Public Consultation on ACER draft Opinion providing technical guidance on the calculation of the values related to CO2 Emission Limits in Capacity Mechanisms

A Eurelectric response paper

October 2019

Eurelectric represents the interests of the electricity industry in Europe. Our work covers all major issues affecting our sector. Our members represent the electricity industry in over 30 European countries.

We cover the entire industry from electricity generation and markets to distribution networks and customer issues. We also have affiliates active on several other continents and business associates from a wide variety of sectors with a direct interest in the electricity industry.

We stand for

The vision of the European power sector is to enable and sustain:
- A vibrant competitive European economy, reliably powered by clean, carbon-neutral energy
- A smart, energy efficient and truly sustainable society for all citizens of Europe

We are committed to lead a cost-effective energy transition by:

investing in clean power generation and transition-enabling solutions, to reduce emissions and actively pursue efforts to become carbon-neutral well before mid-century, taking into account different starting points and commercial availability of key transition technologies;

transforming the energy system to make it more responsive, resilient and efficient. This includes increased use of renewable energy, digitalisation, demand side response and reinforcement of grids so they can function as platforms and enablers for customers, cities and communities;

accelerating the energy transition in other economic sectors by offering competitive electricity as a transformation tool for transport, heating and industry;

embedding sustainability in all parts of our value chain and take measures to support the transformation of existing assets towards a zero carbon society;

innovating to discover the cutting-edge business models and develop the breakthrough technologies that are indispensable to allow our industry to lead this transition.

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Consultation Topic 1: Scope of the Technical Guidance (Section 5 of the draft opinion)

Ensuring the guidance is clear on what "generation capacity" the EPS applies to

The guidance wording needs to be improved to ensure it is clear that:

- The CO_2 emission limits apply to the generation capacity that participates to the capacity mechanisms. Indeed the definition of generation capacity in the frame of capacity mechanism goes beyond the scope of the ACER opinion; it is already tackled in the local market rules for capacity mechanisms. In practice, this generation capacity can be either a single generation unit or a set of generation units.
- The criteria should be met by all individual units participating in the capacity mechanism within the generation capacity unless it is not technically possible to operate the units independently or it reflects their usual operating mode to deliver their commitments in the capacity mechanism. This avoids the potential to average a lower performing unit with a higher performing unit (e.g. different units/fuels that might have a CO_2 intensity above the EPS threshold) – which would be at odds with the intent of the Regulation.
- The criteria should not be applied to generation units that are outside of the capacity mechanism (which would go beyond the scope of the Regulation).

Consultation Topic 2: Emission Calculation Issues (Section 6 of the draft opinion)

Included emissions have to be those specified in the Regulation: only CO_2 emissions

As a point of principle the guidance should not increase the scope of the Regulation by including other GHG such as nitrous oxide and methane – the Regulation is clear and only specifies CO_2 emissions. Consequently, all references to other GHGs or related concepts (e.g. Global Warming Potentials) should be removed from the definitions, the descriptions, the formulas and the tables throughout the document and the draft opinion adapted accordingly.

The definition of "CO_2 equivalent or CO_2(e)" and its use in the text should be removed – the text of the regulation is clear and it is about CO_2 emissions only.

Treatment of cogeneration

The current drafting on cogeneration in Section 6.7 fails to account properly for the fuel used for heat generation in the definitions and in the various formulas. It could therefore result in a plant with an overall efficiency of approx. 80% not being eligible for participation in a capacity mechanism while being in a position to contribute effectively to the security of electricity supply. This flawed approach has the net result of potential discriminating against high efficiency CHP units. This is not the level playing field that the guidance document should be aiming for.

Our understanding is that the idea behind ACER proposal for CHP would be based on formal "design efficiency" requirement put in the Regulation. However, it is clear that the solution proposed by ACER as the specific calculation methodology, which seems to be easy to implement and gives the impression of being formally well justified, results in undermining the role of cogeneration in providing low emitting technology for ensuring electricity security of supply.

We believe that the proposed solution is also not in line with the following EEAG 2014 provisions:

(232) The measure should be designed in a way so as to make it possible for any capacity which can effectively contribute to addressing the generation adequacy problem to participate in the measure, in particular, taking into account the following factors:

(a) the participation of generators using different technologies and of operators offering measures with equivalent technical performance, for example, demand side management, interconnectors and storage. Without prejudice to the paragraph (228), restriction on participation can only be justified on the basis of insufficient technical performance required to address the generation adequacy problem…

Although cogeneration is not explicitely listed in the cases requiring equal treatment, we have no doubts that the provision implicitly refers also to this technology as long as it can provide technical performance at the required level.

We can also understand that cogeneration should get even more and not less preference comparing with the same fuel and the same technology generating capacity according to the following EEAG 2014 provision:

(233) The measure should: […] (e) give preference to low-carbon generators in case of equivalent technical and economic parameters.

Considering the negative effects of not considering properly cogeneration in the calculation method proposed we cannot agree with the specific justification proposed by ACER "*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).*"

Although some Member States could have specific measures to enhance more energy efficiency solutions, including CHP units, it does not justify the exclusion of CHP units from participation in capacity mechanisms because of a flawed approach for this technology.

The calculation method proposed by ACER will result in the loss of the incentive effect for many cogeneration capacity power providers to be available in times of scarcity. At the same time, CHP technologies are among the most cost-effective technologies for reducing CO_2 emissions. This will result in a different treatment of capacity providers within capacity mechanisms and their inefficient use in meeting the challenges of the energy transition. This conflicts with art. 22(1) e) of Regulation (EU) 2019/943. The argument that CHPs are specifically addressed in Directive 2012/27/EU is also contrary to art. 22(1) e) of Regulation (EU) 2019/943 and leads to not optimal use of capacity power resources.

The cogeneration plants can achieve a fuel utilization overall efficiency of up to 90% in comparison to the CCGT condensing plants, that can achieve around 60% of electrical efficiency, or open cycle gas turbines, that can achieve up to 40% of electrical efficiency. Therefore, a modern CHP plant could significantly lower fuel use and corresponding emissions than the combination of a

comparable condensing unit for electricity generation and a district heat only boiler for heat generation, saving around 20 % of CO_2 compared to a CCGT and 40% compared to an OCGT (even by up to 250 million tonnes of CO_2 by 2020). Promoting development of cogeneration is therefore one of the solutions to achieve energy efficiency goals. Small cogeneration facilities can also be an effective way to supply energy to remote areas without the need for expensive grid infrastructure.

Art. 22 (4) of Regulation (EU) 2019/943 specifies that CO_2 emissions should be calculated per kWh of electricity. **The calculation method proposed by ACER ignores the fact that the useful products of CHP units are both electricity and heat. To ensure compliance with art. 22(4) of Regulation (EU) 2019/943, heat production should be taken into account in calculating CO_2 emissions per kWh of electricity.**

The definition of "design efficiency" in Section 4 ("Definitions) should therefore be adapted as follows:

(m) 'design efficiency': the ratio between net electric output of a generation unit and the unit's fuel/feedstock energy input at nominal capacity ***used for producing electricity****, calculated under the relevant standards* ***and expressed in net calorific value (NCV)***

As clarified in this modified definition, the fuel/feedstock energy input shall also be expressed as net calorific value (NCV) / lower heating value (LHV).

The use of both expressions "design efficiency" and "net efficiency at nominal capacity" separately should be avoided throughout the Opinion, since one is the definition of the other. Instead the expression "design efficiency, meaning the net efficiency at nominal capacity" should be used, as referred to in the Regulation.

Eurelectric believes that the rules and procedures for the calculation of CO_2 emission factors and for assessing eligibility for participation in capacity mechanisms should not discriminate against highly efficient combined heat and power plants in the electricity markets. Therefore the opinion should take into account somehow a CO_2 emission credit for the measurable heat production. It should also be acknowledged that there are various options for accounting for this allocation and the choice should be left to the Member States:

a) Allow alternative approach for CHP units (in line with BREF LCP BAT Conclusions)

A first approach is to be in line with the methodologies and approaches of the existing EU jurisdiction for allocation of CO_2 emissions to different energy products and the BAT conclusions for large combustion plants (Commission Implementing Decision (EU) 2017/1442) with respect to energy efficiency.

It is necessary to lay down clear rules based on objective and non-discriminatory criteria for CHP units. In the case of combined heat and power (CHP) plants:

- The "net total fuel utilisation" shall refer to the combustion unit operated at full load and tuned to maximise primarily the heat supply and secondarily the remaining power that can be generated,
- The "net electrical efficiency" shall refer to the combustion unit generating only electricity at full load.

In the case of CHP units, only one of the two approaches should be applied upon decision of the operator, depending on the CHP unit design (i.e. either more oriented towards electricity generation or towards heat generation).

b) Allocation of CO_2 emissions to different energy products

In the second approach and in accordance with current technical and scientific knowledge, in the case of the "net total fuel utilisation" approach, the specific emissions of the generation capacity attributable to electricity production should be calculated in line with international standards (see EN 15316-4-5).

Note that Annex VI B. N° 1 d) of the Directive (EU) 2018/2001 of 11 December 2018 on the promotion of the use of energy from renewable sources (RED II) includes comprehensive and effective rules for assigning fuels and emissions of CHP and apply to situations where an operator has to attribute inputs, outputs and emissions of cogeneration units to sub-installations (based on the 'Carnot method').

c) Allocation of CO_2 emissions for heat according to a reference alternative source

In a third approach Eurelectric proposes to use a usual formula to address the CO_2 emissions from electricity production of CHP unit:

$$\text{Specific CO2 emissions of fossil fuel origin power generation by CHP generation capacity} = \frac{(Total\ CO2\ emissions\ CHP\ Plant - Total\ CO2\ emissions\ of\ alternative\ heat\ source)}{Total\ electricity\ generation\ of\ the\ CHP\ plant}$$

where:

- The alternative heat source is a heat-only boiler using the same fuel as the CHP plant, with an efficiency equal to the reference efficiency provided in the Commission Delegated Regulation (EU) 2015/2402.
- The relevant amount of heat produced by a CHP unit should be regarded to be the 'useful heat' meaning the "heat produced in a cogeneration process to satisfy economically justifiable demand for heating or cooling" (Art. 2 (32) of Directive 2012/27/EU).
- 'Economically justifiable demand' in return means demand that does not exceed the needs for heating or cooling and which would otherwise be satisfied at market conditions by energy generation processes other than cogeneration (Art. 2 (31) Directive 2012/27/EU).

Although this formula is based on clear fundamentals, one should further specify the quantities concerned based on the standard operation of the CHP unit at nominal capacity. Indeed, Art. 22(4) of the Regulation sets the idea that CO_2 emission limits "shall be calculated on the basis of the design efficiency of the generation unit meaning the net efficiency at nominal capacity".

Irrespective of the option chosen, the proposed calculation method should not unduly discriminate between cogeneration units with different heat-to-power ratios. For instance, some methods could discriminate capacity providers with a high heat-to-power ratio because they have a lower electrical efficiency. At the same time, these cogeneration units, despite lower electrical efficiency, ensure high overall efficiency and contribute to significant primary energy savings (PES). Therefore, such a discrimination would be in conflict with art. 22 (1) d) of Regulation (EU) 2019/943.

Waste-to-Energy and mixed fuels

Eurelectric thinks that energy from waste should not be included. UK's Department for Business, Energy & Industrial Strategy (BEIS) has used a legal definition of fossil fuel when implementing the EU Recast Electricity Regulation, and this does not capture energy from waste. Equally installations for the incineration of hazardous or municipal energy from waste are not necessarily captured

within such policies as the EU ETS. This seems like an inappropriate point to bring energy from waste into emissions limits (merits broader work and consideration).

Imposing a disproportionate administrative burden on installations for incinerating waste-to-energy fuels in co-incineration plants or mixed fuels should be avoided:

- Include a **de-minimis rule for mixed fuels** to minimise the administrative burden on operators and competent authorities: *"Where the biomass fraction of mixed fuels or materials is equal or higher than 97 %, the emission factor of biomass shall be applied."*
- Include a **derogation for biogas injected into a gas network**, in line with Article 39 of the Commission Implementing Regulation (EU) 2018/2066 of 19 December 2018 (Monitoring and Reporting Regulation): "*By way of derogation from the preceding paragraphs, where the guarantee of origin has been established in accordance with Articles 2(j) and 15 of Directive 2009/28/EC for biogas injected into and subsequently removed from a gas network, the operator shall not use analyses to determine the biomass fraction.*"

To the extent possible and in a pragmatic approach, the capacity providers should be in a position to reuse any relevant elements already available for their generating capacity and that could help them justify their compliance with the CO_2 emission performance standard.

Waste gases and process gases

In practice, waste gases and process gases of non-renewable origin, which are produced as an unavoidable and not intentional consequence of the production process in industrial installations, may be considered not to be counted as fossil fuels contributing to the emission limits when used to produce electricity and emitting CO_2. Indeed, using these gases in a power plant allows their energy valorisation without an incremental impact on the CO_2 emissions of the industrial process. For instance, when using blast furnace gas in a power plant, the combustion of these gases prevents the release in the atmosphere of more toxic gases and therefore fulfils an environmental objective.

Taking into account the above, in order to calculate the CO_2 emissions of power plants, these types of gases (waste gases and process gases) should be expressly excluded or, at least, treated on a case-by-case approach.

Synthetic fuels

Some synthetic fuels are considered as renewable under the Renewable Energy Directive. It is questionable whether they should then be considered as "fuels of fossil origin". Even so, either the CO_2 used to produce them comes from direct air capture or is from biogenic origin, and the CO_2 emissions should not be counted (as they would not be under the ETS), or the CO_2 comes from an ETS (power) plant, and the emissions will already have been accounted for in the ETS, in which case they should not be counted again for the CRM. Only the case of CO_2 capture from a small non-ETS plant would give rise to emissions, but there is little chance that CO_2 will be captured from such a small plant.

Calculations at the pre-qualification stage

It should be clarified beforehand that the calculations should be determined at the pre-qualification stage (ex-ante evaluation) in order to allow the participation of the capacity to the capacity auctions. Therefore no monitoring or recalculation of the CO_2 emissions values during or at the end of the delivery period is required, except for those specific cases mentioned in section 9.

Consultation Topic 3: Calculation Formulae (Section 7 of the draft opinion)

7.1 Suggested approach to calculate the Specific Emissions of the generation capacity

Ensuring the guidance accounts for upgrades or modifications to plant

The interpretation of "design efficiency" needs to account for upgrades and modifications to plant – i.e. design efficiency can be changed if a plant upgrades. Note that environmental legislation also allows re-assessment after significant changes are made to the plant.

Others

It should be specified that the *specific CO_2 emissions* are expressed in [gCO2/kWh]. A dimensional check of the formula should be performed as required.

7.2 Suggested approach to calculate the Total Emissions of the generation capacity

Consistency with Regulation (EU) 2019/943

The Opinion of ACER introduces a new definition - "total emissions of the generation capacity" - which is not referred to in the Regulation (EU) 2019/943. According to ACER, "total emissions of the generation capacity" means "the ratio between the quantity of CO_2 emitted during one calendar year and the installed capacity, calculated on the basis of design efficiency, expressed in kg/kWe". However, the expression "total emissions" is usually associated with a total mass value, expressed in kg or equivalent - not to a ratio, as it is the case here (kg CO_2/kWe).

To avoid misunderstandings, instead of "Total emissions of the generation capacity" it should be referred "CO_2 emissions on average per year per installed kWe" - as mentioned in the Regulation (EU) 2019/943. Therefore, the definition of "Total emissions of the generation capacity" and its use should be eliminated from Sections 4 and 7.2 of the Opinion.

It should be specify that the "CO_2 emissions on average per year per installed kWe" are expressed in [kgCO2/kWe]. A dimensional check of the formula should be performed as required. If EF and ηdes are to be expressed as referred in Table 2, it seems that a multiplicative factor of 10^{-6} should be included in the formula.

Ensuring the Guidance aligns with the Regulation specifying "*shall be calculated based on design efficiency*" and removing reference to historical emissions

"Design efficiency" is directly specified in the Regulation. There are good reasons for this to be the basis rather than "operational efficiency" – as this can vary depending on the role of plant, its load profiles, etc. It is analogous to the approach used in environmental legislation where "nameplate" efficiency is used - demonstrated after commissioning or after significant changes by performance test under specified (full load) conditions. The guidance needs to align with this principle. While

this appears to be case in parts of the guidance, the first part of Section 7.2 creates a confusion by referencing historical emissions. This source of confusion should be removed.

Pre-qualification requirements / Discussion on historical and future performances

Historical fuel use and electricity produced are not relevant with reference to the requirement to demonstrate compliance based on the "design efficiency" - whereas a plant specification (new plant) or a performance test after commissioning (existing plant) would.

The current proposal from ACER does not allow existing units above the variable threshold of 550 gCO_2/kWh to account for different levels of operation in future compared to the past. For instance, a unit entering a strategic reserve should be kept outside the market and its operating profile will necessarily be affected by this participation. Indeed, strategic reserves are characterised by the fact that in some years they might not be needed at all, in other years only to a very small extent and in rare years above average in order to guarantee security of supply, which is reflected in the concept of "*on average per year*". One could therefore avoid to rely on the exceptional procedure mentioned in Section 7.3 if such an anticipation was allowed and properly tackled.

This text should be replaced by text that sets out a methodology for deriving a limit to MWh from the design efficiency, emission factor for the fuel in question (Annex VI EC 2018/2066), capacity and expected generation.

In any case, more equivalence and coherence between the approaches described in Sections 7.1 and 7.2 should be established:

- Determine specific CO_2 emissions of the generation capacity in line with Section 7.1, based on design efficiency and ISO standard conditions.
- Use this specific CO_2 emissions per kWh of the generation capacity at nominal capacity, normal operating conditions and ISO standards in combination with the applicable threshold of 350 kg CO_2 per year per installed kWe to determine a maximum number of equivalent full-load operating hours per year allowing to stay below the threshold.
- If needed, the ex-post compliance assessment of the generation capacity could then refer to the maximum admitted number of equivalent full-load operating hours per year as a rolling average over a period of 3 years in which the plant takes part in the capacity mechanism.

In our opinion during the pre-qualification process the conversion of the CO_2 annual emission ceiling into an annual operation limitation based on design efficiency should be made, as the past operation of the unit may not reflect its operation within the capacity mechanism. It is also crucial in case of central dispatching model, in which the generation of the unit is dependent on the TSO's decisions, which is not necessarily the most environmentally and economically efficient. For example, the TSO may continuously set the generation on the least efficient level, as its minimal generation is needed in a given localisation. Such unit, based not on its sole decision, but on a TSO's decision, will have higher emissions that its design efficiency.

Alternatively, for an existing plant participating to a capacity mechanism with the budget of 350 kg CO_2 on average per year per installed kW, there can be a commitment from the capacity provider to keep under normal circumstances its operations below the level commensurate with the annual limit for their design efficiency and fuel emission factor. Such an approach would actually be similar to the limitation of emissions of certain pollutants into the air for Large Combustion Plants and the approach followed in the Industrial Emission Directive.

In any case, the exceptional procedure as outlined in Section 7.3 should always be allowed if requested by a capacity provider.

Consultation Topic 4: Documentation and Monitoring (Sections 8 & 9 of the draft opinion)

Section 8 of the draft opinion

Pre-qualification requirements

- In Paragraph 3:
    - It is not feasible at the pre-qualification stage to supply all the information listed for a new build. There needs to be some flexibility for the relevant authorities in each Member State to determine the appropriate way of demonstrating that the requirements of the Regulation have been met.
    - Furthermore, the information specified needs to relate to the requirements of the Regulation. For instance, information on "the amount of fuel consumed per year, for every year of the reference period," and "electricity produced per year, for every year of the reference period" would no longer be necessary if our recommendations to Section 7.2 are being followed (see comments to Consultation Topic 3).
    - Obviously, items in the documentation for the prequalification should only be provided if needed. For instance, a unit that qualifies for the specific CO_2 emission limit of 550 gCO_2/kWh should not be required for information and submit data that are entirely based on information contained in the operational permit of the power plant and/or verified information already submitted to the competent authorities for the purpose of the EU ETS monitoring and reporting and compliance assessment related to the carbon budget of 350 $kgCO_2$/kW.
- In Paragraph 4, ACER suggests that ex-ante calculations should be verified by EU ETS verifiers. Of course, an attention point is that EU ETS verified data represents emission rates that have been achieved in practice – i.e. "operational efficiency" rather than "design efficiency". So the verifiers might have to use a different approach for the verification.
- Several items in Table 3 should be more clearly associated with the definitions in Section 4, e.g. "nominal capacity" vs "net electricity output", "net efficiency" vs "design efficiency", etc…

Section 9 of the draft opinion

Monitoring

While we agree that arrangements need to ensure that no fraudulent activity takes place, the requirements for monitoring need to relate to the requirements of the Regulation.

Therefore, the checks need to relate to the verification of the design efficiency and of the fuel emission rate and, if needed for existing plants using the alternative budget of 350 kg CO_2 on average per year per installed kWe, the capacity and the electricity generation (needed to determine the equivalent full-load operating hours). Note that existing environmental legislation already regulates efficiency and operational hours with reporting of these parameters.

To ensure the best possible operation of the ex-post monitoring system, the contents of the monitoring report mentioned in Paragraph 4 should be further clarified.

- Modify item (a). The ex-post assessment should not focus on electricity production, but on the equivalent full-load operating hours of generation units achieved under the respective capacity mechanism.

To minimise the burden on operators and competent authorities, the monitoring report should not require a repetition of the full energy efficiency determination, but be focused on assessing the reliability of the key assumptions regarding the fuel values used as an input in the calculations:

- Modify item (b): *"Fuel mix and resulting fuel emission factor(s) related to net calorific value", for mixed-fuel generation units;"*
- Modify item (c): *"Fuel mix and resulting fuel emission factor(s) related to net calorific value",* for waste-to-energy generation units;"

Verification

ACER suggests that ex-post monitoring at the end of the delivery period of the CM should be verified by EU ETS verifiers.

Data from the EU ETS verification process would not be directly suitable for this purpose as not all generation units who hold capacity market contracts are within the scope of EU ETS, the data reflects operational performance as opposed to a measure against design efficiency, The cap is applied at the unit level and EU ETS data is more commonly derived at a site level. Therefore, there would be the need to invest in additional monitoring equipment at significant cost. Furthermore, the capacity market year may not be the same as the EU ETS year, which follows the calendar year. For example, the GB CM delivery year operates from October to September.

Any additional verification process would introduce a significant additional regulatory burden and instead compliance could be self-declared by a CM participant against its generation cap, which could be subject to audit by the competent authority. Particularly if there are incentives to ensure compliance in the design of a Member State's CM, such as financial penalties or termination events.

Verification processes also need to take account of CM participants ability to trade relevant obligations; these rights themselves are also enshrined in the Regulation (clause 22(3)(c)). Trading may result in an obligation being acquired/held for very short periods within a year.

Any further comment on the draft opinion

Include further definitions in line with ETS monitoring and reporting

Include definitions for „NCV", „mixed fuels" and „fossil carbon" in line with Commission Implementing Regulation (EU) 2018/2066.

List of Definitions (Section 4)

The definition of "Competent Authority" could be improved and read as follows "*the Authority entrusted by the rules of the local capacity mechanism of verifying compliance of the generation capacity with the provisions of Article 22(4) of Regulation (EU) 2019/943*."

Annex II (emission factor for commercial fuels)

ACER suggests standard emission factors for a limited number of commercial fuels. Eurelectric suggests to include as required further IPCC standard emission factors for commonly used fuels such as LPG, refinery gas, coke oven gas, petroleum coke etc.

Transferred CO_2

The text refers only to art. 49 §1 (a), i.e. CCS, and not (b) precipitated $CaCO_3$ production. There is in principle no difference between the two cases, therefore there is no reason to not refer to case (b). For case (b) the calculation methodology is recommended (not Continuous Emission Monitoring Systems).

Eurelectric pursues in all its activities the application of the following sustainable development values:

Economic Development

- Growth, added-value, efficiency

Environmental Leadership

- Commitment, innovation, pro-activeness

Social Responsibility

- Transparency, ethics, accountability

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