

**OPINION No [NN]/[YYYY]
OF THE EUROPEAN UNION AGENCY
FOR THE COOPERATION OF ENERGY REGULATORS**

of [DD] [Month] [YYYY]

on the calculation of the values referred in the first subparagraph of article 22(4) of regulation (EU) 2019/943 of 5 June 2019 on the internal market for electricity (recast)

THE EUROPEAN UNION AGENCY FOR THE COOPERATION OF ENERGY REGULATORS,

Having regard to Regulation (EU) No 2019/943 of 5 June 2019 on the internal market for electricity¹, and, in particular, Article 22(4) thereof,

Whereas:

- (1) According to Article 22(1)(g) of Regulation (EU) 2019/943, Member States shall set out the technical conditions for the participation of capacity providers in advance of the selection process of any capacity mechanism.
- (2) According to the first subparagraph of Article 22(4) of Regulation (EU) 2019/943, capacity mechanisms shall incorporate limits regarding CO₂ emission to the requirements for participation.
- (3) According to the third subparagraph of Article 22(4) of Regulation (EU) 2019/943, the Agency shall publish an opinion providing technical guidance related to the calculation of the values defined in points (a) and (b) of the same Article.

HAS ADOPTED THIS OPINION:

¹ OJ L158, 14.6.2019, p. 54.

1. INTRODUCTION

In the broader context of the EU Clean Energy Package, Regulation (EU) 2019/943 sets rules to enable a transition of the European electricity system towards a system in which security, affordability and environmental sustainability are fully integrated.

The introduction of emission limits for the participation of generation capacity to capacity mechanisms is a key element to enable this transition.

Regulation (EU) 2019/943 lays down common principles for capacity mechanisms, that are temporary measures needed to ensure resource adequacy. The ACER/CEER Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2017² shows that capacity mechanisms are either operational or about to become operational in fifteen Member States. However, until now, capacity mechanisms have developed separately and in an uncoordinated way, leading to ‘fragmented markets across the EU’³.

In this context, common methodological principles at the European level are needed, in order to ensure that the emission limits introduced in the first subparagraph of Article 22(4) of Regulation (EU) 2019/943 will be applied in a homogenous way among Member States. According to points (a) and (b) of Article 22(4) of Regulation (EU) 2019/943, these limits are set for the emissions of CO₂ of fossil fuel origin per kWh of electricity and for the emissions of CO₂ of fossil fuel origin on average per year, per installed kWe.

The Agency understands the introduction of the CO₂ emission limits is intended to avoid financial support for generation capacity that, as a result of its overall activity, including the trade of electricity in wholesale markets or through OTC trades, does not meet the environmental goals.

It is against that background that, according to the third subparagraph of Article 22(4) of Regulation (EU) 2019/943, the Agency shall publish an opinion providing technical guidance related to the calculation of the values defined in points (a) and (b) of the same Article.

1.1. Structure of the Opinion

In the following section of the document, the relevant steps taken during the drafting process are outlined. Section 3 provides the reader with the legal framework, by quoting Article 22(4) of Regulation (EU) 2019/943.

In Section 4, in order to set the common ground, some relevant terms, which are used throughout the Opinion, are clarified. It starts by providing a definition for terms that are also found in other legislative acts and continues by providing a definition for other terms that, in order to fit the scope of this Opinion, need a higher degree of interpretation.

² ACER/CEER. Annual Report - Electricity Wholesale Markets Volume. Published on 22.10.2018

³ SWD(2016) 410 final. Published on 30.11.2016

Section (s) then clarifies the scope of application of the emission limits, e.g. the Agency's recommendation on what 'generation capacity' should be subject to the emission limits. This section of the document, provides a guidance on the definition of 'generation capacity' to which the emission standards should be applied, describing different production units' layouts.

Before setting out the formulae for the calculation of the values referred at in point (a) and (b) of the first subparagraph of Article 22(4) of Regulation (EU) 2019/943, Section 0 examines key issues related to emissions calculation. The most straightforward approach for a fair application of the emission limit is defined for specific cases as, for instance, generation units burning synthetic fuels and waste waste-to-energy plants.

Finally, formulae for calculating the above-mentioned values are provided and explained in Section 0. The Opinion then concludes with considerations on monitoring and documentation, in order to guide competent Authorities in this activities, while levelling out their work.

2. PROCEDURE

[...]

3. LEGAL FRAMEWORK

Article 22(4) of Regulation (EU) 2019/943 constitutes the legal framework:

“Capacity mechanisms shall incorporate the following requirements regarding CO₂ emission limits:

- (a) from 4 July 2019 at the latest, generation capacity that started commercial production on or after that date and that emits more than 550 g of CO₂ of fossil fuel origin per kWh of electricity shall not be committed or to receive payments or commitments for future payments under a capacity mechanism;
- (b) from 1 July 2025 at the latest, generation capacity that started commercial production before 4 July 2019 and that emits more than 550 g of CO₂ of fossil fuel origin per kWh of electricity and more than 350 kg CO₂ of fossil fuel origin on average per year per installed kWe shall not be committed or receive payments or commitments for future payments under a capacity mechanism.

The emission limit of 550 g CO₂ of fossil fuel origin per kWh of electricity and the limit of 350 kg CO₂ of fossil fuel origin on average per year per installed kWe referred to in points (a) and (b) of the first subparagraph shall be calculated on the basis of the design efficiency of the generation unit meaning the net efficiency at nominal capacity under the relevant standards provided for by the International Organization for Standardization.

By 5 January 2020, ACER shall publish an opinion providing technical guidance related to the calculation of the values referred in the first subparagraph.”

4. DEFINITIONS

For the purpose of this Opinion, the Agency considered the following definitions:

- (a) ‘generation unit’ means ‘generation unit’ as defined in Article 2(71) of Regulation (EU) 2019/943: a single electricity generator belonging to a production unit;
- (b) ‘production unit’ means ‘production unit’ as defined in Article 2(24) of Regulation (EU) 543/2013: a facility for generation of electricity made up of a single generation unit or of an aggregation of generation units;
- (c) ‘waste’ means ‘waste’ as defined in point (1) of Article 3 of Directive 2008/98/EC, excluding substances that have been intentionally modified or contaminated in order to meet this definition;
- (d) ‘biomass’ means biomass as defined in Article 2(24) of Directive (EU) 2018/2001: ‘the biodegradable fraction of products, waste and residues from biological origin from agriculture, including vegetal and animal substances, from forestry and related industries, including fisheries and aquaculture, as well as the biodegradable fraction of waste, including industrial and municipal waste of biological origin’;
- (e) ‘biomass fuels’ means biomass fuels as defined in Article 2(27) of Directive (EU) 2018/2001: gaseous and solid fuels produced from biomass;
- (f) ‘biogas’ means ‘biogas’ as defined in Article 2(28) of Directive (EU) 2018/2001: gaseous fuels produced from biomass;
- (g) ‘bioliquids’ means ‘bioliquids’ as defined in Article 2(32) of Directive (EU) 2018/2001: liquid fuel for energy purposes other than for transport, including electricity and heating and cooling, produced from biomass;
- (h) ‘fossil fraction’ means ‘fossil fraction’ as defined in Article 2(37) of Directive (EU) 2018/2066: the ratio of fossil carbon to the total carbon content of a fuel or material, expressed as a fraction;
- (i) ‘biomass fraction’ means ‘biomass fraction’ as defined in Article 2(38) of Directive (EU) 2018/2066: the ratio of carbon stemming from biomass to the total carbon content of a fuel or material, expressed as a fraction;

Furthermore, for the purpose of this Opinion, the following definitions should apply:

- (j) ‘existing generation unit’: a generation unit that started commercial production before 4 July 2019.
- (k) ‘new generation unit’: a generation unit that started commercial production on or after 4 July 2019.

- (l) ‘net electricity output’: the electricity which a generation unit can produce, less any demand associated solely with facilitating the operation of that generation unit and not fed into the network (e.g the demand of auxiliary systems as fuel preparation, flue-gas treatment, waste water treatment, cooling system, fans and pumps, etc).
- (m) ‘design efficiency’: the ratio between the net electricity output of a generation unit and the unit's fuel/feedstock energy input at nominal capacity, calculated under the relevant standards.
- (n) ‘nominal capacity’: the maximum continuous net active power which a generation unit can produce and feed into the network, as specified in the connection agreement or as agreed between the relevant system operator and the generation unit owner;
- (o) ‘specific emissions of the generation capacity’: the ratio between the quantity of CO₂ (or CO_{2(e)}) emitted and the net electricity produced, calculated on the basis of design efficiency, expressed in g/kWh.
- (p) ‘total emissions of the generation capacity’: the ratio between the quantity of CO₂ (or CO_{2(e)}) emitted during one calendar year and the installed capacity, calculated on the basis of design efficiency, expressed in kg/kWe.
- (q) ‘CO₂ equivalent or CO_{2(e)}’: the amount of carbon dioxide (CO₂) emission that would cause the same integrated radiative forcing, over a given time horizon, as an emitted amount of a greenhouse gas (GHG) or a mixture of GHGs. The CO₂-equivalent emission is obtained by multiplying the emission of a GHG by its Global Warming Potential (GWP) for the given time horizon.⁴
- (r) ‘global warming potential’ or ‘GWP’: the total contribution to global warming resulting from the emission of one unit of a GHG relative to one unit of the reference gas, CO₂, which is assigned a value of 1.
- (s) ‘competent Authority’: the Authority responsible of verifying the compliance of generation capacity with the technical eligibility requirements to participate in capacity mechanisms.

5. SCOPE OF THE TECHNICAL GUIDANCE

The emission limits introduced in points (a) and (b) of the first subparagraph of Article 22(4) of Regulation (EU) 2019/943 refer to the ‘generation capacity’ and should be calculated on the basis of the design efficiency of the ‘generation unit’. For the scope of this technical guidance two issues require particular clarification:

⁴ IPCC, Fifth Assessment Report (AR5), Annex II, p.121

First, the concept of ‘generation capacity’ needs further specifications. In fact, in general, generation capacity is understood as the maximum electricity output that an electricity generator can produce, without exceeding its thermal limits. When considering a group of production units (e.g. the production units connected to a specific transmission system), generation capacity refers to the maximum electricity output that can be injected in the system by the group of production units.

However, Article 22(4) of Regulation (EU) 2019/943 does not specify what generation capacity should be subject to the emission limits and what should be the relation between ‘generation unit’, ‘production unit’ and the generation capacity that is subject to the limits.

To ensure an equal application of the emission limits in all Member States, emission limits should be applied, individually, to the generation capacity of each generation unit that either participates in full or in part in a capacity mechanism or that it is part of the generation capacity participating in a capacity mechanism. In principle, generation units belonging to the same production unit have to be considered separately, unless it is technically not possible to operate and control them independently.

Where generation units work in tandem, using the same source of thermal energy, such as for example in a combined-cycle gas turbine (CCGT), their generation capacity or net electricity production should be considered as combined and calculated taking into account only the thermal energy produced from the primary energy input of the generation unit that participate in the capacity mechanism. Extra thermal inputs should be also considered, together with their related emissions, if linked to the generation unit that participate in the capacity mechanism (e.g. post-combustion of exhaust gases or integrated thermal solar).

The ‘generation capacity’ to be subject to the emission limits, in more complex production unit configurations, should be addressed on a case by case basis, taking into account the interoperability of the generation units, the different types of fuels used and the environmental principles underlying the introduction of the emission limits in the Regulation.

Second, capacity mechanisms are defined as temporary measure to ensure the achievement of the necessary level of resource adequacy by remunerating resources for their availability, excluding measures relating to ancillary services or congestion management⁵.

With regard to this remunerating aspect, it is to note that Article 29 of Directive (EU) 2018/2001 establishes criteria which generation units consuming biofuels and biomass fuels have to fulfil in order to be eligible for financial support. Therefore, capacity mechanisms involving biofuels and biomass fuels, could be understood as a relevant financial support mechanism in the meaning of Article 29(1)(c) of Directive (EU) 2018/2001.

Article 22 of Regulation (EU) 2019/943 refers to emission limits of “fossil fuel origin”, therefore it is not within the scope of the present technical guidance to further specify the

⁵ OJ L158, 14.6.2019, p. 66.

relationship between Article 22 of Regulation (EU) 2019/943 and Article 29 of Directive (EU) 2018/2001 or to assess the compliance of capacity mechanisms with the requirements of Article 29 of Directive (EU) 2018/2001.

Finally, the Agency's Opinion, does not prevent Member States from being more ambitious in fostering the achievement of EU decarbonisation targets. In this respect, some Member States already apply lower emission limits⁶ than those introduced in Regulation (EU) 2019/943, coal phase-out policies or they might consider upstream emissions related to the life cycle of the fuel (e.g. production, transportation, distribution, combustion).

6. EMISSIONS CALCULATION ISSUES

6.1. Waste-to-energy and mixed fuels

The emission limits introduced in points (a) and (b) of the first subparagraph of Article 22(4) of Regulation (EU) 2019/943 apply to the CO₂ 'of fossil fuel origin'. Therefore, in the case of generation units using waste or mixed fuels, the biomass fraction of the waste or mixed fuels has to be determined.

The Agency recommends that the biomass fraction of mixed fuels or waste be determined according to the approach laid down in the EU ETS framework⁷. Accordingly, one of the following values should be used:

- (a) Default biomass fraction of 0%;
- (b) Values resulting from case-specific analyses to determine the biomass fraction, according to Article 39(2) of Commission Implementing Regulation 2018/2066;
- (c) If the application of point (b) is proven to be technically not feasible or would incur unreasonable costs, values estimated by means of an alternative method (e.g. values based on analyses carried out in the past, where the operator can demonstrate that those

⁶ In Italy and the United Kingdom emission limits have already been introduced in the capacity mechanism rules while in France emission limits have been set in the call for tenders for new capacity in the period 2023-2029. These Member States have set limit values that are at the same level or lower than the ones of point (a) and, in the case of Italy, (b) of the first subparagraph of Article 22(4) of Regulation (EU) 2019/943. However, the implementation parameters are not uniform. For instance, in the United Kingdom applicants have to submit a 'Fossil Fuel Emissions Declaration', while in Italy a calculation certified by a third-party verifier is required. The emission limit in the French capacity mechanism has been set at a value of 200 g of CO₂ of fossil fuel origin per kWh of electricity produced (the only Member State of the three that has introduced a limit value that is lower than the one prescribed by the Regulation) but a clear calculation methodology is missing. Italy and the United Kingdom clearly exclude biomass from the calculation, while a strict interpretation of the French call for tenders for new capacity launched on 12 June 2019 would include also CO₂ emissions from biomass. On top of this, RTE considers also the emissions from greenhouse gases (GHGs) other than CO₂ and their conversion into CO₂ equivalent.

⁷ OJ L334, 31.12.2018, p. 22.

values are representative for future mixed fuels/batches of waste) can be applied, if approved by the competent Authority.

In the case of waste-to-energy units, emission factors should be determined on a case-by-case approach. The Agency recommends that the competent Authorities rely on values determined in accordance with the relevant provisions of Articles 32 to 35 of Regulation (EU) 2018/2066.

6.2. Synthetic fuels

Synthetic fuels as synthetic methanol or synthetic methane typically have carbon content and emit CO₂ when utilised in electricity production. According to Article 22(4) of Regulation (EU) 2019/943, these emissions have to be taken into account when calculating the values referred in point (a) and (b) of the first subparagraph of the same Article.

Since, at the time of writing, standard emission factors for synthetic fuels are not defined in any official document, a case-by-case approach has to be applied to determine these emission factors. The Agency recommends that the competent Authorities rely on values determined in accordance with the relevant provisions of Articles 32 to 35 of Regulation (EU) 2018/2066.

This should apply also to the so-called carbon capture and utilisation (CCU) fuels where, by definition, the carbon is stored only temporarily and therefore cannot benefit from the application of the principles defined in Subsection 6.4 of this Opinion.

As Directive (EU) 2019/944 asks for a [methodology/delegated act] from the European Commission on the topic of the estimating emission for synthetic fuels, and this work is currently ongoing, the Agency recommends competent Authorities to consider this as a future reference for values and methodologies to estimate emission factors for synthetic fuels.

6.3. Hydrogen

Hydrogen can be used for electricity production in stationary fuel cells or, more rarely, in internal combustion engines. Hydrogen has no carbon content and therefore there are no direct CO₂ emissions related to hydrogen utilisation in electricity production.

Fuel cells units directly utilising a fuel with carbon content (e.g. CH₄ or CH₃OH) for steam reforming processes, should calculate and report to the competent Authority their values of specific emissions and total emissions.

6.4. Transferred CO₂

When calculating the values of specific emissions of the generation capacity and total emissions of the generation capacity, CO₂ emissions of fossil fuel origin that are captured and transferred to any of the installations described in point (a) of the first subparagraph of Article 49 of Regulation (EU) 2018/2066, should be subtracted from the emissions of the generation capacity.

In this case, the Agency recommends that the competent Authorities ask for the submission of documented measures, compliant with the measurement-based methodology of the EU ETS framework⁸, which requires continuous emission monitoring systems (CEMS).

If the capacity provider demonstrates a situation of technical unfeasibility or unreasonable costs, a method to estimate the captured CO₂ should be submitted by the capacity provider to the competent Authority for approval.

6.5. Upstream emissions

The Agency recognises the co-legislators' intention to address the emission limits introduced in points (a) and (b) of Article 22(4) of Regulation (EU) 2019/943 to the emissions deriving from fossil fuel utilisation. Upstream emissions are therefore out of the scope of the above-mentioned emission limits.

6.6. Electricity storage

Electricity from electricity storage units should be considered as carbon neutral.

6.7. Cogeneration

Production units for combined heat and electricity production (CHP) are integrated systems that can be designed in many different ways, on the basis of several technologies (e.g. gas turbines, back-pressure steam turbines or internal combustion engines). In order to ensure a level playing field, the Agency considers that, in the context of the emission limits for the participation in capacity mechanisms under Regulation (EU) 2019/943, the calculation of CO₂ emissions of a CHP unit should be based only on the design efficiency of the unit as defined in Section 4 of this Opinion (i.e. the net electrical efficiency) as the Regulation sets CO₂ emission limits per kWh 'of electricity' and for 'installed kW_e'.

It is finally noted that the specific objective to enhance a process of transition towards a more efficient energy system, including electricity, heating and cooling transformation, transmission and distribution, together with a more efficient energy consumption is specifically addressed in Directive 2012/27/EU (Energy Efficiency Directive).

6.8. Demand side response

On-site back-up generation units linked with demand side response participation in capacity mechanisms should be subject to the emission limits introduced in Article 22 of Regulation (EU) 2019/943 and the calculation methodology recommended in this Opinion should apply.

⁸ OJ L334, 31.12.2018, p. 26.

6.9. Greenhouse gases other than CO₂

Studies from the European Environmental Agency (EEA)⁹ and the European Investment Bank¹⁰ show that carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) are the most relevant GHGs during the combustion of fossil fuels, in electricity production.

Given their negative effects, Member States should take these GHGs into account when assessing the eligibility of generation capacity in capacity mechanism. Emissions of CH₄ and N₂O should be converted into tonnes of carbon dioxide called CO_{2(e)}, or CO₂-equivalent, according to their Global Warming Potentials (GWP).

GWP factors should be used in accordance with values agreed under the [delegated act] of the Energy Union Governance Regulation (EU) 2018/1999.

7. CALCULATION OF THE VALUES REFERRED IN THE FIRST SUBPARAGRAPH OF ARTICLE 22(4) OF REGULATION (EU) 2019/943

7.1. Specific Emissions of the generation capacity

The specific emission of the generation capacity should be calculated with the following formula, derived from the EU-ETS calculation-based methodology¹¹:

$$\text{specific emissions} = \frac{0,0036 \cdot \sum_f (S_f \sum_i EF_{fi} \cdot GWP_i)}{\eta_{\text{des}}}$$

Where:

Term	Specification
i	Index for greenhouse gases (GHGs) meaning: CO ₂ , CH ₄ and NO ₂ .
f	Fuel
S _f	Fuel share [%] of fuel <i>f</i> over the total fuel input, calculated over a calendar year on the basis of the Net Calorific Value. Total sum of shares must be equal to one.
0,0036	Conversion factor (1 kWh equal to 0,0036 GJ).
η _{des}	Design efficiency (see Section 0). A non-exhaustive list of relevant technical standards is provided in Annex III. Regulation 2019/943 refers to the standards provided by the International Organization for Standardization. Where ISO standards are not available, EN standards should be considered. In case technical standards are not available, the estimate of design efficiency has to be approved by the competent Authority.
GWP _i	Global warming potential (see Section 0).

⁹ EEA GHGs data viewer accessible at www.eea.europa.eu/data-and-maps/data/data-viewers.

¹⁰ European Investment Bank, EIB Project Carbon Footprint Methodologies Version 11. December 2018.

¹¹ OJ L181, 12.7.2012, p.41

EF _i	<p>Emission factors (EF_i) are expressed in [kg GHG/TJ]. The Agency recommends that:</p> <ul style="list-style-type: none"> - All the generation units that fall in the EU ETS should determine the emission factor for CO₂ with the same approach that is applied in their monitoring plan within the EU ETS framework, as prescribed in point 2.1 of Annex II of Regulation (EU) 2018/2066¹², according to the installation category (Article 19 Regulation (EU) 2018/2066) and tier (Article 26 Regulation (EU) 2018/2066) applied. They should apply reference emission factors for N₂O and CH₄ as specified in Annex II of this Opinion. - In the case of waste-to-energy units and units burning synthetic fuels, emission factors for CO₂, CH₄ and N₂O, should be determined as defined in Sections 6.1 and 6.2 of this Opinion. - New generation units that are under development, should submit to the competent Authority their best estimate of the emission factor(s) based on the information available. - All the other generation units, should apply reference emission factors as specified in Annex II of this Opinion.
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Table 1 Terms of the formula for the calculation of the value of “specific emission”.

7.2. Total emissions of the generation capacity

Article 22(4) of Regulation (EU) 2019/943 specifies that, for existing generation units, the value of total emissions shall be referred to the CO₂ emitted ‘on average per year’. As already mentioned in Section 1, the Agency understands the provisions introduced in Article 22(4) of Regulation 2019/943, as a measure to avoid financial support for generation capacity that, as a result of its overall activity, including the trade of electricity in wholesale markets or through OTC trades, does not fulfil the emission limits.

To the Agency’s view, the historical operation of the existing generation unit(s) which form the generation capacity, should be taken into account when calculating the value of total emission of the generation capacity. To the extent possible, the Agency recommends to consider the average total emissions of the generation unit(s) over the last three full calendar years before the pre-qualification. To the Agency’s view, basing the calculation of total emissions on the historical emission over the last three years has two main advantages:

- It gives a very good picture of the CO₂ performance of the generation unit(s) willing to participate in a capacity mechanism;
- It simplifies and streamlines the overall monitoring process (e.g. less need for ex-post monitoring and less risk of errors leading to potential market distortions).

¹² OJ L334, 31.12.2018, p.50

The Agency recommends to calculate the total emissions of the generation capacity with the following formula:

$$\text{total emissions} = \frac{1}{N} \cdot \sum_{y=Y-1}^{Y-N} \frac{\text{specific emissions}_y \cdot \text{electricity production}_y}{\text{installed capacity}_y}$$

Where:

Term	Specification
Y	Year of pre-accreditation of the generation capacity.
N	Number of full calendar years considered for the calculation. The latest three full calendar years should be considered when possible. Testing period should not be considered.
specific emissions	Emission performance of the generation capacity [gCO ₂ /kWh] is calculated on the basis of the net efficiency at nominal capacity under the relevant technical standards, as defined in Section 7.1 of this Opinion.
electricity production	Total electricity injected into the grid by the generation unit in year y, expressed in kWh.
installed capacity	It is the nominal capacity of the generation unit(s), expressed in MW _e .

Table 2 Terms of the formula for the calculation of the value of "total emission".

7.3. Admissibility of corrective action plans

On an exceptional basis, generation capacity which does not comply with the emission limits at pre-qualification phase (i.e. prior to the auction for capacity), could be allowed to participate upon submission of a corrective action plan, to the competent Authority, describing the measures that will be taken in order for the generation capacity to comply with the emission limits.

If, according to the submitted corrective action plan, the generation capacity providers can credibly commit to ensure compliance with the limits, during the delivery period of the capacity mechanism, they could be allowed to participate in the capacity mechanism. In assessing this, both the technical features of the generation units and the design characteristics of the capacity mechanism should be considered.

8. DOCUMENTATION

Pursuant to Article 22(4) of the Regulation (EU) 2019/943, Member States should ensure that the emission limits, defined in the same Article, are included in the applied capacity market rules. Moreover, according to Article 22(5) capacity mechanisms that are already in place should be reviewed in light of Regulation (EU) 2019/943, without prejudice to commitments or contracts concluded by 31 December 2019.

In order fully to implement Article 22(4) of Regulation (EU) 2019/943, competent Authorities should have access to all necessary data and should be given the competence effectively to

monitor the compliance of the requirements introduced in points (a) and (b) of the first subparagraph of Article 22(4) of Regulation (EU) 2019/943.

As part of the pre-qualification process of the capacity mechanism, competent Authorities should be provided by capacity providers with an ex-ante calculation of the specific emission of the generation capacity and total emissions of the generation capacity supported by a document containing, at least, the following data:

Data	Documentation Source
Name of company	Connection agreement.
Generation unit(s) operator	Connection agreement.
Name of generation unit(s)	Connection agreement.
Connection agreement number	Connection agreement.
Nominal capacity	Power plant commissioning contract, historic power plant testing, information from other technical sources.
Net efficiency	Power plant commissioning contract, historic power plant testing, information from other technical sources.
Type of fuel(s)	Connection agreement, power plant commissioning contract, historic power plant testing, information from other technical sources.
Amount of fuel consumed per year, for every year of the reference period	Purchase receipts, delivery receipts, contract purchase or firm purchase records, stock inventory documentation, metered fuel documentation.
Electricity produced per year, for every year of the reference period	Metering system, TSO metering.
Fuel consumption at nominal capacity	Power plant commissioning contract, historic power plant testing, information from other technical sources.
Net calorific value(s) and emission factor(s) used	If other than defaults provided, provide reference to the EU ETS approved monitoring plan, purchase receipts; delivery receipts; contract purchase or firm purchase records; IPCC, IEA, national or industry reports, test reports.
Assumptions made in estimating fuel consumption, net calorific value and emission factors.	All applicable sources.
Applied ISO standard	N/A

Table 3 Documentation that should be maintained

In order to ensure a fair application of the emission limits across Europe and discourage fraudulent behaviour, the calculation of the specific emissions and of the total emission of the generation capacity together with their modifications should be verified, e.g. be certified by a third-party verifier accredited for scope 1(a) and/or scope 1(b) of Annex I of Regulation 2018/2067 of 19 December 2018 on the verification of data and on the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council.

9. MONITORING

An effective introduction of the emission limits requires not only accurate documentation, but also reliability of data sources, for the values used as an input in the calculations. For this reason, to take into account the actual asset of more complex generation unit(s) whose characteristics might change in time, the Agency recommends competent Authorities to establish an ex-post monitoring activity, to be performed at the end of the relevant delivery period of the capacity mechanism, in the following cases:

- (a) Existing generation units that, for pre-qualifications taking place from 3 July 2019 to 3 July 2022, have less than three years of commercial production at time of pre-accreditation¹³;
- (b) Mixed fuels generation units;
- (c) Waste-to-energy;
- (d) Generation units in which CO₂ is capture and transferred¹⁴;
- (e) Non-compliant generation units that, on exceptional basis, are allowed to participate in the capacity mechanism based on a credible commitment which includes the submission to the competent Authority of a credible action plan as described in Section 7.3.

This ex-post monitoring activity should ensure that the emission values calculated at the pre-qualification stage, or the commitment taken by non-compliant units, are representative of the units performance during the delivery period and based on reliable assumptions.

The monitoring activity should be performed by means of a report, certified by a third-party verifier accredited for scope 1(a) and/or scope 1(b) of Annex I of the Commission Implementing Regulation 2018/2067, and submitted by the capacity provider to the competent Authority. The ex-post monitoring report should refer to the actual activity of the generation unit(s) in the period of twelve months starting from the first day of delivery of the capacity mechanism.

According to the type of generation unit(s) described in point (a) to (e) of the first paragraph of this Section, the above-mentioned report should be mainly focused on the following:

- (a) Electricity produced in year Y, for existing generation units that, for pre-accreditations taking place from 3 July 2019 to 3 July 2022, have less than three years of commercial production at time of pre-accreditation;
- (b) Fuel mix and resulting emission factor(s), for mixed-fuel generation units;

¹³ In this case only a review of total emission of the generation unit(s) is needed.

¹⁴ To any of the installations described in point (a) of the first subparagraph of Article 49 of Commission Implementing Regulation 2018/2066.

- (c) Biodegradable fraction and resulting emission factor(s), for waste-to-energy generation units;
- (d) Yearly CO₂ captured, for generation units in which CO₂ is capture and transferred;
- (e) The action plan implementation progress and the calculation of specific emission and total emission values showing compliance with the emission limits, if applicable, for non-compliant units that, on exceptional basis, are allowed to participate in the capacity mechanism based on a corrective action plan.

Done at Ljubljana, on [DD] [Month] [YYYY].

For the Agency
The Director
Alberto Pototschnig

Annexes:

Annex I: Summary of the comments received during the public consultation process

Annex II: Standard emission factors of fuels

Annex III: Relevant ISO and EN standards

ANNEX I: SUMMARY OF THE COMMENTS RECEIVED DURING THE PUBLIC CONSULTATION PROCESS TOGETHER WITH A METHODOLOGICAL NOTE

Organisation	Comment
[Organisation]	[Contribution]
[Organisation]	[Contribution]
[Organisation]	[Contribution]
[Organisation]	[Contribution]
[Organisation]	[Contribution]
[Organisation]	[Contribution]
[Organisation]	[Contribution]

Table 4 Summary of the comments received, during the public consultation process.

ANNEX II: STANDARD EMISSION FACTORS OF FUELS

The emission factors below refer to Table 1 “Fuel emission factors related to net calorific value (NCV) and net calorific values per mass of fuel.” in Annex VI of the Commission Implementing Regulation (EU) 2018/2066 of 19 December 2018 and to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

Fuel	EF _{CO2} (kg CO ₂ /TJ)	EF _{CH4} (kg CH ₄ /TJ)	EF _{N2O} (kg N ₂ O/TJ)	Source
Crude oil	73.300	3,0	0,6	IPCC 2006 GL
Gas/diesel oil	74.100	3,0	0,6	IPCC 2006 GL
Bituminous coal	94.600	1,0	1,5	IPCC 2006 GL
Sub-bituminous coal	99.610	1,0	1,5	IPCC 2006 GL
Lignite	101.000	1,0	1,5	IPCC 2006 GL
Natural gas	56.100	1,0	0,1	IPCC 2006 GL
Liquefied Petroleum Gases	63.100	1,0	0,1	IPCC 2006 GL
Wood/wood waste	0	0	0	IPCC 2006 GL
Other primary solid biomass	0	0	0	IPCC 2006 GL

Table 5 Standard emission factors and NCV per mass of fuel.

ANNEX III: RELEVANT ISO AND EN STANDARDS

For some technology, the definition of design efficiency is not yet standardized at the international level. Where ISO standards are not available, European EN standards are provided, if available.

- ISO 3977-2:1997 – gas turbines (standard reference conditions and ratings)
- ISO 3077-3:2004 – gas turbines (design requirements)
- ISO 15550:2016 – internal combustion engines
- EN 12952-15:2004 – steam generators

PRELIMINARY DRAFT