $S_{i,d}$ as available in the building or building unit,

vi. $I_{ic}(FL(S_{i,d}))$ is the impact criterion score of service $S_{i,d}$ for impact criterion number ic, according to the service's functionality level, $I_{ic}(FL(S_{i,d})) \in \mathbb{N}$

vii. $I(d, ic)$ is the impact criterion score of domain number d for impact criterion number ic, $I(d, ic) \in \mathbb{N}$

(c) In accordance with the catalogue of smart-ready services, the maximum impact criterion score of each technical domain for each impact criterion is determined, as follows: $I_{max}(d, ic) = \sum_{i=1}^{N_d} I_{ic}(FL_{max}(S_{i,d}))$, where:

i. $FL_{max}(S_{i,d})$ is the highest functionality level that service $S_{i,d}$ could have according to the smart-ready service catalogue,

ii. $I_{ic}(FL_{max}(S_{i,d}))$ is the impact criterion score of service $S_{i,d}$ for its highest functionality level, which means the maximum impact criterion score of service $S_{i,d}$ for impact criterion number ic,

iii. $I_{max}(d, ic)$ is the maximum impact criterion score of domain number d for impact criterion number ic,

(d) The smart readiness score expressed as a percentage for each of the impact criterion is determined using the weighting specified in Annex V, as follows: $SR_{ic} = \frac{\sum_{d=1}^{N} W_{d,ic} \times I(d,ic)}{\sum_{d=1}^{N} W_{d,ic} \times I_{max}(d,ic)} \times 100$, where:

i. d is the number of the technical domain in question,

ii. N is the total number of technical domains,

iii. $W_{d,ic}$ is the weighting factor expressed as a percentage of technical domain number d for impact criterion number ic (see section 3.19)

iv. SR_{ic} is the smart readiness score expressed as a percentage for impact criterion number ic

(e) smart readiness scores along the three key capabilities highlighted in Annex Ia, point 2 of the EPBD are determined, using the weighting factors specified in Annex III, as follows:

$SR_c = \sum_{ic=1}^{M} W_c(ic) \times SR_{ic}$, where:

i. SR_c is the smart readiness score for key capability c,

ii. M is the total number of impact criteria, $M \in \mathbb{N}$

iii. $W_f(ic)$ is the weighting factor expressed in percentage of impact criterion number ic for key functionality f according to Annex III

iv. SR_{ic} is the smart readiness score of impact criterion number ic.

(f) Optionally, the total smart readiness score is calculated, as follows: $SR = \sum \frac{1}{3} \times Sr_c$, where:

i. SR is the total smart readiness score,

ii. SR_c is the smart readiness score of key capability c.

(g) Optionally, smart readiness scores of technical domains along each impact criterion are calculated, as follows: $SR_{d,ic} = \frac{I(d,ic)}{I_{max}(d,ic)} \times 100$

3.16 Annex II: smart readiness impact criteria

This annex specifies the smart readiness impact criteria:

- The smart readiness impact criteria are:
    1. energy efficiency;
    2. maintenance and fault prediction;
    3. comfort;
    4. convenience;
    5. health and wellbeing;
    6. information to occupants;
    7. energy flexibility and storage.

3.17 Annex III: weighting of impact criteria and key capabilities

This Annex specifies the weighting factors of impact criteria for each of the key capabilities of the smart readiness indicator and the weighting factors of the three key capabilities in the calculation of the total smart readiness score.

- Each impact criterion is relevant for only one key functionality and for each key functionality, all relevant criteria have equal weighting factors.
- For the 'energy performance and operation' key capability, the relevant impact criteria are 'energy efficiency' and 'maintenance and fault prediction'.
- For the 'response to user needs' key capability, the relevant impact criteria are 'comfort', 'convenience', 'information to occupants' and 'health & wellbeing'.
- For the 'energy flexibility' key capability, the only relevant impact criterion is 'energy flexibility & storage'.

3.18 Annex IV: technical domains

This annex specifies technical domains in which the smart-ready services are categorised:

- The smart readiness technical domains are:
    1. heating;
    2. cooling;

3. domestic hot water;
4. controlled ventilation;
5. lighting;
6. dynamic building envelope;
7. electricity;
8. electric vehicle charging;
9. monitoring and control.

3.19 Annex V: weighting of technical domains

This annex specifies the weighting factors of the technical domains in the calculation of the smart readiness scores along impact criteria:

- Each technical domain is weighted for each of the impact criterion and the weighting factors characterise the influence of the technical domain on the impact criterion in question.
- Technical domains' weighting factors are expressed as a percentage, and for each impact criterion, the sum of the weighting factors of the technical domains equals to 100%.
- The standard approach to allocate weighting factors to the technical domains is based on:
    - climatic zone's energy balance for the weighting factors of 'heating', 'cooling', 'domestic hot water', 'controlled ventilation', 'lighting', and 'electricity' technical domains along the 'energy efficiency', 'maintenance and prediction' and 'energy flexibility and storage' impact criteria.
    - fixed weighting factors and equal weighting factors otherwise.
- Five European climatic zones are differentiated: North, West, South, North-East and South-East[5] in the definition of the weighting factors of the technical domains.
- The weighting factors of technical domains can differ between residential and non-residential buildings for some impact criteria.
- Member States are responsible for defining the weighting factors and, for this purpose, are encouraged to use, where available, relevant EU guidance.

3.20 Annex VI: smart ready service catalogue

[5] These climate zones have been defined on the basis of the study "Assessment of policy options for the review of Directive 2010/31/EU (https://op.europa.eu/s/nxKt). These zones have been defined based on (i) climate conditions, (ii) building stock characteristics and (iii) cost structures and level of investment costs/energy costs.

This Annex specifies that smart-ready service catalogue(s) are provided for the calculation of the smart readiness scores:

- For the purpose of calculating smart readiness scores in accordance with the methodology set out in Annex I of this Regulation, Member States make available at least one smart-ready catalogue to be used by experts as the basis for the identification and assessment of smart-ready services.
- A smart-ready service catalogue includes the list of smart-ready services to be considered for the calculation of the smart readiness score, related functionality levels, and corresponding individual scores along the impact criteria.
- Member States are encouraged to provide guidelines to experts on the most effective way to identify and assess smart-ready services using, where available, relevant EU guidance.
- Member States may decide to make available several smart-ready catalogues, for instance for different building types.

3.21 Annex VII: possible adaptation of the standard calculation process

This Annex will specify how the standard calculation process set out in Annexes I-VI may be adapted in the application of the methodology:

- To avoid unfairly penalising a building or building unit, some smart-ready services may be omitted in the calculation of the smart readiness scores, in case those services are not relevant for that building or building unit.

- Member States define the conditions under which such adaptations are relevant and allowed.

- Weighting factors of those technical domains for which the (climatic) energy balance approach would be used under the standard calculation process can be calculated based on the consumptions as evaluated in the energy performance certificate of the building or building unit in question.

3.22 Annex VIII: smart readiness indicator rating

This Annex specifies how a smart readiness rating is determined from the total smart readiness score, as follows:

- The smart readiness rating is expressed on the basis of seven smart readiness classes, from A (highest smart readiness) to G (lowest smart readiness).

- Each smart readiness class corresponds to a range of total smart readiness scores, as follows: A (90 – 100%); B (80 – 90%); C (65 – 80%); D (50-65%); E (35-50%); F (20-35%); G (<20%).

3.23 Annex IX: content of the smart readiness indicator

The information contained in the smart readiness indicator and conveyed to the end user includes at least the following:

- Date of issuance of the certificate,
- general information on the building or building unit (type of building or building unit, surface area, date of construction, location),
- where available, the energy performance class of the building or building unit as specified by a valid energy performance certificate,
- smart readiness rating of the building or building unit,
- optionally, total smart readiness score of the building or building unit,
- smart readiness scores along the three key capabilities highlighted in Annex I of the regulation,
- smart readiness score per impact criterion,
- optionally, scores of each technical domain for each impact criterion,
- where possible, available information on connectivity, interoperability, and cybersecurity of systems and data protection,
- an informational note clarifying that the certificate reflects the smart readiness at the date of issuance and that any significant modifications on the building and its systems would affect smart readiness and would therefore require to update the information given on the certificate,
- Recommendations on how to improve smart readiness of the building or building unit.