EUROPEAN
COMMISSION

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COMMISSION DELEGATED REGULATION (EU) …/...

of XXX

amending Annex VII of Directive (EU) 2018/2001 as regards a methodology for calculating the amount of renewable energy used for cooling and district cooling

This draft has not been adopted or endorsed by the European Commission. Any views expressed are the preliminary views of the Commission services and may not in any circumstances be regarded as stating an official position of the Commission.

EXPLANATORY MEMORANDUM

1. CONTEXT OF THE DELEGATED ACT

Directive (EU) 2018/2001 on the promotion of energy from renewable sources (REDII) obliges Member States to endeavour to increase the share of renewable energy in the heating and cooling sector by an indicative 1.3 percentage points annually. REDII also sets an indicative one percentage point annual increase target for district heating and cooling. In addition, the Directive requires that renewable energy in heating and cooling is counted when calculating the share of renewable energy in gross final consumption of energy for the purposes of fulfilling the EU 32% renewable energy target for 2030.

To fulfil the above mentioned heating and cooling and district heating and cooling targets, and to be able to provide national renewable energy contributions to the EU overall renewable target also in the cooling sector, Member States must be able to calculate the quantity and share of renewable energy used for cooling. A harmonised methodology is needed to ensure that renewable energy used in cooling is calculated in the same way by each Member State and monitoring, reporting and verification at EU level, including via European statistics, is possible.

While the RED II outlines the methodology to calculate the shares of renewable energy in electricity, transport and heating, it does not provide a methodology on how to take into account renewable cooling. The absence of such methodology prevents Member States from using renewable cooling for fulfilling their heating and cooling and district heating and cooling targets, and reduces their opportunities to contribute to the overall EU renewable target. Given the growing demand for cooling and its significant share in several Member States' final energy consumption, a methodology is necessary to ensure that the cooling sector contributes to the EU renewable target and is integrated fully in the EU renewable energy framework.

Article 7(3), fifth subparagraph of Directive (EU) 2018/2001 mandates the Commission to adopt a delegated act by 31 December 2021 in order to establish a methodology for calculating the quantity of renewable energy used for individual cooling and district cooling and to amend Annex VII. That methodology shall include minimum seasonal performance factors for heat pumps operating in reverse mode.

The methodology proposed in this delegated regulation explains how renewable energy must be accounted when used for cooling, including district cooling. This will ensure that all Member States calculate their share of renewable energy for cooling in a harmonised way.

2. CONSULTATIONS PRIOR TO THE ADOPTION OF THE ACT

A study from external contractors lead by TU-Wien provided technical support for the development of the calculation methodology and analysed possible options for the definition and accounting of renewable energy for cooling[1]. It also provided an in-depth overview of technologies and cooling consumption, and performed modelling based impact assessment to establish the impacts on overall renewable energy shares and target achievement in the heating and cooling sector. Economic and environmental impacts have also been modelled and analysed both qualitatively and quantitatively. In addition, JRC provided scientific

[1] Renewable cooling under the revised Renewable Energy Directive, ENER/C1/2018-493, TU-Wien, Eurac, Armines, Viegand Maagøe, e-think, 2021.

support throughout the analytical process, and a dedicated JRC study was used to further define boundaries between cooling and waste heat and cold[2].

During the development of the methodology, several consultations were held with Member States and other stakeholders on several occasions:

- Concerted Action meeting of the Renewable Energy Directive (CA RED) on 27 May 2020 with Member States;
- EUROSTAT consultation held on 14 May 2020 with Member States;
- Concerted Action meeting of the Energy Efficiency Directive (CA EED) on 14 October 2020 with Member States;
- Concerted Action meeting of the Renewable Energy Directive (CA RED) on 28 October 2020 with Member States;
- EUSurvey consultation from 23 October to 16 November 2020;
- Public stakeholder workshops with Member States, cooling industry, academia, experts, and other stakeholders on 26 November 2020 and 15 July 2021.

At these events, the core concepts of the proposed renewable cooling definition and calculation methodology were presented to participants. The participants commented both orally at the meetings and in writing after each meeting. Follow-up meetings with key stakeholders and Member States took place throughout the elaboration process. This step-by-step process gradually narrowed down and fine-tuned the proposed options in order to select a final methodology that is accurate, practical and creates the correct incentives.

3. LEGAL ELEMENTS OF THE DELEGATED ACT

(1) Legal basis

The proposed regulation is a delegated act adopted pursuant to Article 7(3) 5th subparagraph of Directive (EU) 2018/2001, which empowers the Commission to establish a methodology for calculating the quantity of renewable energy used for cooling and district cooling.

(2) Subsidiarity

Heating and cooling constitute the biggest energy end-use sector, responsible for about 50% of the final energy consumption in the European Union. Of this, cooling constitutes currently about 4%, but it is growing everywhere in Europe. In Member States with a warm climate, cooling can be as important as heating in terms of quantity and share of energy consumption. The absence of a calculation methodology prevents Member States from accounting renewables in cooling for their renewable targets and contributions, and hinders the development of sustainable cooling in Europe. To ensure the same accounting rules across all Member States, Directive (EU) 2018/2001 mandates the Commission to establish a methodology at Union level.

EU action in establishing a common methodology for calculating the share of renewable energy in cooling is of high value-added, because it ensures that such a share is calculated in a harmonised manner in all Member States. A common methodology is a pre-condition to measure Member States' renewable energy contribution, target achievement and compliance with the REDII provisions in the same way and ensure equal opportunities for Member States to fulfil their obligations under REDII regardless of their climate conditions. The

[2] Defining and accounting for waste heat and cold, by Lyons, L., Kavvadias, K., Carlsson, J. JRC, 2021.

methodology is also necessary to allow for a reliable comparison of data and a fair assessment of Member States' efforts to promote the use of renewable energy for cooling.

(3) Proportionality

This proposal does not go beyond what is necessary to achieve the aim of establishing harmonised accounting rules for renewable energy used for cooling. This proposal is therefore proportional to the intended outcome.

(a) Choice of instrument

The proposed form of action is a directly applicable delegated regulation amending Annex VII to Directive 2018/2001/EU to introduce a methodology for calculating the amount of renewable energy used in cooling, including district cooling. As the methodology should be used in the same way in all Member States, a directly applicable regulation is the most appropriate legal instrument.

(b) Budgetary implication

The proposal has no impact on the EU budget.

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THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources[3], and in particular Article 7(3), ' fifth subparagraph thereof,

Whereas:

(1) Directive (EU) 2018/2001 establishes rules for Member States to calculate the share of renewable energy in the electricity, transport and heating sectors, but it lacks a methodology on how to account the share of renewable energy in cooling. A calculation methodology on renewable cooling is necessary to allow Member States to comply with their obligations in cooling in a similar way as they can fulfil their obligations on heating. Such a methodology is key to ensure a level playing field with heating and to provide equal opportunities for Member States, including those with high cooling shares in their final energy consumption.

(2) Annex VII of Directive (EU) 2018/2001 provides a methodology to calculate renewable energy from heat pumps used for heating, but does not regulate how to calculate renewable energy from heat pumps used for cooling. The lack of methodology in that Annex to calculate renewable energy from heat pumps used for cooling prevents the cooling sector from contributing to the Union's overall renewable energy target laid down in Article 3 of Directive (EU) 2018/2001 and makes it more difficult for Member States, especially those with a high cooling share in their energy consumption, to deliver the heating and cooling target and district heating and cooling targets under Articles 23 and 24 of that Directive, respectively.

(3) Therefore a methodology on renewable cooling, including district cooling, should be introduced in Annex VII to Directive (EU) 2018/2001. Such a methodology is necessary to ensure that the renewable energy share from cooling is calculated in the same harmonised way in all Member States and a reliable comparison of all cooling systems in terms of their capacity to use renewable energy for cooling is possible.

(4) The methodology should include minimum seasonal performance factors (SPF) for heat pumps operating in reverse mode in line with Article 7(3), sixth subparagraph of Directive (EU) 2018/2001. Since all active cooling systems can be considered as heat pumps working in reverse mode, which also can be called cooling mode, minimum seasonal performance factors should apply to all cooling systems. This is necessary because the way heat pumps work is that they extract and transfer heat from one location to another. In the case of cooling, heat pumps extract heat from a space or

[3] OJ L 328, 21.12.2018, p. 82

process and reject it to the environment (air, water or ground). Extraction of heat is the essence of cooling and the core function of a heat pump, and since this extraction goes against the natural flow of energy, which goes from hot to cold, such extraction requires energy input to the heat pump, also called a cooling generator.

(5) The mandatory inclusion of minimum seasonal performance factors in the methodology is due to the importance of energy efficiency to establish the presence and use of renewable energy by heat pumps. The renewable energy in the case of cooling is the renewable cold source, which can increase the efficiency of the cooling process, and makes the seasonal performance factor of cooling higher. High seasonal performance factors, while being an energy efficiency indicator, function at the same time as proxy for the presence and use of renewable cold source in cooling.

(6) In cooling, the cold source functions as a heat sink, as it absorbs the heat extracted and rejected by the heat pump outside the space or process that needs to be cooled. The quantity of renewable cooling depends on the efficiency of the cooling process, and is equivalent to the quantity of heat absorbed by the heat sink. This in practice is equivalent to the quantity of cooling capacity provided by the cold source.

(7) The cold source can be ambient energy or geothermal energy. Ambient energy is present in ambient air (formerly known as aerothermal) and ambient water (formerly known as hydrothermal), while geothermal energy comes from the ground under the surface of solid earth. Ambient and geothermal energy used for cooling by means of heat pumps and district cooling systems should be taken into account for the purposes of calculating the share of renewable energy in the gross final consumption of energy, provided that the final energy output significantly exceeds the primary energy input required to drive the heat pumps. This requirement, established in Article 7(3), third subparagraph of Directive (EU) 2018/2001, can be fulfilled with appropriately high seasonal performance factors as defined by the methodology.

(8) Given the variety of cooling solutions, it is necessary to define which cooling solutions should fall into the scope of the methodology and which should be excluded. Cooling by the natural flow of thermal energy without the intervention of a cooling device is passive cooling and should therefore be excluded from the scope of the calculation in accordance with Article 7(3), fourth subparagraph of Directive (EU) 2018/2001.

(9) Decreasing the need for cooling by building design, such as building insulation, green roof, vegetal wall, and shading or increased building mass, while valuable, can be considered as a passive cooling and should therefore not be included in the scope of the renewable cooling calculation**.**

(10) Ventilation (either natural or forced), which is the introduction of ambient air inside a space with the aim to ensure appropriate indoor air quality is considered passive cooling and should therefore not be included in the scope of the renewable calculation. This exclusion should be maintained even when ventilation leads to the introduction of cold ambient air and thus reduces the cooling supply in some periods of the year; however, this cooling is not the primary function and ventilation may also contribute to heating the air in the summer and thus to increase the cooling load. Notwithstanding, where ventilation air is used as a heat transport medium for cooling, the corresponding cooling supply, which can be supplied either by a cooling generator or by free cooling, should be considered active cooling. In situations where the ventilation airflow is increased above ventilation requirements for cooling purposes, the cooling supply due to this extra airflow should be part of the renewable cooling calculation.

(11) Comfort fan products include a fan and electric motor assembly. Comfort fans move air and provide summer comfort by increasing the air speed around the human body, which gives a thermal feeling of coolness. As opposed to ventilation, there is no introduction of ambient air in the case of comfort fans; comfort fans only move indoor air. Consequently, they are not cooling indoor air but heating it (all electricity consumed is ultimately released as heat in the room where the comfort fan is used). Comfort fans are not cooling solutions and should therefore fall outside the scope of the renewable cooling calculation.

(12) Cooling system energy input in means of transportation (such as cars, trucks, ships) is in general supplied by the transportation engine. The use of renewable energy in non-stationary cooling is part of the renewable transport target calculation pursuant to Article 7(1), point (c) of Directive (EU) 2018/2001 and should therefore not come into the scope of the renewable cooling calculation.

(13) The temperature range of the cooling supply for which renewable cold sources can grow, and reduce or displace the energy use of a cooling generator lays between 0°C and 30°C. This temperature range is one of the parameters that should be used to screen potential cooling process sectors and applications to be included in the scope of the renewable cooling calculation.

(14) Process cooling with low and very low cooling supply temperature has little room to use renewable cold sources to any significant degree and is mostly operated with electrically driven refrigeration. The main way of making refrigeration equipment renewable is through their energy input. When electricity driven refrigeration equipment is renewable, it is already accounted for in the renewable electricity shares under Directive (EU) 2018/2001. The efficiency improvement potential is already covered by the EU ecodesign and labelling framework. Consequently, there would be no benefit of including refrigeration equipment in the scope of the renewable cooling calculation.

(15) As regards high temperature process cooling, any thermal power plant, combustion and other high temperature processes offer the possibility to recover waste heat. Incentivising the release of high temperature waste heat into the environment without heat recovery through renewable cooling would be against the “energy efficiency first” principle and environmental protection. In that perspective, the 30 °C temperature limit is not enough to distinguish those processes; indeed, in a steam power plant, condensation may occur at 30 °C or lower. The cooling system of the power plant may supply cooling at a temperature lower than 30 °C.

(16) To ensure that the scope is clearly set, the methodology should include a list of processes where the recovery or avoidance of waste heat should be prioritised instead of incentivising the use of cooling. Sectors where waste heat avoidance and recovery is promoted through Directive 2012/27/EU of the European Parliament and of the Council[4] include power generation plants, including cogeneration, and processes producing hot fluids from combustion or from an exothermic chemical reaction. Additional processes where waste heat avoidance and recovery is important include cement, iron and steel manufacturing, wastewater treatment plants, information technology facilities (such as data centres), power transmission and distribution

[4] Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC (OJ L 315, 14.11.2012, p. 1).

facilities, as well as cremation and transportation infrastructures, where cooling should not be promoted for mitigating waste heat resulting from these processes.

(17) A central parameter for the calculations of renewable energy from heat pump used for cooling is the seasonal performance factor calculated in primary energy, denoted as the SPF_p. SPF_p is a ratio expressing the efficiency of cooling systems during the cooling season. It is calculated by dividing the produced quantity of cooling with the energy input. Higher SPF_p is better, because more cooling is produced for the same energy input.

(18) To calculate the quantity of renewable energy from cooling, it is necessary to define the share of the cooling supply that can be considered renewable. This share is denoted as s_{SPF_p}. The s_{SPF_p} is a function of a low and high SPF_p threshold value. The methodology should set a low SPF_p threshold value below which renewable energy from a cooling system is zero. The methodology also sets a high SPF_p threshold value above which the entire cooling supply produced by a cooling system counts as renewable. A progressive calculation method allows calculating the linearly growing portion of the cooling supply that can be counted as renewable from cooling systems with SPF_p values falling between the low and high SPF_p thresholds.

(19) The methodology should ensure that, in accordance with Article 7(1), second subparagraph of Directive (EU) 2018/2001, gas, electricity, and hydrogen from renewable sources are considered only once for the purposes of calculating the share of gross final consumption of energy from renewable sources.

(20) To ensure stability and predictability from the application of the methodology for the cooling sector, the low and high threshold SPF values calculated in primary energy terms should be set using the default coefficient, also called primary energy factor as set in Directive 2012/27/EU.

(21) It is appropriate to distinguish between different approaches to calculating renewable cooling depending on the availability of standard values for the parameters needed in the calculation, such as standard seasonal performance factors or equivalent full load hours of operation.

(22) It is appropriate that the methodology allows the use of a simplified statistical approach based on standard values for installations smaller than 1.5 MW nominal capacity. Where standard values are not available, the methodology should make it possible to use measured data to allow cooling systems to benefit from the calculation methodology of renewable energy from cooling. The measurement approach should apply to cooling systems with a nominal capacity above 1.5 MW, for district cooling and for small systems using technologies where standard values are not available. Notwithstanding the availability of standard values, Member States may use measured data for all cooling systems.

(23) Member States should be allowed to undertake their own calculations and surveys in order to improve the accuracy of national statistics beyond what is feasible with the methodology set out in this Regulation.

(24) Annex VII to Directive (EU) 2018/2001 should therefore be amended accordingly,

HAS ADOPTED THIS REGULATION:

Article 1

Amendment

Annex VII to Directive (EU) 2018/2001 isreplaced by the Annex to this Regulation.

Article 2

Entry into force

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels,

For the Commission
The President
Ursula VON DER LEYEN