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SEM Committee
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Queens House
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Submitted by email to: kenny.dane@uregni.gov.uk
Submitted on: 20th March 2020

Re: Fingleton White's Response to the consultation on the Capacity Remuneration Mechanism 2024/25 T-4 Capacity Auction Parameters and Compliance with the Clean Energy Package

Fingleton White welcomes the opportunity to comment on this public consultation.

Fingleton White provides multidiscipline engineering services for the energy industry throughout Ireland and the UK. It operates across multiple sectors including gas, bioenergy, hydro, solar, CHP, industrial heat and water.

Clean Energy Package

The calculation method of the grams of CO_2 of fossil fuel origin per kWh of electricity is critical to how the Clean Energy Package is implemented in the CRM.

Article 22(4) of Regulation (EU) 2019/943 states the following;

> *"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"*

This calculation is straightforward when comparing the net electrical efficiency of different conventional turbine and engine technologies as there is only one electrical efficiency. An understanding of Combined Heat Power (CHP) plant efficiency calculations is required to allow the electrical efficiency of a CHP to be compared to a conventional electrical generation plant.

A CHP plant located on an industrial site provides both heat and electricity. The two most common efficiency metrics used are;

1. CHP Efficiency $\frac{Heat\ Out + Electricity\ Out}{Gas\ In}$
2. CHP Electrical Efficiency $\frac{Electricity\ out}{Gas\ In}$

The CHP electrical efficiency only looks at the electricity generated but includes all the gas consumed. It ignores that useful heat was generated from the gas included in the calculation. The CHP electrical efficiency is useful as a comparison between different CHP plants and a CHP plant over time.

The calculation method that is used within the CHP industry for comparing the electrical efficiency of a CHP plant to conventional fossil fuel electrical generation, is the called the Effective Electrical Efficiency.

3. Effective Electrical Efficiency $\frac{Electricity\ out}{(Gas\ in - ((Heat\ Out) \div (efficiency\ of\ boiler))}$

This calculation method appreciates that if the CHP was not there then the heat would be provided by a gas fired boiler. This calculation removes the gas required to generate the heat to give a true reflection of the electrical efficiency of the CHP. This allows the CHP electrical efficiency to be compared to conventional electrical generating plant as only the additional gas required to generate the electricity is included.

The European Investment Bank (EIB) use this calculation method. They call it the "heat bonus" approach. The EIB Energy Lending Policy was published in November 2019 after a long consultation. Page 34 of the document is shown below and I have highlighted the relevant part;

High efficiency co/tri generation	Contribution to energy efficiency	To be considered by the Bank as an energy efficiency investment, the project will need to meet both criteria listed below. Calculations will be made using the methodology for high-efficient cogeneration as provided by the EED and its related Decisions 2011/877/EU and 2008/952/EC: a. At least 50% of generated electricity comes from high-efficiency cogeneration, i.e. at least 50% of generated electricity is cogenerated and Primary Energy Savings (PES) for this cogenerated electricity and useful heat reach at least 10% (principal criterion); b. At least 5% net PES is achieved on an annual basis for the entire generated electricity and useful heat (additional safeguarding criterion). Recovery of industrial waste gas or heat is considered to be energy efficient and therefore not subject to the minimum efficiency requirements of the Directive. In the case of gas-fired co/tri-generation, the project is eligible for Bank support if it results in emissions in the production of power of less than 250 g CO_2 per kWh_e. GHG emissions are allocated between heat and power using the heat bonus approach.

The EIB understands that the simple Electrical Efficiency calculation does not allow a fair comparison between CHP and conventional plant and they use the Heat Bonus approach.

The legislation and the ACER opinion both state that the calculation of grams of CO_2 should be based on just kWh 'of electricity'. That is exactly what the Effective Electrical Efficiency/Heat Bonus approach does. It completely removes the heat from the calculation along with the gas associated with that heat.

The Effective Electrical Efficiency/Heat Bonus method is a logical way to compare the CO2 emission per kWh of electricity from a CHP to conventional electrical generating plant. CHP is the most efficient method to produce both heat and electricity. Using the heat bonus method will ensure that CHP continues to be part of the generation portfolio in keeping with Energy Efficiency Directive and the countries energy and climate targets.

Fingleton White are available to discuss our views in more detail in person or at future workshops.

Regards,

Ronan Nevin