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Date 30/11/2022

By email to mjoseph@cru.ie and donna.maye@uregni.gov.uk

RE: **Best New Entrant Cost of New Entry (BNE-Net CONE) Consultation Paper (SEM -22-076)**

Dear Merin and Donna

The Electricity Association of Ireland (EAI) welcomes the opportunity to respond to the SEMC Consultation on BNE-NET CONE. For the purposes of responding to this consultation EAI has engaged the services of Frontier Economics and their review is now enclosed alongside this letter. EAI represents most of the capacity, both existing and new, that will bid into the forthcoming T-4 auction next March. There is a great deal of uncertainty surrounding the optimum power generation mix of the future needless to say that all technologies will need to have zero or negative emissions. In the meantime, we need to retain the existing fleet of generation and attract new investment to ensure Security of Supply. The Capacity Market is crucial in this regard.

Our members are recommending the following actions from this consultation:

1. SEMC's calculation of Net CONE needs to be updated to include realistic assumptions that would be used by a rational, private investor in new technology for the upcoming auction. Any reduction to the current BNE for the T-4 auction would be wholly inappropriate (especially where the T-4 auction is already in progress and investment decisions have been made in time for qualification which was October 2022)

2. An interim review (see our enduring ask in point 3) of the level of price caps and multipliers for this upcoming auction (they are both too low).

3. A separate, holistic, and future looking review of BNE and BNE alternatives considering for example one or multiple reference units that will facilitate the procurement of

capacity that can meet the future period challenges of supporting wind penetration and meeting emissions and carbon targets to 2030 and beyond. We do not believe that the current BNE methodology is fit for purpose and only accept the current methodology (notably requiring enhanced multipliers) for next March's T-4 given the short timeline to that auction.

This consultation concerning the calculation of BNE-Net CONE to signal reference technology and to determine auction price caps (APC and ECPC) is of critical importance to our members, as are the multipliers used to express the Net CONE relative to New and Existing Capacity. It should be highlighted that the BNE-NET CONE calculated within the Consultation is significantly understated due to very significant under-estimates particularly in capital costs and an over-estimate in Energy Inframarginal Rent and DS3 revenues. The attached report prepared by Frontier Economics on behalf of our members, outlines in greater detail the underestimates under these and other parameters of the BNE analysis presented by the SEMC.

Frontier have concluded that there are a number of significant issues with the current approach to the BNE-Net CONE not least that the proposals risk exacerbating existing security of supply problems and that the current level of uncertainty, whilst acknowledged, has not been sufficiently factored into the approach. They also conclude that insufficient time has been provided to allow for stakeholders to adequately respond and they further identify a number of issues with individual estimates and assumptions. Review of these issues EAI consider will change the picture of the overall best entrant.

In our members' view, the approach for the calculation of Net CONE does not reflect realistic assumptions that would be used by a rational, private investor in new technology. For instance, the Net Cone assessment does not:

- Adequately model costs, revenues, and inflation for every year of the proposed asset types, despite the significant degree of uncertainty from mid-2026 (including capacity shortfall and significant wind penetration)

- acknowledge or model the changing investor and financing landscape including change in appetite away from fossil fuels and

- Does not consider regulatory obligations around the transition to a low-carbon system, carbon budgets, renewables targets.

In summary, BNE should be recalculated using realistic assumptions as per the Frontier report (and as required by EU legislation). The proposed reduction in the BNE at this time, is during the process of the T-4 2026/27 auction which has already commenced with qualification and exception milestones having passed, is wholly inappropriate. As demonstrated by Frontier

Economics, there are several parameters that have been underestimated in the identifying of the specific technology as being the best entrant. The process for this auction is already in train and our members have been clear previously about the detrimental impact to market and investor confidence that mid-process reduction would cause. Investment and project decisions for entering this auction have already been made in time for qualification, therefore, a reduction would have a significant effect on our members with both existing and new projects intended for this auction. It is important to note that the proposed reduction risks units not qualifying and for existing units locks them into a lower price that cannot be mitigated since the option for USPC has now timed out (qualification was in October 2022).

The proposed BNE is not fit for purpose or appropriate for the low carbon, net zero future targeted for 2030. The BNE being set will impact procurement of capacity from 2026 out to 2029 with 10-year contracts well into the 2030's, overlapping directly with regulatory, national, and supranational obligations and targets. The BNE proposed is suggesting a continuation of fossil fuel only conventional generation with such aggressive price caps that there is no signal either for redevelopment or conversion to low carbon alternatives, or for a new pathway to zero carbon capacity to be delivered, such as new hydrogen-ready CCGTs and peakers. Our members are significantly concerned with this near-term view of the function of the BNE, when it is setting the tone for such a long and significant period in the future.

We note that in acknowledgement of uncertainty, the SEMC has stated in the consultation that there could be a re-evaluation of the relationship between Net CONE and the Auction Price Cap (APC). This is interpreted as relating to the level of multiplier for the APC being increased. As per the EY review, it has been made clear that higher price caps have failed to encourage new entry. A significant drop in Net CONE with an insufficiently higher multiplier does not achieve a significantly increased price cap to manage the investor risk being created by this proposed change, and especially in the absence of the future looking signals that investors would be expecting at this time.

More significantly, an asymmetric adjustment to APC with a continued low Existing Capacity Price Cap (ECPC) would demonstrate how little existing generation is valued at a time when capacity contracts are necessary to retain units that are keeping the lights on and at a time where government policy is to retain existing capacity until new capacity can arrive. Yet, the revenue value of this capacity is continually eroded through CRM and other revenue stream assumptions. If there was an intention to increase the APC, this cannot be actioned without a corresponding upward adjustment to the ECPC. With any considered increase in the multipliers, it is worth noting that the APC would need to go far higher than the SEMC have ever really considered to make it meaningful given the future market climate and historic validation (in the EY report) that current (higher) cap values did not lead to new capacity delivery. A higher APC would need to be followed by a similarly meaningful increase in ECPC as

there is a benefit for consumers too in maximising the efficiency of existing capacity and enabling existing capacity to invest to continue being reliable and/ or to convert to being low carbon (e.g., hydrogen). Therefore, as demonstrated, a review of multipliers is needed in addition to, not instead of, a calculation of Net CONE with realistic assumptions. The proposed interim step by the SEMC of an adjustment on a multiplier (which we consider must be for both multipliers) is not a substitute for the other ask of industry, a holistic review of the BNE during the course of 2023 to set a BNE that will procure the future energy mix needed to support wind penetration and carbon budgets expected for 2030.

Once the T-4 auction has concluded, EAI would welcome engagement with the SEMC on the issues that have been thrown up by this consultation. We have doubts that this current approach of ex-ante price regulation that focuses solely on the cheapest cost outcome will deliver a net zero power system in the limited time remaining. Instead, the RAs should consider and evaluate, with industry, other mechanisms adopted in other jurisdictions, including for example considering ex-post regulation like the precedent in our neighbouring GB market.

We are available to discuss this response at a convenient moment and please do not hesitate to contact me if you need further information regarding this response.

Yours sincerely,

Stephen Douglas

Senior Energy Policy Advisor

Electricity Association of Ireland (EAI)

RESPONSE TO SEM COMMITTEE'S CONSULTATION ON BNE-NET CONE

Prepared for the Electricity Association of Ireland

30 NOVEMBER 2022

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CONTENTS

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1 Executive Summary

In October 2022, the SEM Committee published a consultation document on the Best New Entrant (BNE) / Net Cost of a New Entrant (Net CONE) (the consultation document) supported by a study carried out by CEPA (SEM -22-076 and 22-076a) (CEPA's study). The results are intended to inform decisions on the auction parameters to be defined for the T-4 capacity auction for the year 2026/27 to be conducted in March 2023.

The consultation document proposes significantly reducing Net CONE compared to previous estimates. Specifically, €58.31/kW/year in 2026/27 prices compared to €92.30/kW/year for 2022/23.

The EAI has asked Frontier Economics review of the SEM Committee's proposal.

1.1 The proposed Net CONE risks exacerbating security of supply problems

Calculating Net CONE and applying it to the CRM needs to meet the purpose of providing a safeguard against market power while still attracting sufficient capacity into the market to meet security of supply needs. Ireland currently faces a security of supply crisis. EirGrid/SONI is predicting deficits and CRU has acknowledged the need for 2GW of new generation. The CRM has, to date, failed to deliver adequate new investment. Consequently, the CRU has already had to put in place emergency measures to ensure that security of supply requirements are met in the coming winters.

The current Net CONE proposal risks materially underestimating the cost of a Best New Entrant, resulting in auction caps that are too low. The result will be to substantially weaken investment signals for new and existing plant and exacerbate the existing security of supply crisis.

1.2 The approach taken is inconsistent with best practice

The consultation documents states that the approach taken has regard to the ACER methodology for calculating Net CONE.[1] However, our review shows that the approach is materially inconsistent with ACER's methodology.

ACER's methodology details the steps required to calculate Net CONE. In doing so, the ACER methodology makes several references to calculating their steps with reference to the choices or requirements of "rational private investors". It states that in calculating the steps the required "tasks shall be performed based on transparent, reliable, objective and verifiable sources and criteria".

In our view the approach taken departs materially in several dimensions.

[1] ACER Decision No. 23/2020

- **The approach does not "account for expected developments that may affect the economic and technical parameters":**[2] In particular, as described below, the IMR estimate is done for one year and then extrapolated over the lifetime of the asset, rather than estimated for each year to account for changing market dynamics.
- **The approach does not account for differences in risk**:[3] The ACER methodology states that, where possible, different WACCs should be calculated for each reference technology to account for differences in risks. However, the CEPA/Ramboll study applies the same WACC to each technology.
- **The approach is not fully transparent, and the calculations are not possible to verify**:[4] For example, the ACER approach requires publishing data that was used to calculate Net CONE such as fuel prices and carbon prices. These have not been published as part of the study.

For these reasons, and the material underestimation of certain parameters, as explained below, we consider that the approach taken in the CEPA/Ramboll study deviates significantly from the requirements of a rational private investor.

1.3 Net Cone has been materially underestimated

Several parameters that feed into the Net CONE estimate have been materially underestimated.

1.3.1 The IMR methodology is inappropriate, and the assumptions used are unrealistic

The **approach taken to the IMR estimate is of particular concern**. IMR has not been estimated over the lifetime of the asset. Rather, IMR has been estimated (from our understanding) based on a 2025/26 model run. These results have then been extrapolated over the 20-year life of the asset. This is inconsistent with changing market dynamics, in particular, increasing RES penetration, changing load factors, changing merit order position and fluctuations in fuel and carbon prices. Accounting for these issues would result in an IMR, and a Net CONE, that is significantly higher than that proposed.

CEPA appears to have acknowledged that this simplified IMR approach may not be the preferred approach. In response to a question of why it was not possible to commission specific model runs for IMR revenues, CEPA stated:

> *This analysis was constrained by the time and resources available prior to the consultation. We understand that the RAs are considering undertaking more and specific PLEXOS runs for the purpose of the final version of the report.*

The approach taken also **fails to consider the move towards a decarbonised energy system in the coming decades**. That is, the approach assumes that a new gas plant can be built in 2026 or 2027, and continue to operate on natural gas for the next 20 years without needing to adapt to zero-

2 ACER Decision No. 23/2020, Article 9.5

3 ACER Decision No. 23/2020, Article 14.3.

4 ACER Decision No. 23/2020, Article 17.

emissions gas in the future. Such an approach risks precluding future-proofed projects from competing in the capacity market, which may undermine national climate targets.

We recommend that the modelling approach should be updated before Net CONE is finalised.

1.3.2 The capital costs of a Best New Entrant have been materially underestimated

We have not been able to fully assess all aspects of the costs estimates given the lack of time available to respond to the consultation. However, we have identified five areas where the CEPA/Ramboll study has underestimated capital costs.

- **Engineering, procurement and construction (EPC) costs**: These costs were inflated to June 2022 – due to that being the latest data available – but now should be updated to end of September (the end of the capacity year). Using the same data source as the CEPA/Ramboll study, updating the analysis to September 2022 results in an additional uplift above CEPA's estimate of 11%[5]. This translates into an increased EPC cost estimate of approximately €36m for CCGT plants and €9m for OCGT plants in both Ireland and Northern Ireland.
- **Other capital costs linked to EPC**: These costs are linked to EPC through assumed percentages of costs. Applying the mechanistic update for inflation outlined above results in a 11% increase in these costs for CCGTs and OCGTs.
- **Connections costs**: Discussion with industry suggest that the connection costs estimates provided in the CEPA/Ramboll study significantly underestimate the connection costs faced by an entrant. In particular, experience suggests that each project needs a new substation which costs a multiple of what is assumed in the CEPA/Ramboll study.
- **Site procurement costs**: No justification is provided as to why using average agricultural land costs (uplifted by 100%) is a suitable estimate for the cost of industrial land needed for a gas plant. A more appropriate approach would be to gather direct market evidence on the cost of site procurement, through surveys of market participants. Failing this, a pragmatic alternative would be to use Poyry's previous estimate from 2018 adjusted for inflation.
- **Interest during construction**: The CEPA/Ramboll study includes interest during construction based on the estimated cost of debt and assuming a capital structure of 40% debt. This is incorrect. The correct approach – as outlined in the ACER methodology paper and as typically used by rational private investors – would be to estimate the cost of capital on the phased cash flows during construction using WACC instead of just cost of debt. To not do so, would be to imply that no equity is employed during the construction phase.

1.3.3 DS3 assumed revenues are inconsistent with SEMC's regulatory direction

The paper provides very limited detail about how CEPA/Ramboll arrived at the proposed DS3 revenue figures. However, there are a number of reasons to think that the CEPA/Ramboll approach to estimating DS3 revenues could result in an overestimate of the benefit of DS3 revenues. In particular:

[5] CEPA/Ramboll uplifted the original EPC estimate using inflation from February to June 2022 (8.4%), but the same source shows prices increased from February to September by 20.7%. This translates into an 11% increase over CEPA's estimate.

- the 20% tariff reduction assumption is inconsistent with SEM Committee policy direction and, as such, the expectations of a rational private investor; and
- the load factors assumed in the analysis are not reasonable over time given such load factors would expect to reduce over the lifetime of the asset.

1.3.4 The WACC does not reflect the current higher-rate macro-economic environment

Our assessment of CEPA/Ramboll's WACC estimate suggests that the cost of capital for a new entrant has likely been underestimated. This is based on:

- **Out of date information:** the risk-free rate and the cost of debt do not reflect current market evidence (due to CEPA/Ramboll's July data cut-off); and
- **Concerns around the beta estimate:** The asset beta is significantly lower than previous estimates, without clear justification. We consider that this may be driven by several issues with the beta methodology. In particular, the asset beta estimate is based on a sample of companies that is unlikely to be reflective of the risks faced by a new entrant. Moreover, the asset beta estimate does not reflect the different risks in business models by technology. Finally, we note that the asset beta is inconsistent with regulatory precedent from elsewhere.

The risk in underestimating WACC in this scenario is that such an underestimate would result in an net CONE that would be insufficient to cover an investors' costs.

1.3.5 The approach to inflation is inconsistent

CEPA/Ramboll provides an initial Gross CONE estimate based on 2022-23 values, and use a forecast inflation assumption of 2% per annum (i.e., 8% in total) to inflate its results to 2026-27, the year in which the T-4 auction will take place. We have identified three issues with this proposed approach.

1. The 2% per annum inflation assumption does not reflect current inflation expectations in Ireland. The latest inflation forecast for Ireland suggest that inflation will be above these long-term expectations for the next two years.
2. It is incorrect to simply add a 2% inflation rate for each year between 2022-23 to 2026-27. It would be more appropriate to estimate a compounded inflation rate adjustment over the time period.
3. Inflation rate data should be converted from calendar years to capacity market years (which run from October to September).

Updating the inflation adjustment for these three points would results in an inflation adjustment to 2026/27 of 14.9% compared to CEPA's 8%.

The CEPA/Ramboll study also inflates both IMR and DS3 revenues by inflation over time. We have several concerns with this approach:

- First, IMR is highly likely to decrease over time as the load factor decreases due to increased RES and lower position in the merit order; and
- Second, DS3 tariffs may decrease over time, as signalled by the EirGrid/SONI consultation.

If the modelling approach is updated to assess expected revenues in each year, indexing revenues would not be an issue.

1.4 Recommendations

Our review finds that:

- the proposed Net CONE risks exacerbating security of supply problems;
- the approach taken is inconsistent with best practice and inconsistent with how a rational investor would consider such an investment; and
- several parameters within the Net CONE estimate have been materially underestimated.

Given the issues identified, we consider that it would be appropriate for the Net CONE analysis to be updated and undertaken more fully in line with best practice. The updated analysis should be consulted on in full with industry stakeholders.

However, we also consider that the SEM Committee should consider how Net CONE is applied within the capacity market auction and whether continuance of the current BNE methodology is appropriate. It is not clear that the current application – if continued – will deliver either the required capacity by 2030 or an efficient mix and type of plant over the coming decades required for Ireland to move towards net zero emissions. This is in the context of:

- increased uncertainty in parameter estimation (particularly IMR);
- the need for efficient existing units to have signals to implement retrofits and refurbishments;
- failure to previously secure sufficient capacity in all locations; and
- the need to secure significant amounts of new capacity to 2030.

We have identified five potential ways in which the SEM Committee could consider changing the relationship between Net CONE and the auction price caps, which are:

- change the multiplier for the Auction Price Cap;
- change the multiplier in the Existing Price Cap;
- allow default Unit Specific Price Caps for existing capacity;
- introduce Unit Specific Price Caps for new capacity; and
- use Net CONE (and its multiples) as a guide rather than a fixed cap.

In our view, making changes to the approach used would strike a better balance between ensuring that critical capacity is built, whilst at the same time continuing to safeguard against the potential exercise of market power.

2 Introduction

In October 2022, the SEM Committee published a consultation document on the Best New Entrant (BNE)/ Net Cost of a New Entrant (Net CONE) supported by a study carried out by CEPA/Ramboll (SEM-22-076 and 22-076a). The results are intended to inform decisions on the auction parameters to be defined for the T-4 capacity auction for the year 2026-27 to be conducted in March 2023.

The consultation document proposes significantly reducing Net CONE compared to previous estimates. Specifically, €58.31/kW/year in 2026-27 prices compared to €92.30/kW/year for 2022-23.

The EAI has asked Frontier Economics to review the SEM Committee's proposal. Our review is presented under the following headings.

- Section 3 outlines the policy context relating to BNE Net CONE.
- Sections 4-9 assess the elements of the CEPA/Ramboll Net Cone estimate, including:
  - capital cost of chosen technology;
  - energy infra-marginal rents;
  - DS3 revenues;
  - financial parameters; and
  - calculation of BNE Net CONE.
- Section 10 considers alternative applications of Net CONE to the CRM auction.
- Section 11 concludes.

3 Policy context and objectives

This section sets out the policy context within which the Net CONE estimate is used, and the broader objectives that are being pursued.

In particular, in this section we set out that:

- Net CONE plays a critical role in providing appropriate signals for new and existing generation;
- Ireland is facing a security of supply crisis, whereby it is essential that investment in new generation takes place as soon as is feasible; and
- Material reductions in Net CONE significantly weaken investment signals.

3.1 The role of Net CONE

The SEM Committee's Capacity Remuneration Mechanism (CRM) is designed to compensate generators for "missing money". That is, generators' expected market returns may be insufficient to cover their costs. If this were the case, this would risk both current generators exiting the market and insufficient new entry, which would in turn lead to concerns about the adequacy of capacity in the market to meet security of supply requirements.

The CRM procures capacity through a competitive auction that focuses on delivering the lowest cost capacity. The CRM auction includes price caps to protect against the potential for generators to earn excess returns if there is a lack of competition in any particular auction. These price caps are currently set at:

- 150% of Net CONE for new capacity; and
- 50% of Net CONE for existing capacity.[6]

Therefore, the purpose of Net CONE can be as a safeguard against market power.

However, **it is crucial that Net CONE provides sufficient headroom to allow for efficient existing and new technologies to be able to bid into the auction**. This is because setting Net CONE too low will result in:

- existing capacity being unable to recoup its forward-looking costs, which may mean that existing capacity would exit the market earlier than otherwise; and
- new capacity not entering the market as investors would not be confident of earning sufficient revenue to cover their total cost of investment.

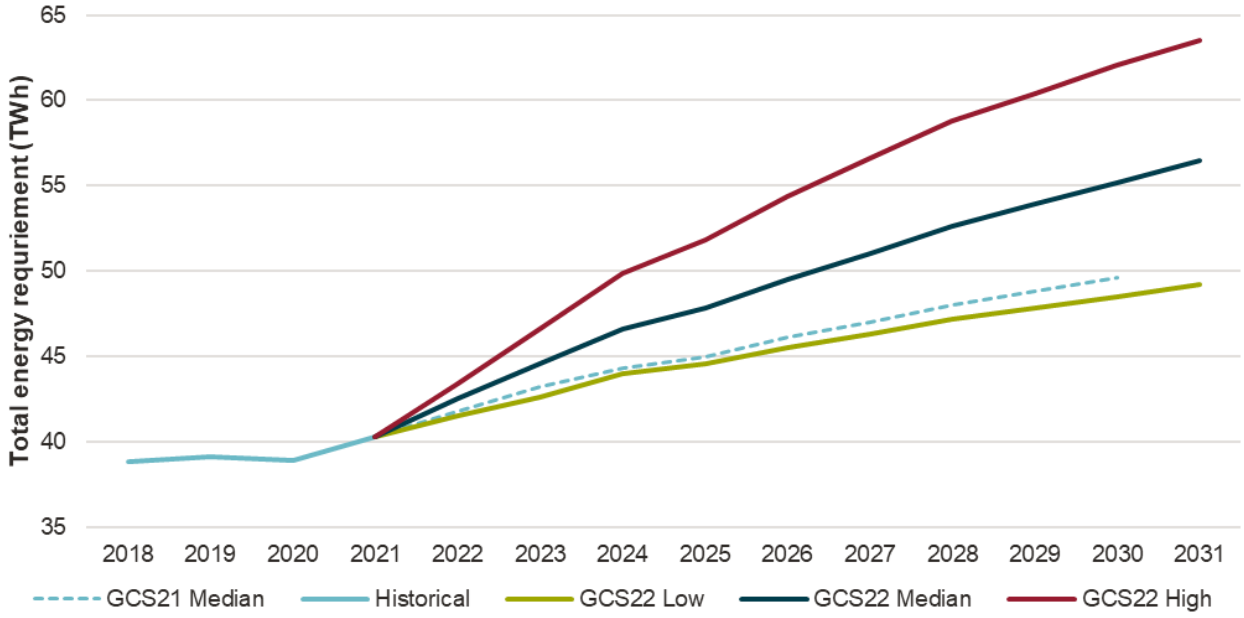
6 Net CONE is also used in calculating the shape of the demand curve in the capacity auction.

3.2 Ireland faces a Security of Supply crisis

EirGrid and SONI recently published its 2022 Generation Capacity Statement which "*predicts a challenging outlook for Ireland, with capacity deficits identified during the 10 years to 2031*". The capacity deficits are driven by growing demand and significant forecast retirement of existing generation.

In Eirgrid/SONI's median demand forecast scenario, energy demand is forecast to increase 40% by 2031, from 2021 levels (see chart below). This is driven by electrification of heat and transport, in line with decarbonisation objectives, data centre demand and increased economic activity. In a high demand scenario, demand may grow by as much as 58% over the period.

Figure 1 Combined demand forecast for the All-Island system



Source: EirGrid/SONI Generation Capacity Statement 2022

EirGrid/SONI also anticipates a substantial retirement of existing capacity in the short term, including that:

- almost 1,160 MW of capacity will retire in 2023[7]; and
- 820 MW of capacity is expected to retired in 2024[8].

Additionally, since last year, 365 MW of previously awarded capacity have terminated their capacity market contracts. This is in addition to the previous 266 MW which also terminated. According to EirGrid/SONI, "*this means that most new predictable capacity that was expected to come online over the coming years has now withdrawn*".

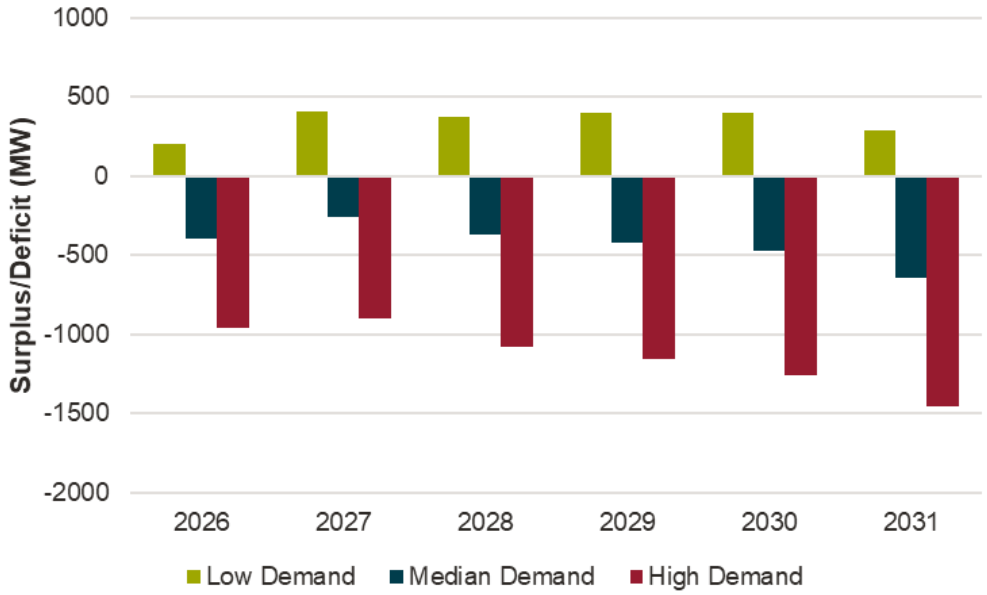
7 This consists of 476 MW capacity in NI (Kilroot) and 682 MW capacity in ROI (592 MW at Tarbert and 90 MW at Aghada)

8 This consists of 820 MW capacity in ROI (Moneypoint)

The combination of growing demand and retiring generators is expected to lead to adequacy deficits over the period 2022-2031. In particular, EirGrid/SONI's median forecast shows expected material deficits in every year from 2026 (see below). Given these concerns the CRU has identified the need to deliver **over 2 GW** of enduring flexible gas-fired generation capacity by 2030 through the CRM.

The modelled need for an additional 2 GW of gas-fired generation is based on the assumption that the vast majority of existing gas-fired plant will remain on the system to after 2030.[9] This shows the combined need of both existing and new gas-fired capacity in order to meet Ireland's security of supply standards and facilitate RES penetration.

Figure 2 Adequacy results for the All-Island system



Source: EirGrid/SONI Generation Capacity Statement
Note: This adequacy study assumes that the second North-South Interconnector will be fully operational by 2026

3.3 Materially reducing Net CONE will significantly reduce investment incentives

If the CRM auction includes a price cap that is too low, needed investment will not take place and Ireland will be faced with a security of supply crisis, that will require either further expensive emergency measures ,[10] or will lead to blackouts.

Evidence from past auctions shows that:

- even with significantly higher price caps, the CRM has failed to deliver require investment in new capacity; and

9 More than 90% of existing gas-fired capacity is assumed to remain on the system according to Eirgird's 2022-31 Capacity Outlook.

10 https://www.cru.ie/wp-content/uploads/2021/08/CRU21085-EirGrid-letter-to-CRU-re-winter-emergency-measures.pdf

- the proposed new price cap is significantly below the price that new entry has previously required to invest.

EY's review of the performance of the CRM analysed whether sufficient capacity has been delivered to date by the CRM.[11] EY's analysis showed that 37.5% of previous CRM auctions were undersubscribed in at least one constraint area. Moreover, EY noted the most recent two auctions (T-3 24/25 and T-4 25/26) saw offered capacity in Ireland and Greater Dublin LCCAs significantly less than required. This analysis shows that, even at the existing Net CONE, the CRM is already failing to attract sufficient capacity in all auctions and locations.

We have analysed the results of previous auctions to determine whether the previous auction clearing prices were above or below the implied price caps according to the proposed net CONE.[12]

We then compare those prices to the price caps for new and existing capacity implied by the proposed Net CONE.[13] The results of our analysis are set out below.

This analysis shows two things.

- The Existing Price Cap implied by the proposed Net CONE would be below the clearing price for existing capacity in the last nine auctions that existing capacity cleared in.
- The Auction Price Cap implied by the proposed Net Cone would be below the clearing price for new capacity in four of the last five auctions that new capacity cleared in.

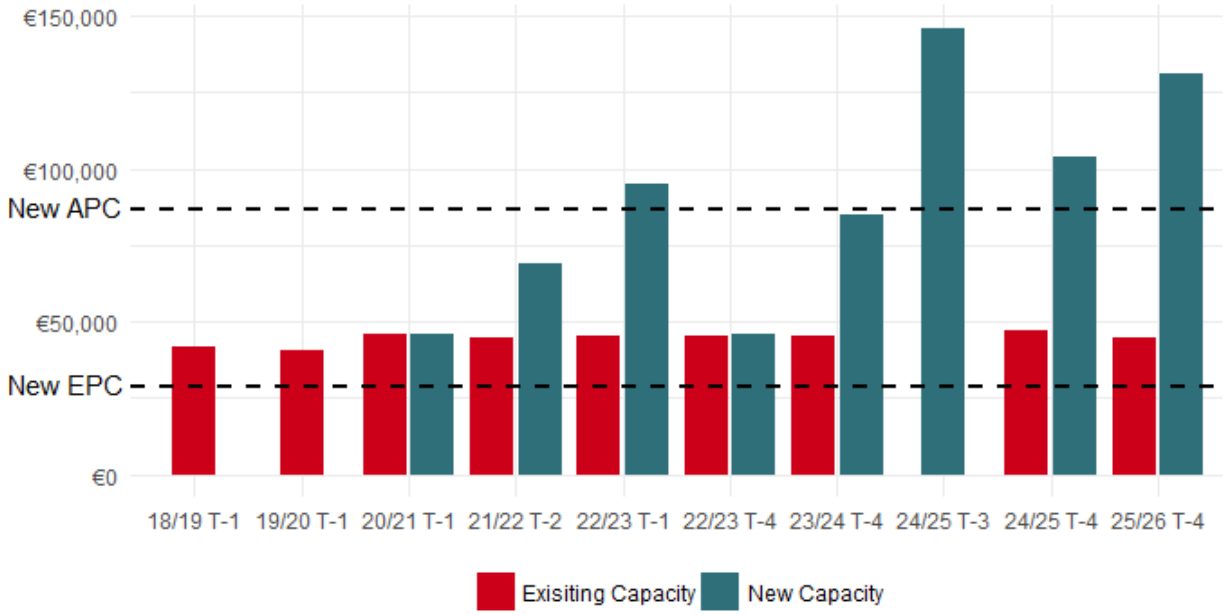
This further emphasises the risks to existing and new capacity that would arise from the proposed Net CONE.

11 EY, 2022, Performance of the SEM Capacity Remuneration Mechanism

12 To do this, we first need to breakdown the previous clearing prices by existing and new capacity, as both are subject to different price caps. Unfortunately, SEMO does not publish auction results at this level of granularity. However, we can estimate this by calculating the volume of existing and new capacity cleared in each auction, which we can do by considering the contract length for each successfully awarded unit.

13 Assuming that the auction continues to set the Existing Price Cap at 0.5 * Net CONE and the Auction Price Cap (for new capacity) at 1.5 * Net CONE.

Figure 3 CRM auction results



Source: *SEMO Data*
Note: *Capacity weighted clear prices. 'New' and 'Existing' proxied by contract duration.*

Investors in new capacity will also need to be cognisant of Ireland's transition to a net zero energy system by 2050. While there is still policy and technical uncertainty as to how this will be achieved, it is possible that it will involve gas plant being converted to be fuelled by zero-emission gas. For example, Ireland's consultation on developing a Hydrogen Strategy stated that the "use of hydrogen could decarbonise the conventional generation required at times when variable renewable electricity is less plentiful, as well as enhancing energy security by diversifying supply".[14] As such, rational private investors will need to take account of this policy landscape when making investment decisions. That consideration will likely include either a expectation of future capex to convert their plant to the use of alternative fuels or an expectations that their plant may not earn a return over the entire lifetime of the asset.

3.4 Summary

Ireland faces a security of supply crisis. EirGrid/SONI is predicting deficits and CRU has acknowledged the need for 2GW of new generation. The CRM has, to date, failed to deliver adequate new investment. Materially reducing net CONE and hence the CRM price caps, risks materially reducing investment incentives and materially increasing the risks to security of supply.

14 https://www.gov.ie/en/consultation/5c087-consultation-on-developing-a-hydrogen-strategy-for-ireland/

4 Costs

The costs of the reference technology and candidate plant types are, of course, a key element in the estimate of Net CONE. We review the costs of the four technologies considered by CEPA/Ramboll below, in particular:

- engineering, procurement and construction (EPC) costs;
- other capital costs linked to EPC;
- site procurement costs; and
- interest during construction.[15]

In each case, we first briefly describe the CEPA/Ramboll approach and then present our assessment. At the end of the section we outline our overall conclusions relating to the CEPA/Ramboll approach to costs.

4.1 EPC costs

4.1.1 CEPA/Ramboll approach

EPC costs account for 75-80% of the overall capital costs assessed by CEPA/Ramboll.

The CEPA/Ramboll study outlines that EPC costs are estimated using the PEACE estimation programme of the GT-PRO16 model, which develops reference costs based on the GT model and plant design. The EPC price used is based on what CEPA/Ramboll describe as a 'full turnkey EPC price', which includes all equipment, delivery, erection, commissioning, testing, cabling and switchgear, and where required, gas receiving and conditioning equipment.

The reference date for the prices used by CEPA/Ramboll is February 2022. However CEPA/Ramboll recognise that costs have changed significantly over 2022 due to large volatility in world markets. For this reason, it uplifts prices by 8.4%, based on a comparison of the producer prices index for the Euro Area between February and June 2022 (which it states was the latest available data at the time of reporting).

We understand that the cost do not include a provision for additional capital expenditure that may be required to convert the plant to zero-emission gas in the future.

15 We also note that CEPA/Ramboll estimate for connection costs appears low as it does not take costs related to a new substation into account. Feedback from EAI members suggests that a substation is generally required for such projects that would at least double the CEPA/Ramboll assumed connection cost.

16 CEPA/Ramboll outline that GT PRO is a top-down design program used to fix the design of the gas turbine-based power plant using a set of key parameters (e.g. fuel, HV connection arrangement and voltage)

4.1.2 Assessment of CEPA/Ramboll EPC costs

The CEPA/Ramboll study does not provide extensive detail of the EPC costs, apart from its source and the characteristics of the plant, and it is therefore hard for us to comment in detail. Our assessment below therefore focuses on appropriate inflation adjustments and comparisons to other published capital costs for new plants.

Adjusting previous cost estimates for outturn inflation

We agree with the CEPA/Ramboll study that the price data used in the EPC analysis (with reference date February 2022) needs to be updated to take account of price changes during 2022. The CEPA/Ramboll study updated costs to end of June – as that was the most up-to-date data available a the time. Now that data is available until the end of September 2022 (the end of the capacity year), we consider that this the calculation should be updated to reflect this.[17]

Using the same data source as the CEPA/Ramboll study, updating the analysis to September 2022 results in an additional uplift above CEPA's estimate of 11%[18]. This translates into an increased EPC cost estimate of approximately €36m for CCGT plants and €9m for OCGT plants in both Ireland and Northern Ireland.

The impact of this analysis on the EPC contract costs is outlined in Table 1 (for Ireland) and Table 2 (for Northern Ireland) below.

Table 1 Ireland: EPC Contract costs (€m)

Technology type	EPC cost comparison (€ million)	
	CEPA/Ramboll results (Inflation to June 2022)	**Updated results (Inflation to September 2022)**
CCGT *(Difference between CEPA/Ramboll results and updates)*	315.9	351.6 *(+36)*
OCGT *(Difference between CEPA/Ramboll results and updates)*	79.1	88 *(+9)*
Engines *(Difference between CEPA/Ramboll results and updates)*	173.1	192.7 *(+20)*
BESS *(Difference between CEPA/Ramboll results and updates)*	69	76.8 *(+8)*

Source: Frontier elaboration of CEPA/Ramboll report

17 Note that these costs are then inflated to 2026/27 as part of the final Net CONE calculation, discussed further below.

18 CEPA/Ramboll uplifted the original EPC estimate using inflation from February to June 2022 (8.4%), but the same source shows prices increased from February to September by 20.7%. This translates into an 11% increase over CEPA's estimate.

Table 2 Northern Ireland: EPC Contract costs (€m)

Technology type	EPC cost comparison (€ million)	
	CEPA/Ramboll results (Inflation to June 2022)	Updated results (Inflation to September 2022)
CCGT *(Difference between CEPA/Ramboll results and updates)*	313.6	349.1 *(+36)*
OCGT *(Difference between CEPA/Ramboll results and updates)*	77.8	86.6 *(+9)*
Engines *(Difference between CEPA/Ramboll results and updates)*	167.2	186.1 *(+19)*
BESS *(Difference between CEPA/Ramboll results and updates)*	66.6	74.1 *(+8)*

Source: Frontier elaboration of CEPA/Ramboll report

This simple mechanistic update to the CEPA/Ramboll approach illustrates the highly uncertain inflationary environment that currently exists. The addition of three months of recent data significantly increases the EPC costs that should be included in the BNE Net CONE estimation.

This is particularly important given construction costs have been running ahead of general inflation in recent years, and further upwards pressure on costs is expected in the coming years. This is also evident in the forecasts for the producer price index that are available from the same source used by CEPA/Ramboll. An additional 9% increase in the producer prices index is forecast through to the end of 2022 and further significant increases are forecast for 2023 (12%) and 2024 (4%)[19].

Comparison to other published costs

We have also compared the CEPA/Ramboll study's fixed capital cost estimates to electricity generation construction costs published by BEIS[20] in the UK. The most recent BEIS cost estimates were from 2020. BEIS published cost estimates for class H CCGT plants and for a number of different sizes of OCGT plants. We understand that the EPC cost estimates used in the CEPA/Ramboll study are based on class F CCGT plants and 200MW OCGT plants. While this means that a like-for-like comparison with BEIS estimates is not possible, we still consider it as a useful high level cross-check for CEPA/Ramboll estimates.

19 https://tradingeconomics.com/euro-area/producer-prices "Producer Prices in Euro Area is expected to be 188.06 points by the end of this quarter, according to Trading Economics global macro models and analysts expectations. In the long-term, the Euro Area Producer Prices is projected to trend around 210.63 points in 2023 and 219.06 points in 2024, according to our econometric models."

20 https://www.gov.uk/government/publications/beis-electricity-generation-costs-2020

We compare the CCGT and OCGT costs reported by BEIS (medium scenario estimate)[21] and the CEPA/Ramboll study results in Table 3 below. We would typically expect larger sized plants to have lower per kW costs compared to smaller plants. Therefore, all else being equal, we would expect CEPA/Ramboll's estimates to be higher than BEIS cost estimates.

However, CEPA/Ramboll costs estimates for both CCGT and OCGT plants appear to be lower than the BEIS estimates. This suggests that the CEPA/Ramboll study's cost estimates are likely materially underestimating the construction costs of CCGT and OCGT plants.

Using BEIS estimates would imply an EPC cost of €382m for 470MW CCGT plants and €108m for 100MW OCGT plants, a 21% and 36% increase respectively over the original estimate by CEPA/Ramboll.

Table 3 Comparison of CEPA/Ramboll and BEIS cost estimates

Plant type	BEIS construction costs €/kW (medium estimate)	CEPA/Ramboll EPC costs €/kW (using nameplate capacity)[22]
CCGT plant	813	672
OCGT plant	542	398

Source: *BEIS: "Electricity generation costs 2020". Frontier elaboration of CEPA/Ramboll report.*

Note: *Inflation was sourced from the Bank of England, up to June 2022. The exchange rate was sourced from Bloomberg (June 2022). The plants we refer to from the BEIS report are class H CCGT plants and 300MW OCGT plants.*

4.2 Other capital costs linked to EPC costs

4.2.1 CEPA/Ramboll's approach to other non-EPC costs

For a number of other non EPC costs, the CEPA/Ramboll study uses a percentage of EPC costs to derive those cost estimates. Those cost categories are:

- owner's contingency;
- financing fees;
- construction insurance; and
- other non-EPC costs.[23]

[21] We take as reference BEIS medium estimate of construction costs (BEIS also provides a low and a high estimate) and convert the costs from 2018 GBP to June 2022 Euros (to make it a like for like comparison with CEPA/Ramboll's estimate).

[22] The BEIS model does not include a de-rating factor, so we compare to CEPA/Ramboll estimates of costs per kW of nameplate/rated capacity.

[23] According to CEPA/Ramboll, these costs include *'environmental Impact Assessments , legal, owner's general and administration, owner's engineer, start-up utilities, commissioning, O&M mobilisation and spare parts*'.

4.2.2 Assessment of other non-EPC costs

As the above cost categories are linked to the EPC estimate, any change in EPC costs also needs to be reflected in these costs.

Applying the mechanistic update for inflation outlined in the section above results in an 11% increase in these costs for CCGTs and OCGTs. This amounts to an additional €6 million for CCGTs and an additional €1.5 million for OCGTs compared to the CEPA/Ramboll study estimate.

4.3 Site procurement costs

4.3.1 CEPA/Ramboll approach

The CEPA/Ramboll study uses agricultural land values as a proxy for estimating site procurement costs. Specifically, CEPA/Ramboll use 2021 agricultural land value data from the Irish Farmer's Journal.[24] CEPA/Ramboll then applies an uplift of 100% to these values, to reflect the fact that not all agricultural land is suitable for constructing generation plant. This is based on CEPA/Ramboll's expectation that industrial land is likely to be more expensive than agricultural land. CEPA/Ramboll's then multiply the estimated per acre land cost by the assumed required area for each generation technology.

4.3.2 Assessment of site procurement costs

Our comments on the estimated site procurement costs focus on the following:

- the updated estimate results in a significant decrease in site costs, which is unusual given high land price inflation since 2018;
- using agricultural land with an assumed price premium to estimate site costs has not been well justified;
- land costs are not differentiated by technology type; and
- we consider that 2021 land prices should be inflation adjusted to 2022.

The CEPA/Ramboll study's estimated land prices is significantly lower than the previous report by Poyry in 2018[25], as outlined in the table below. While the CEPA/Ramboll study notes the fact, it does not provide any explanation or justification for the difference. Such a large decrease in estimated land costs is particularly unusual during a period of high land price inflation.[26]

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24 https://www.rte.ie/news/business/2022/0316/1286705-land-values-up-by-a-third-in-2-years-farmers-journal/#:~:text=At%20%E2%82%AC11%2C966%20on%20average,33%25%2C%20the%20study%20concludes.

25 Poyry estimated a land price of €150,000 per acre in Ireland and €187,500 per acre in Northern Ireland.

26 For example, the Irish Farmers Journal estimated that between 2020 and 2021, agricultural land prices increased by 16% in ROI and 14% in NI.

We provide below an estimate of what site procurement costs would be if CEPA/Ramboll maintained the land costs used by Poyry in 2018, updated for inflation.

Table 4 Site cost comparison (Poyry – CEPA/Ramboll)

	Ireland (€m)			Northern Ireland (€m)		
	Poyry	CEPA/Ramboll	**Difference**	Poyry	CEPA/Ramboll	**Difference**
CCGT	2.35	0.49	**1.86**	2.93	0.55	**2.38**
OCGT	0.85	0.18	**0.67**	1.07	0.20	**0.87**
Engines	0.94	0.20	**0.74**	1.17	0.22	**0.95**
BESS	0.85	0.18	**0.67**	1.07	0.20	**0.87**

Source: Poyry 2018 report and CEPA/Ramboll 2022 report

It is unclear to us why the use of generic agricultural land values to estimate the cost of industrial land would result in an accurate estimate. Most of the type of land that is included in this dataset would not be suitable for the construction of an energy plant. Therefore applying a generic and arbitrary uplift to these land values has not been justified as a suitable approach to account for the potential difference in prices between agricultural and industrial land.

Additionally, CEPA/Ramboll doesn't provide any distinction in land costs between plant types (i.e. only the required area is different across plant types), and therefore assumes that the cost would be the same for each technology. We would expect higher costs for CCGT plants (compared to OCGT plants), given that they can be built on only a limited number of. It is unclear how this has been accounted for by CEPA/Ramboll.[27]

We consider a more appropriate approach would be to gather direct market evidence on the cost of site procurement, for example, through surveys of market participants. Failing this, a pragmatic alternative would be to use Poyry's previous estimate from 2018 and adjust it for inflation to reflect 2022 land prices.

4.4 Interest during construction

4.4.1 CEPA/Ramboll approach

The CEPA/Ramboll study includes interest during construction (IDC). This is evaluated at the estimated cost of debt (3.47% for Ireland and 4.61% for Northern Ireland) and assuming a capital structure of 40% debt.

[27] If the approach in the CEPA/Ramboll study was to be persisted with (which we do not think it should be), we consider that the 2021 data should be updated for inflation in 2022.

Although CEPA/Ramboll does not explain in detail how it has arrived at this estimate, it appears to be based on how much interest would be accrued on the debt element of financing during the construction period.

4.4.2 Assessment of CEPA/Ramboll approach

It appears as though the cost of capital during the construction only takes account of the cost of debt, and not the full cost of capital. That is, no allowance has been made for the opportunity cost of equity during the construction period.

The correct approach, and the approach typically used when assessing such investment decisions, would be to estimate the foregone cost of capital on the phased cash flows during construction using WACC instead of just cost of debt. To not do so, would be to imply that no equity is employed during the construction phase.

It is standard practice to apply the WACC to construction costs during the construction period. For example, ACER's methodology for calculating the cost of new entry and BEIS's Electricity Generation Cost report both apply WACC to the capital costs incurred during construction[28]. We consider that the interest during construction should be updated to include the full cost of capital and be applied to the full construction costs amount (by phase) rather than just the debt financed proportion.

To show the impact of this correction, we have estimated the cost of all capital during the construction period by assuming equal phasing of cash flows over a construction period of 3 years for CCGT and 2 years for other technologies. Cash flows are assumed to be at the mid-point each year. The table below provides our estimate. This results in a significant uplift compared to the CEPA/Ramboll study estimates as (1) it does not just apply to 40% of the costs, as assumed by CEPA and (2) the WACC is higher than the Cost of Debt.

Table 5 Interest during construction comparison

	Ireland (€m)			Northern Ireland (€m)		
	Overall cost	CEPA/Ramboll	**Difference**	Overall cost	CEPA/Ramboll	**Difference**
CCGT	46.1	7.3	**38.8**	59.4	6.6	**52.8**
OCGT	8.1	2.0	**6.1**	10.3	1.5	**8.8**
Engines	16.6	4.1	**12.5**	20.7	2.9	**17.8**
BESS	6.1	1.5	**4.6**	7.8	1.1	**6.7**

Source: CEPA/Ramboll report, Frontier estimates

[28] ACER, 2020, Methodology for calculating the value of lost load, the cost of new entry and the reliability standard. Available at: europa.eu

4.5 Conclusion

Overall, we find that the proposed capital costs are materially underestimated.

The below tables summarise the key mechanistic changes to the CEPA/Ramboll estimates that we consider should be made. However, we note that we have not been able to fully assess all aspects of the costs estimates given the lack of time available to respond to the consultation. Therefore, the below estimates should be seen as a lower bound estimate.

Table 6 Summary of updated capital cost estimates for Ireland (compared to CEPA/Ramboll)

Cost	CCGT	OCGT	Engines	BESS
EPC	351.6 (315.9)	88.0 (79.1)	192.7 (173.1)	69.7 (62.6)
EPC linked cost	59.4 (53.4)	14.9 (13.4)	32.6 (29.3)	10.4 (9.3)
Site costs	2.3 (0.5)	0.8 (0.2)	0.9 (0.2)	0.8 (0.2)
Interest during construction	46.1 (7.3)	8.1 (2.0)	16.6 (4.0)	6.1(1.5)
Other costs not assessed	(18.3)	(13.5)	(12.2)	(7.4)
Total fixed costs	**477.7 (395.3)**	**125.3 (108.1)**	**255.0 (218.8)**	**94.4 (81.0)**

Source: CEPA/Ramboll report and Frontier Economics analysis
Note: CEPA/Ramboll results provided in brackets

Table 7 Summary of updated capital cost estimates for Northern Ireland (compared to CEPA/Ramboll)

Cost	CCGT	OCGT	Engines	BESS
EPC	349.1 (313.6)	86.6 (77.8)	186.1 (167.2)	68.6 (61.6)
EPC linked cost	59.0 (53.0)	14.6 (13.1)	31.4 (28.2)	10.2 (9.2)
Site costs	2.9 (0.6)	1.1 (0.2)	1.2 (0.2)	1.1 (0.2)
Interest during construction	59.4 (6.5)	10.3 (1.5)	20.7 (2.9)	7.8 (1.1)
Other costs not assessed	(18.3)	(13.5)	(12.2)	(7.5)
Total fixed costs	**486.4 (392.0)**	**125.2 (106.1)**	**251.6 (210.7)**	**95.2 (79.6)**

Source: CEPA/Ramboll report and Frontier Economics analysis
Note: CEPA/Ramboll results provided in brackets

5 Calculation of IMR

To calculate Net CONE, deductions must be made for:

- estimated infra-marginal rent (IMR); and
- revenues from the DS3 markets.

This section discusses the IMR estimates, while DS3 revenues are discussed in Section 6.

5.1 CEPA/Ramboll approach

The IMR values proposed by CEPA/Ramboll are outlined in table 8 below.

Table 8 CEPA/Ramboll proposed IMR revenues (€/derated kW, 2026-27)

	CCGT	OCGT	Engines	BESS
Ireland	106.48	0.65	0.65	71.77
Northern Ireland	106.48	1.50	1.50	71.77

Source: CEPA/Ramboll BNE 2022 report

The CEPA/Ramboll study states that the IMR values used for the CCGT, OCGT and the gas engine reference technologies are based on PLEXOS model runs for 2025-26.[29] The study provides limited information about the assumptions and methodological approach of the model runs. For example limited information is provided about the following assumptions and how they change over time:

- gas and electricity prices;
- the running hours and load factors assumed for each technology[30];
- efficiency factors;
- plant closure assumptions; and
- merit order position.

Our understanding is that the CEPA/Ramboll study uses a model run for 2025-26 and then extrapolates these results over the lifetime of the asset. It appears to do this by inflating the 2025-26 IMR results to 2026-27, using a 2% forecast inflation assumption.[31] This is done instead of modelling the expected IMR for each year of the asset life, as would typically be done when considering such

29 The CEPA/Ramboll study uses a different approach for estimating the IMR for BESS as it states that the PLEXOS model runs 'are less suitable because most of the batteries currently modelled are primarily targeting system services revenues'. Therefore it estimates the revenues through the analysis of the hourly prices from the same PLEXOS model runs, but applying different assumptions for inputs and outputs of the battery storage operation.

30 CEPA/Ramboll just state that it assumes "*that the CCGT would be online 65.6% of hours in a year, but that the OCGT and reciprocating engines would only operate for 40 hours annually (c. 0.4%)".*

31 See section 8 for further discussion.

an investment. By extrapolating the one year model output, the study assumes no real change in the IMR from 2026-27 to 2035-36 (and it is difficult to discern what assumptions are made beyond 2036).

The CEPA/Ramboll study acknowledges the limitations of this approach:

> *'for the gas units this may be an overly optimistic assumption in the context of increasing levels of variable RES generation in the SEM which may reduce the annual run hours of thermal units. This would lead to lower revenues for CCGT units if lower run hours are not offset by higher rents. Hence, it may be appropriate to apply some form of reduction to the CCGT infra-marginal rent figures to reflect lower rents in the later years.*
>
> *Such a reduction could be based on a 'rule of thumb' or specific market modelling. We leave this question open as a topic which stakeholders can comment on through the consultation.'*

5.2 Assessment

As noted above, it is difficult to comment on the IMR values proposed by the CEPA/Ramboll study, as it does not provide sufficient information about the underlying methodological assumptions and approach. However, we have a number of concerns about the proposed IMR approach.

Our primary concern relates to our understanding that the CEPA/Ramboll study does not model IMR for each year over the life time of the asset. Rather it models IMR for the year prior to the relevant capacity year, and assumes that the real IMR will then remain constant over the lifetime of the asset.

This is a very simplified approach which does not take into account the changing dynamics in the market that are forecast to occur over the coming two decades, and therefore is inconsistent with the approach set out in ACER methodology.[32]

We consider that a more appropriate approach would be to model the IMR for each year. This would allow for an appropriate consideration of changing dynamics in the market. In particular, we consider the IMR estimates have not fully considered:

- changing gas an carbon prices;
- increasing RES penetration in the future;
- the changing load factor over time;
- changes to the merit order over time; and
- the potential need for gas plants to be retrofitted to ensure compatibility with low-carbon gases to remain in the merit order in the future.

We expand on each of these points.

[32] ACER Decision No. 23/2020

Input prices

CEPA/Ramboll's approach implicitly assumes that gas and carbon prices either don't change over the life time of the asset, or, if they do change, that such changes do not impact a gas plant's IMR. This does not appear to be a realistic assumption.

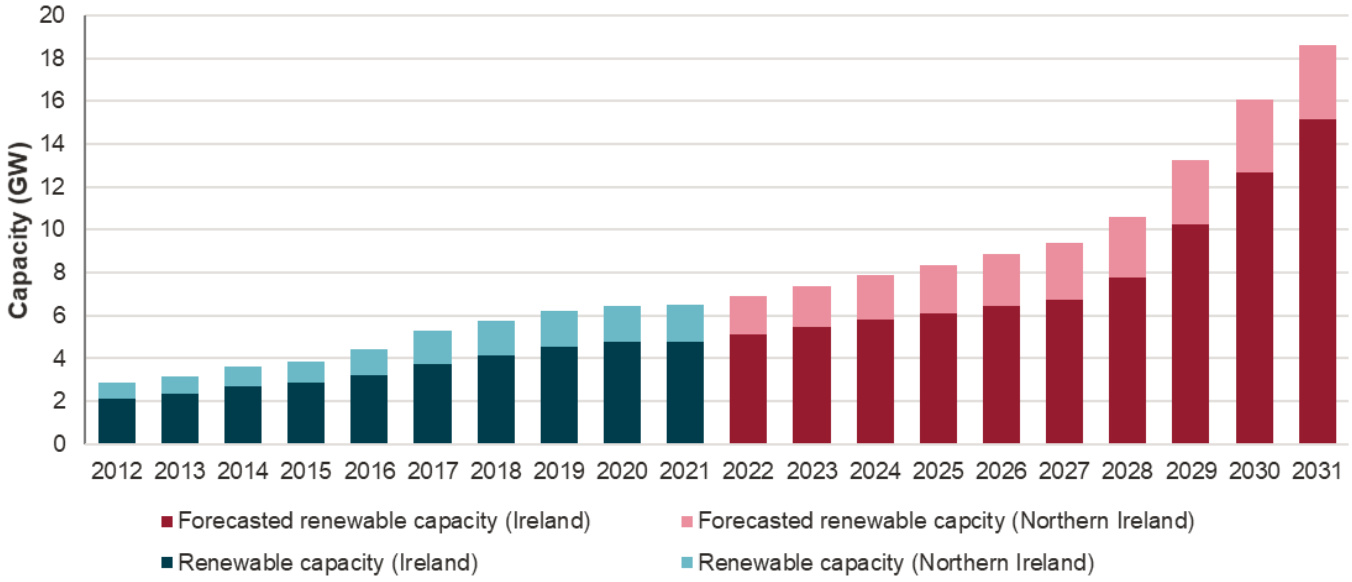
The IMRs proposed by CEPA/Ramboll do not take RES into account

We agree with the CEPA/Ramboll study that the IMR estimates used are an *'overly optimistic assumption in the context of increasing levels of variable RES generation in the SEM'.*

We consider that increasing RES should be taken into account in the IMR estimation. Renewable generation capacity has increased by 128% from 2012-21, and is forecast to increase by 168% from 2022-31, as outlined in the chart below This assumption is based on a target of 70% of electricity consumption from renewable sources. The Ireland Climate Action Plan 2021 and the Northern Ireland Energy Strategy, subsequently increased this ambition to target 80% renewable electricity by 2030. EirGrid/SONI will update the renewable capacity assumption accordingly in the 2023 Generation Capacity Statement. Therefore the renewable capacity forecasts outlined below could be considered conservative.

Overall, RES targets have increased in Ireland and the UK since the 2018 BNE paper was published, and therefore this results in higher forecast RES output and, we would expect, lower IMR.

Figure 4 All-Island renewable capacity



Source: EirGrid/SONI Generation Capacity Statement

This evidence suggests that it is not reasonable to assume that the IMR does not reduce over time to take account of RES penetration increasing.

The SEM also recognises the uncertainty related to the IMR of CCGTs in its consultation paper: *'it is reasonable to expect that the IMR of a CCGT is highly uncertain for later years of the assessment, as the installed RES-E capacity grows, and the system moves towards being able to accommodate SNSP at levels close to 100%.'*

However, this uncertainty and the risks it brings has not been accounted for in the IMR used in the Net Cone estimate. This is particularly the case where CEPA/Ramboll's study indicates that plausible IMR range for CCGT is between €24.27/kW/year and €106.48/kW/year, yet the higher figure only is used in the final estimate of Net CONE.

Given the existing situation in the capacity market and the wider uncertainty in the market, it feels appropriate to take a cautious approach to choosing estimates within a range.

The load factors used by CEPA/Ramboll are not appropriate

CEPA/Ramboll provides very limited information about the load factors used in the analysis. However it does note that it assumes a load factor of 65.6% for CCGTs, and it appears that this load factor is used for the duration of the analysis period.

This load factor is likely to be a significant over-estimate of an appropriate assumption for CCGTs given the above evidence on RES penetration. Previous Frontier Economics analysis suggests that a load factor of 30-40% from 2027-30 is a more reasonable estimate. In addition we consider that over the lifetime of the asset, load factors are likely to be materially lower again if Ireland is to meet its climate obligations.

Therefore we consider CEPA/Ramboll's load factor assumption to be inconsistent with expectations of a CCGT investor.

The IMRs proposed by CEPA/Ramboll do not account for changing position in merit order

We agree with CEPA/Ramboll that *'position in the merit order'* is a key factor in determining IMR.

However the IMRs proposed by CEPA/Ramboll do not take into account the reality that the merit order position will change over time. In particular, the CEPA/Ramboll study does not take account the relative position of a hypothetical new CCGT plant in the merit order stack and how it is likely to change over time. That is, by using a one year model estimate, and extrapolating that over the life time of the asset, the study assumes that the plant will retain its position in the merit order. That is clearly not likely to occur as further entry will take place over time, and what was efficient new plant will become less efficient old plant over time.

We also note that CEPA/Ramboll changed the methodological approach for forecast IMRs compared to the 2018 review. In 2018, Poyry assumed a 5% per annum reduction from 2031/32 in IMRs related to CCGTs. Poyry included this assumption to *'reflect the entry of newer, more efficient units on the system and decreasing load factor for the reference CCGT'*.

The IMRs proposed by CEPA/Ramboll do not account for future retrofitting for compatibility with low-carbon gas

The CEPA/Ramboll study does not appear to have taken account of the type of generation energy mix that will be required in Ireland in the next 10-20 years. For example, zero-emission gas generation has been identified in Ireland's Climate Action Plan as a measure that could deliver further abatement in the electricity sector in future years.[33] As a result, realistically over the next 20 years, gas-fired plants will need to be converted to be compatible with low carbon gases (e.g. hydrogen, carbon capture and storage). However, the IMRs proposed by CEPA/Ramboll appear to be only consistent with a plant that has been converted to zero-emission gas. That is, we would expect that a plant that has not be converted may risk not earning IMR at the bank end of the lifetime of the asset. As such, given that the CEPA/Ramboll study has not included retrofit conversion costs as a capital cost, this should be taken account in lower expected IMR over the course of the asset life.

5.3 Conclusion

As noted above, it is difficult to comment on the IMR values proposed by the CEPA/Ramboll study, as sufficient information about the underlying methodological assumptions and approach is not provided.

In our view, the approach taken fails to reflect the expectations of IMR from an investor. In particular, extrapolating a one year model run over the course of the asset life does not take into account any changing market dynamics. As outlined above, these market dynamics are likely to change significantly.

We think this modelling approach should be updated to before Net CONE is finalised. Failing that, we consider it would be appropriate to use the conservative IMR estimate as set out in the CEPA/Ramboll study.

Finally, the IMR calculation is inherently very uncertain. This is because it depends on factors – which change over time – such as fuel prices, plant park, load factor, renewable penetration, etc. As the IMR makes up a proportionally larger proportion of revenues for CCGT – compared to other plant types – this makes the Net CONE for CCGT particularly uncertain. We consider that this uncertainty should be accounted for the in the Net CONE estimate and application.

[33] Department of the Environment, Climate and Communications, Climate Action Plan (2021)

6 Calculation of DS3 Revenues

CEPA/Ramboll's calculation of BNE Net CONE includes a deduction for DS3/ancillary services revenues.

6.1 CEPA/Ramboll approach

The CEPA/Ramboll study estimates potential DS3 revenues as a function of run hours, technology capability, prices, and scalars or other incentives which may apply under future arrangements.

For run hours, CEPA/Ramboll use the same assumptions from the modelling used to determine IMR values. This means assuming that CCGT would be online 65.6% of hours in a year, while OCGT and reciprocating engines 40 hours annually (0.4%).

Technology capability is based on a study conducted by EirGrid and SONI for their analysis of 2030 volumes, which itself is based on historical data calculated at the fleet level. CEPA/Ramboll then make a series of adjustments to this capability factor to move from the fleet level estimates of TSOs to discrete units.

CEPA/Ramboll use 2021-22 published tariffs as the base for the estimation. A 20% discount is then applied to the 2021-22 tariffs in anticipation of lower prices once services are subject to competitive auctions. CEPA/Ramboll recognise that *"this is an uncertain assumption",* and point to a lack of evidence to determine the appropriate size of this discount.

Finally, CEPA/Ramboll apply a limited number of scalars to its DS3 revenues calculation. Specifically it applies:

- a performance scalar of 1;
- a product scalar of 1.5 for FFR (for BESS exclusively) and 1 for other technologies; and
- a location scalar of 1.94 for BESS located in Ireland, while other units are provided with a location scalar of 1.

The resulting estimates of system services revenues are provided in the table below. Finally, CEPA/Ramboll assumes that these revenues are maintained at the same level across the 2026/27 to 2035/36 period.

Table 9 Estimates of system services revenues 2022 prices (€/kW)

	CCGT	OCGT	Engines		BESS
	ROI & NI	ROI & NI	ROI & NI	ROI	NI
DS3 Revenue - CEPA/Ramboll	€ 13.85	€ 7.01	€ 7.03	€ 66.48	€ 57.47
DS3 Revenue – Poyry	€ 8.86	€ 16.80	N/A	N/A	N/A

Source: CEPA/Ramboll report and Poyry 2018 report

Note: Poyry estimates have been updated in 2022 money

6.2 Assessment

It is not possible to comment in detail about how CEPA/Ramboll arrived at the proposed DS3 revenue figures as limited detail is provided about elements of the estimation approach.

However there are a number of reasons to think that the CEPA/Ramboll approach to estimating DS3 revenues could result in an overestimate of the benefit of DS3 revenues. In particular:

- the 20% tariff reduction assumption is inconsistent with SEM Committee policy direction; and
- the load factors assumed in the analysis are not reasonable.

We discuss both of these issues below.

The tariff levels are inconsistent with current expectations

We consider that the 20% reduction that CEPA/Ramboll apply to tariffs is inconsistent with investor expectations given current policy direction. For example, EirGrid/SONI are currently consulting on a number of options relating to reductions to DS3 tariffs.

- Option 1: A proposal to reduce tariff rates by 35% for all service[34] from Q1 2023. In addition, it is proposed that for every 100MW of Fast Acting Services procured at Procurement Gates following Gate 7, that rates be reduced by 10%.
- Option 2: A proposal to reduce tariff rates by 25% for all services from Q1 2023. In addition, it is proposed that for every 100MW of Fast Acting Services procured at Procurement Gates following Gate 7, that all rates be reduced by 7%
- Option 3: A proposal to reduce TSS values for all services from 6.3 to 2.5 when SNSP exceeds 70% and from 4.7 to 1.5 when SNSP is between 60% and 70% from Q1 2023.

[34] For FFR, POR, SOR, TOR1 and TOR2 services

- Option 4 is a combination of Option 1 and Option 3. It is a proposal to reduce tariff rates for al services by 10% and to reduce TSS values for all services from 6.3 to 3.5 when SNSP exceeds 70% and from 4.7 to 2.5 when SNSP is between 60% and 70% from Q1 2023.[35]

Furthermore, the CEPA/Ramboll study does not appear to fully take into account the reducing effect on DS3 revenues arising from the introduction of Competitive Arrangements for System Services in 2026.

The CEPA/Ramboll study does not appear to have taken the above factors fully into account and therefore risks significantly overestimating DS3 prices compared to what a rational investor would expect.

The load factor assumptions are not appropriate

As noted in Section 5, the CEPA/Ramboll study provides very limited information about the load factors used in the analysis. The study notes the assumed load factor used (for example, 65.6% for CCGTs), and it appears that this load factor is used for the duration of the analysis period.

As noted previously we consider that:

- the load factor for CCGT, in particular, is a significant overestimate; and
- it is not reasonable to assume that new entrant plant will maintain the same load factor for the duration of the capacity contract.

[35] DS3 System Services Tariffs Consultation, EirGrid/SONI (2022) (https://www.eirgridgroup.com/site-files/library/EirGrid/DS3-System-Services-Consultation-16-Sept-2022.pdf)

7 Cost of capital

The sections assesses the cost of capital proposed in the SEM Committee consultation document and the CEPA/Ramboll study.

7.1 CEPA/Ramboll's approach

The CEPA/Ramboll study uses the Capital Asset Pricing Model to estimate WACC, drawing on a number of sources to obtain the financial parameters required. We briefly summarise its approach below.

7.1.1 Cost of equity

For cost of equity, the study separately calculates the risk free rate, equity beta and total market return.

- **Risk free rate**: CEPA/Ramboll uses a one month average of sovereign bonds with a 10-year tenor. Using this approach, CEPA/Ramboll estimates:
  - 2.06% for Northern Ireland; and
  - 1.14% for the Republic of Ireland.
- **TMR:** CEPA/Ramboll uses precedent from Irish and UK price controls to for a view on TMR. CEPA/Ramboll uses:
  - 9.43% for the nominal TMR for NI.
  - 8.69% for the nominal TMR for IE.
- **Beta**: CEPA/Ramboll develops a sample set of 21 comparator electricity generator companies, and calculates daily asset beta estimates using 2yr windows and averaging the beta estimates over a five-year period. It then uses the 65th percentile of that range. Based on this approach, CEPA/Ramboll gets an asset beta of 0.55, which it notes is below the Poyry (2018) Best New Entrant study of 0.69.

7.1.2 Gearing

CEPA/Ramboll uses a consistent gearing assumption of 40% for gearing in both jurisdictions, as per the Poyry (2018) BNE study.

7.1.3 Cost of debt

The CEPA/Ramboll study uses a one-month average of BBB non-financial corporate 10yr+ nominal yields to estimate cost of debt. The approach results in the study estimating a cost of debt of:

- 4.61% for the Northern Ireland; and
- 3.47% for the Republic of Ireland.

7.1.4 CEPA/Ramboll's overall WACC

The below table summarises CEPA/Ramboll's overall WACC estimate for Ireland and Northern Ireland. Net CONE is based off a nominal pre-tax WACC. CEPA/Ramboll calculate one cost of capital for each jurisdiction, rather than separately for different technologies.

Table 10 CEPA/RAMBOLL's overall WACC estimate

	Ireland	Northern Ireland
Post-tax CoE	8.06%	8.82%
Cost of Debt	3.47%	4.61%
Vanilla WACC	6.22%	7.13%
Pre-tax WACC	**6.92%**	**8.90%**
WACC currently applied for calculating net CONE (as per Poyry 2018 study)	8.31%	8.90%

Source: CEPA/Ramboll study

7.2 Assessment

In our assessment we:

- discuss the WACC estimate within the current financial and economic environment;
- discuss the use of technology-neutral WACC estimates; and
- comment on key parameter estimates driving results.

7.2.1 Current financial and economic environment

We note that CEPA/Ramboll's data cut-off was July 2022. While some of the recent change in the economic environment has been reflected in CEPA/Ramboll's estimates, we consider it will be important in the final decision to reflect how significantly the economic environment has changed in recent months.

The Russian war in Ukraine has had a significant impact on financial markets and the real economy. Inflation is currently at record levels, with prices in Ireland estimated to have risen by 9.5% in the year to October 2022[36] and CPI increasing by 11.1% in the UK over the same period.[37]

Central banks have been making monetary policy changes to counter this inflationary pressure, with large rate hikes from the ECB and Bank of England.

- The ECB, for example, raised rates by 50bps on 21 July, and then by 75 bps on 8 August and 75 bps on 27 October. These last two rate increases were after CEPA/Ramboll's data cut-off. The

[36] CSO, Press Statement Flash Estimate for the Harmonised Index of Consumer Prices October 2022

[37] ONS, Consumer price inflation, UK: October 2022

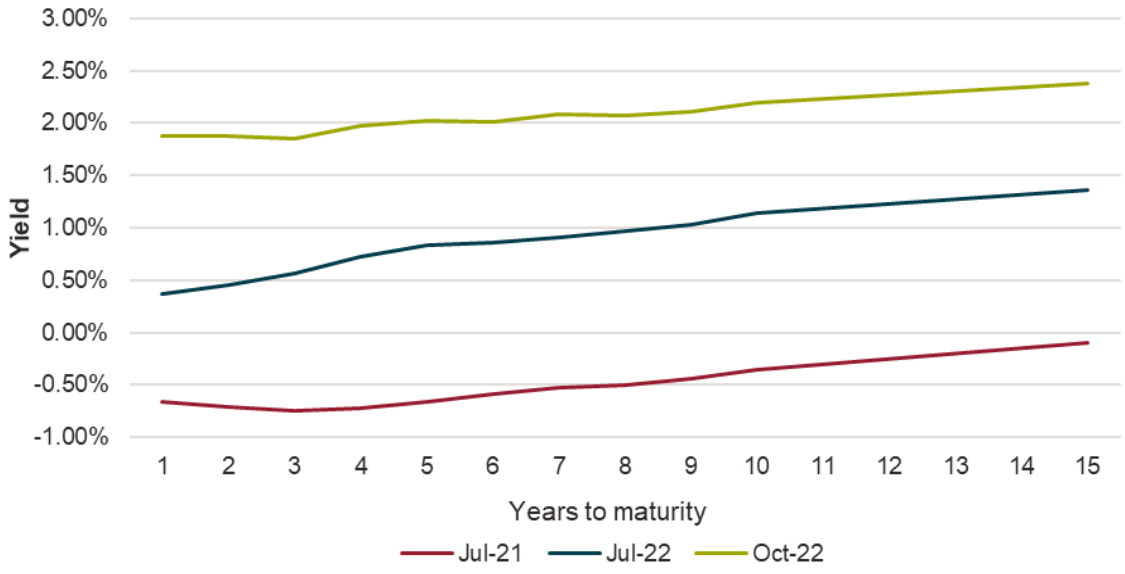
ECB has also stopped net purchases under its asset purchase programme as of 1st July 2022, signalling a normalisation of previously expansionary monetary policy.[38]

- The Bank of England has raised rates even further in recent months. In June (the last Monetary Policy Committee meeting before CEPA/Ramboll's data cut-off) rates were increased to 1.25%. They were since increased further to 1.75% in August, 2.00% in September and to 3% in September (the biggest rates have been in the UK for 33 years).

As well as increases in rates, there is also increased uncertainty for investors. The Central Bank of Ireland recently noted that uncertainty around the medium-term outlook remains high, with most uncertainty relating to the possibility of further rate increases in, and/or persistently higher commodity and energy prices.[39]

The changing macro-economic environment has also been reflected in the yield curves for government bonds. This change is shown in the charts below for German sovereign bonds and UK sovereign bonds. Both show a large increase between last year and this year, but also a significant increase since CEPA/Ramboll's July 2022 data cut-off. The clear shift upwards shows how the general risk environment has changed over the past year. These bonds are considered to be low risk investments, yet the yield required on these has still increased significantly, showing that investors are demanding greater returns across the market.

Figure 5 German sovereign yield curve

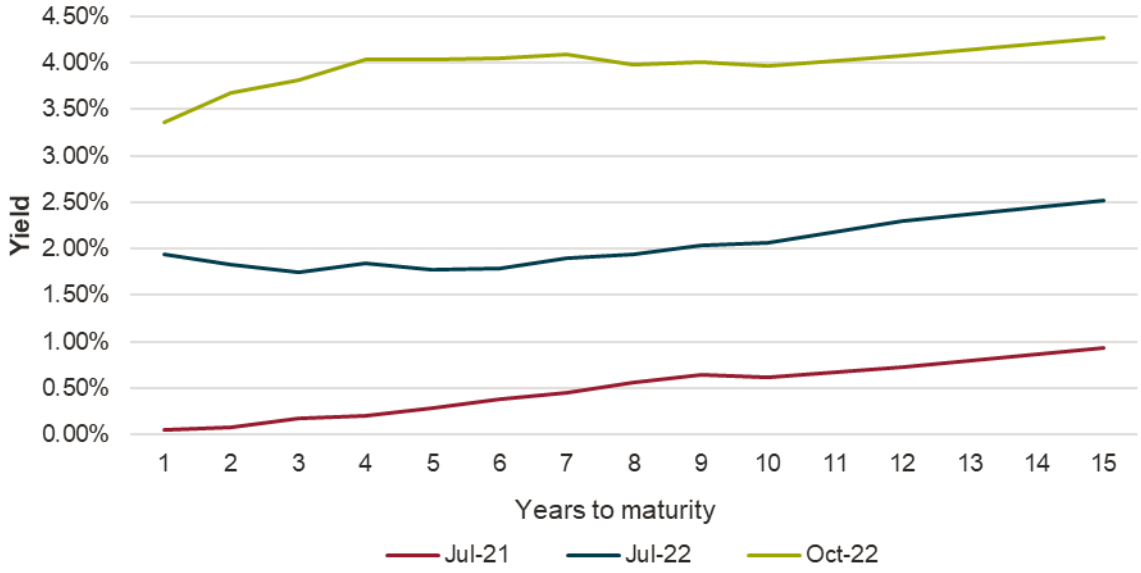


Source: Bloomberg

38 ECB, 2022, *Asset Purchase Programmes,* available from: https://www.ecb.europa.eu/mopo/implement/app/html/index.en.html

39 Central Bank of Ireland, July 2022, Quarterly Bulletin Q3 2022.

Figure 6 Bank of England



Source: Bloomberg

The above shows both evidence of a higher-rate environment, but also a more uncertain environment for investors.

In this context, we note that CEPA/Ramboll has **proposed lowering WACC compared to 2018** for net CONE in the Republic of Ireland (the lowest cost entrant in the consultation document). This in unusual given the current high interest rate environment compared to 2018. We would expect that, given the current market evidence, the nominal cost of capital in 2022 would be higher than 2018 for most investors.

7.2.2 Technology-neutral WACC estimates

As noted above, CEPA/Ramboll's WACC estimates are technology neutral. That is, they do not take account of potential differences in risks between technologies.

Such an approach would be appropriate if technologies faced broadly similar risks. However, in this case, they do not.

ACER's methodology for calculating Net CONE suggest that, where possible, WACC should be calculated for different technologies depending on their risk.[40]

Where relevant and upon availability of robust data, the entity calculating CONE shall calculate a different WACC for each reference technology (or specific group of reference technologies) in order to account for differences in risks (taking into account hedging opportunities expected to be available).

[40] ACER Decision No. 23/2020

In this case, the difference in risk can be seen starkly between the different proportions of required revenue that would come from market revenues compared to capacity market payments for CCGT and OCGT plants. According to CEPA/Ramboll's analysis, the proportion of market revenues are:

- 67-68% of CCGT; and
- 9-10% for OCGT.

CCGTs are therefore far more expose to volatile market returns, which depend on factors such as the wholesale price, load running hours, merit order position and the price setting technology; all factors which are likely to change over time.

Given this, it has been typical elsewhere that different technologies have different hurdle rates. For example, BEIS in the UK typically considers different hurdle rates for different technologies when considering the cost of generation.

- In 2018, BEIS commissioned Europe Economics to provide a report on the cost of capital for electricity generation, storage and demand side response. This report found hurdle rates of:[41]
  - 7.1% for OCGT; and
  - 7.5% for CCGT.
- These cost of capital estimates have been used in more recent BEIS documents, such as its 2020 Electricity Generation Costs report.

We consider that it would be appropriate for the Net CONE estimation to use different costs of capital for different technologies. We comment further in the beta section below how hat might be done.

7.2.3 Parameter estimates

CEPA/RAMBOLL states that its approach in using market data is "trying to strike a balance between ensuring our estimate reflects current market conditions, whilst limiting the volatility that arises from using shorter-term data". We agree these factors needs to be balanced. However, given the current uncertainty in the macro-economic environment, we also consider that additional judgement needs to be applied to ensure that the expectations of future rates are captured.

Below we outline our assessment of three key parameters that are driving CEPA/Ramboll's results: risk free rate, beta and cost of debt.

Risk free rate

As noted above, CEPA/Ramboll uses a one-month average of yields on sovereign bonds with a 10 year tenor in order to estimate the risk-free rate. We understand that these estimates are from July 2022.

41 Note that these are real pre-tax cost of capitals, and therefore not directly comparable to the CEPA/Ramboll estimates in terms of levels.

We have updated CEPA/Ramboll's approach to use the latest available data from October. Using the same approach of taking a one month average of sovereign bonds with a 10-year tenor we find:

- 2.20% for Ireland; and
- 3.96% for Northern Ireland.

It is important to take account of these significant changes in market rates in any proposed Net CONE decision.

Table 11 Risk free rate using CEPA/Ramboll approach

Time period	Ireland	Northern Ireland
July	1.14	2.06
October	**2.20**	**3.96**
Difference	*1.06*	*1.90*

Source: Bloomberg

Beta

The CEPA/Ramboll study finds as asset beta of 0.55, which is materially lower than the previous estimate of 0.69. This is based on a direct estimate of betas using a sample set created by CEPA, and comparison to regulatory precedent.

Below we comment on both the sample set used, and the regulatory comparison.

Sample set

The sample set comprises of 21 different energy companies. Many of these companies are likely to have different risks than, for example, a standalone CCGT plant. If their underlying risk is different from a new entrant CCGT plant, then this will lead to a systemic bias in the beta estimates.

In particular, the sample set appears to have included companies with business models that have very low market risk due to their lack of volatility in revenues. For example, generators whose revenues are predominantly or exclusive via CFD payments would have lower risk than a generator exposed to more revenue risk through the market. We consider that the inclusion of such companies is likely to have resulted in a downwards bias to the beta estimate. For example, the sample set used in the study includes:

- Alerion Cleanpower, which is a renewables generator;
- Solarparken, which develops and operates photovoltaic energy systems;
- Voltalia, which is a renewables generator; and
- Ceres power, which is a fuel cell company that earns a large proportion of its revenues through licencing fees.

All of these companies appear to have business models that may incorporate less market risk than a new entrant gas plant. (Other generators within the sample set also appear to have a proportion of CFD backed plant or other non-relevant assets. However, in the time available to respond to the consultation, we have been unable to do a deep dive on all the companies included in the sample.)

These companies should be excluded from the sample set of companies to avoid potential downwards bias to the beta estimate given that these companies face different risks than a new entrant into ISEM.

Regulatory precedent

The CEPA/Ramboll study compares its estimate to the corresponding ranges determined by the CMA in the Energy Market Investigation from 2016.

However, we do not consider that this is the most relevant, granular or recent precedent from the UK. As noted above, BEIS commissioned Europe Economics in 2018 to estimate the cost of capital for different generation technologies.

That study found asset betas of:

- 0.87 for CCGT; and
- 0.78 for OCGT.

In relation to CCGT, the study noted that CCGT can, at least to some degree, be treated as standalone, and as such continue to have a higher asset beta than those of portfolio generators. In other words, portfolio generators have lower risk and therefore should not be seen as direct comparators for a standalone CCGT.

The 2018 study goes on to state:

> *The UK's portfolio generators have an average asset beta of 0.66, ranging from SSE's 0.58 to Centrica's 0.75.* ***We might therefore expect that CCGT should have an asset beta of above 0.75, perhaps treating the UK portfolio generator average, 0.66, as a lower bound*** *{emphasis added}.*

Given the sample set used in the CEPA/Ramboll study does not appear to provide a useful comparison to a new entrant, we consider the most appropriate approach would be to use the above beta estimates from the BEIS study, which are:

- 0.87 for CCGT; and
- 0.78 for OCGT.

Cost of debt

As noted above, CEPA/Ramboll has used a one month average of yields on corporate bonds to estimate the cost of debt. While this approach will result in volatility of the cost of debt estimate

depending the timing that such calculation is being undertaken, if this approach is used then it is important to update for more up-to-date market evidence.

We outline above how yields on corporate bonds have increased for all lengths to maturity since CEPA/Ramboll's July data cut-off. The table below shows nominal yields for BBB non-financial corporates with 10+ to maturity. This is the same index CEPA/Ramboll used in its calculation of cost of debt. As can be seen, the yields have increased by 207 and 121 bps for UK and Euozone, respectively, between July and October.

Table 12 Cost of debt

	Euro	GBP
July average	3.47%	4.61%
October average	4.68%	6.68%
Difference	**1.21%**	**2.07%**

Source: Bloomberg

7.2.4 Conclusion on WACC

Our assessment of CEPA/Ramboll's WACC estimate suggest that the cost of capital for a new entrant has likely been underestimated. This is based on:

- WACC estimate being below the 2018 estimate, despite the current macro-economic environment of higher interest rates;
- the risk free rate not reflecting current market evidence (due to CEPA/Ramboll's July data cut-off);
- an asset beta that is significantly lower than previous estimates, without clear justification;
- asset beta estimate that does not reflect the different risks in business models by technology;
- asset beta estimate that is based on a sample of companies that is unlikely to be reflective of the risks faced by a new entrant;
- asset beta is inconsistent with regulatory precedent from elsewhere; and
- the cost of debt estimate not reflecting current market evidence (due to CEPA/Ramboll's July data cut-off).

The risk in underestimating WACC in this scenario is that such an underestimate would result in a net CONE that would be insufficient to cover an investors' costs.

We also note that we have not undertaken our own WACC estimate as part of the response to the consultation, as the time period for responses has not been sufficient to allow us to undertake such an estimate.

8 Calculating Net CONE

We now review how the cost data and the WACC estimates have been combined in order to estimate Net CONE.

8.1 CEPA/Ramboll approach

CEPA/Ramboll calculate the value of Net CONE for each technology on an annual basis by combining the cost, revenue and WACC estimates outlined int the sections above. CEPA/Ramboll then apply the de-rated capacity to this to estimate Net CONE for 2022-23. The results are then converted to 2026-27 prices using a 2% per annum inflation forecast assumption.

8.2 Assessment

We observe two issues with the CEPA/Ramboll approach to estimating the final Net CONE. These are the CEPA/Ramboll approach to applying inflation to:

- costs; and
- revenues.

8.2.1 Assessment of how inflation is applied to costs

CEPA/Ramboll provides an initial Gross CONE estimate based on 2022-23 values. CEPA/Ramboll use a forecast inflation assumption of 2% per annum (i.e., 8% in total) to inflate its results to 2026-27, the year in which the T-4 auction will take place.

Firstly, it is not accurate to simply add a 2% inflation rate for each year between 2022-23 to 2026-27. It would be more accurate to estimate a compounded inflation rate adjustment over the time period.

Secondly, we consider that the 2% per annum inflation assumption used by CEPA/Ramboll does not reflect current inflation expectations in Ireland. The latest inflation forecast for Ireland are summarised in the table below. Multiple sources are forecasting a much higher inflation rate than the 2% used by CEPA/Ramboll, therefore we consider that the analysis should be updated to take this into account.

More generally, we note that due to the great uncertainty and volatility in world markets, inflation forecasts have been regularly updated upward over the last year. Therefore, the use of current inflation forecasts should be considered conservative.

Table 6 Inflation forecasts

Source	2022	2023	2024
Central Bank of Ireland	8.0%	6.3%	2.8%
Department of Finance	8.5%	7.1%	2.4%
European Commission	8.3%	6.0%	2.8%
European Central Bank	8.1%	5.5%	2.3%
Average	8.2%	6.2%	2.6%

Source: *Central bank: https://www.centralbank.ie/docs/default-source/publications/quarterly-bulletins/qb-archive/2022/quarterly-bulletin-q4-2022.pdf?sfvrsn=1666951d_6*
Department of Finance: https://assets.gov.ie/235721/53370477-b198-4540-913a-422b745d058a.pdf
EU Commission: https://economy-finance.ec.europa.eu/economic-surveillance-eu-economies/ireland/economic-forecast-ireland_en
ECB: https://www.ecb.europa.eu/pub/projections/html/ecb.projections202209_ecbstaff~3eafaaee1a.en.html#toc7

In addition, we consider that the inflation rate data should be converted from calendar years to capacity market years (which run from October to September). Using the average inflation forecast rates outlined in the table above, we estimate forecast inflation rates relating to the capacity market year. As no forecasts are published after 2024, we use a long-term average forecast inflation assumption of 2%. The results of this analysis are outlined in the Table below. We consider that these inflation forecast assumptions are more appropriate for the initial years of the analysis, compared to the 2% per annum inflation forecast proposed by CEPA.

Table 14 Inflation forecasts per capacity market year

	2022-23	2023-24	2024-25	2025-26
Weighted Average	6.7%	3.5%	2.0%	2.0%

Source: *Frontier Economics analysis of published inflation forecasts*
Note: *Split years reflect Oct-Nov and Jan- Sept of the following year, in line with the capacity market years*

In the Table below, we provide an assessment of how this adjustment impacts the final Gross Net CONE estimates.

Table 7 15 Gross Net CONE estimates for 2026/27

	CCGT		OCGT	
	Ireland	Northern Ireland	Ireland	Northern Ireland
CEPA/Ramboll Gross Net CONE, €/ derated kW	181.9	185.9	96.4	236.5
Updated Gross Net CONE, €/ derated kW	193	197.4	102.3	251.0
Difference € / derated kW	**11.2**	**11.4**	**5.9**	**14.5**

Source: Frontier Economics analysis

8.2.2 Assessment of how inflation is applied to revenues

The CEPA/Ramboll study also inflates both IMR and DS3 revenues by inflation over time. This approach appears to have been taken because, as discussed above, the study uses model results for only one year rather than models expected revenues in all future years.

The approach to instead inflate IMR and DS3 revenues by inflation is strange as:

- IMR is expected to decrease over time as the load factor decreases due to increased RES and lower position in the merit order; and
- DS3 tariffs are expected to decrease over time, as signalled by the EirGrid/SONI consultation.

We consider the modelling approach should be updated to assess expected revenues in each year, which would mean that indexing revenues would not be an issue.

8.3 Conclusions on calculating Net CONE

We consider, at a minimum, the Net CONE calculation needs to be updated to account for issues with the estimation of:

- capital costs;
- IMR;
- DS3 revenues;
- cost of capital;
- inflation adjustment to costs; and
- inflation adjustments to revenues.

Adjusting for these elements alone would results in a significantly higher Net CONE for all technologies.

9 Alternative application of Net CONE

The above analysis shows:

- there is a material risk that Net CONE has been significantly underestimated in the consultation document;
- investors face significant risk in terms of future returns, especially in relation to the level and sustainability of market revenues; and
- applying the proposed Net CONE to CRM price caps, in the same manner as previous auctions, would result in a material risk of insufficient volumes of capacity being offered to the market, and thus pose further risks to ISEM's security of supply.

Therefore, in this section we consider alternatives to the current application of Net CONE in Ireland. We note that a full review of the CRM auction parameters is outside the scope of this consultation. However, the SEM Committee also notes that "*given the level of uncertainty around some of the components of Net CONE, **the relationship between Net CONE and the Auction Price Cap** {emphasis added} for the T-4 2026/27 and subsequent auctions may need to be considered*". Therefore, the below sets out our assessment of that relationship and suggests alternatives.

9.1 Current relationship between Net CONE and Auction Price Cap

The Auction Price cap is set in the CRM based on 1.5 x Net CONE. This is done on the basis that there has historically been uncertainty around the Net CONE estimate, and therefore there needs to be some headroom above the Net CONE estimate to allow for sufficient capacity to enter.

Likewise, the Existing Capacity Price Cap is set at 0.5 x Net CONE to recognise that existing capacity will not have the same level as fixed costs to cover, but that it needs to be set at a sufficient level to cover forward looking costs. Again, this needs to account for uncertainty in forward looking costs and revenues, otherwise it will risk prompting exit or dissuading incentives to refurbish to existing capacity.

As acknowledged in the CEPA/Ramboll consultation paper there is '*significant uncertainty around certain parameters used in the cost estimations*. The SEM Committee's paper also acknowledges '*that the current market volatility and other areas of uncertainty cannot be fully captured in such an analysis*.

Therefore, it is appropriate that the relationship between Net CONE and the auction price caps is reviewed to account for the increased uncertainty and wider context of:

- avoiding inefficient exit of existing capacity; and
- the need for significant additional new capacity.

9.2 Alternative relationship options

Alternative applications of the Net CONE should be considered to both provide more flexibility and price discovery within the auction, and to account for the additional uncertainty.

In relation to existing capacity, EY's review of the CRM performance found that there was scope to change how Net CONE was applied to existing capacity.

> *A more proportionate approach to mitigating market power – i.e., that does not foreclose potential for price discovery among existing plants – would seek to focus bidding restrictions on exceptional cases. This could be achieved through either raising the ECPC or through making USPC applications approved by default except where there is material evidence to support intervention.*[42]

Building on this, we summarise below **five potential ways in which the SEM Committee could consider changing the relationship between Net CONE and the auction price caps**. We note that these options are not mutually exclusive and could be all implemented concurrently.

- **Change the multiplier for the Auction Price Cap**: The existing multiplier of 1.5 * Net CONE was set at a time when there was significantly less uncertainty in the market, and thus estimates of Net CONE were less exposed to material forecast risk. As noted in the CEPA/Ramboll report, there is '*significant uncertainty around certain parameters used in the cost estimations*'.[43] The SEM Committee's paper also acknowledges '*that the current market volatility and other areas of uncertainty cannot be fully captured in such an analysis*'.

  An alternative to this approach would be to include a higher multiplier to account for such uncertainty. It is not unusual for capacity auctions to have different multipliers. For example, previous multipliers used in the USA range from 1.5 to 1.95, depending on the market.[44] Changing the multiplier would not remove the need to update the Net CONE estimate to allow this to be as accurate as possible, but would provide for additional headroom given the clear increase in uncertainty as recognised by the SEM Committee and CEPA/Ramboll. It would also allow for additional capacity to compete within the CRM auction, and for price discovery to select the most efficient technology choice at any particular time. Moreover, it would increase the likelihood that sufficient capacity is procured in the CRM auctions, and therefore reduce the risk of future capacity shortfall.
- **Change the multiplier in the Existing Price Cap**: Similarly, the relationship between Net CONE and the existing price cap is subject to the same uncertainties. If Net CONE is underestimated – due to the current uncertainties as noted by SEM/CEPA/Ramboll, then applying a 0.5 * multiplier to the existing price cap may mean that existing capacity is unable to compete in the CRM auction, which in turn could lead to potential exit and/or reduce incentives to refurbish existing capacity to prolong their useful life.

[42] https://www.semcommittee.com/sites/semc/files/media-files/SEM-22-054A%20Performance%20of%20the%20SEM%20CRM.pdf

[43] CEPA/Ramboll report

[44] Brattle Group, 2019, Alberta's Capacity Market Demand Curve

As such, an alternative to the existing price cap multiplier would be to increase it, say, to at least be in line with any increase applied to toe Auction Price Cap. This could be done in addition to relaxing the application process around Unit Specific Price Caps (USPC), as discussed below.[45]

- **Allow default Unit Specific Price Caps for existing capacity**: For existing capacity that consider their forward-looking costs will be above the existing capacity price cap, they are able to apply to the regulator for a USPC. The USPC must be approved prior to the auction by the regulator, which may result in a barrier to existing capacity entering the auction. An alternative would be for USPC to be accepted – by default – and existing capacity to bid into the auction on that basis. Where there is material evidence to suggest that their bid may be above a realistic net going forward cost, then a more rigorous consideration of their USPC could be considered.
- **Introduce Unit Specific Price Caps for new capacity**: To allow for the possibly that some efficient and required new capacity may be above Net Cone x multiplier, then a USPC could be considered for new capacity. Such USPCs for new capacity could also be the default.
- **Use Net CONE (and its multiples) as a guide rather than a fixed cap:** The other alternative is to relax the relationship with Net CONE from being a price cap to a price guide. That is, a multiple of Net CONE would be provided to participants as guide to the maximum price. This would not prevent investors bidding above this price, but any such bidder would be expected to be able to provide supporting evidence, if required, to justify their bids to the regulator.

[45] The USPC does not remove the need for an accurate Net CONE assessment. In addition it is important that changes relating to USPC would be consulted upon.

10 Conclusions

This section summarises our conclusions following a review of SEM's consultation document and the CEPA/Ramboll technical report.

10.1 The proposed Net CONE risks exacerbating security of supply problems

Calculating Net CONE and applying it to the CRM needs to meet the purpose of:

- providing a safeguard against market power; and
- attracting and retaining sufficient capacity in the market to meet security of supply needs.

ISEM is currently facing a critical capacity shortage that gives rise to significant security of supply concerns. The CRU has already had to put in place a programme of work – including emergency measures – to ensure that security of supply requirements are met in the coming winters. Approximately 2 GW of additional flexible capacity has been identified as being required through to 2030. It is important this capacity is delivered for security of supply, economic and energy transition reasons. It is equally important that existing capacity receives efficient price signals to avoid prompting inefficient exit or distorting investment incentives to refurbish plant to extend useful asset life.

The current Net CONE proposal risks materially underestimating the cost of a Best New Entrant, resulting in auction caps that are too low. The result will be to substantially weaken investment signals and exacerbate the existing security of supply crisis.

This is in clear contrast to the needs for security of supply, as well as wider economic and environmental impacts.[46]

10.2 The approach taken is inconsistent with best practice

The consultation documents states that the approach taken has regard to the ACER methodology for calculating Net CONE.[47] However, our review shows that the approach is materially inconsistent with ACER's methodology.

ACER's methodology details the steps required to calculate Net CONE. In doing so, the ACER methodology makes several references to calculating their steps with reference to the choices or requirements of "rational private investors". It states that in calculating the steps the required "tasks shall be performed based on transparent, reliable, objective and verifiable sources and criteria".

In our view the approach taken departs materially in several dimensions.

46 For example, Data Centre connections has already been restricted due to a lack of generation capacity, and emergency capacity measures have also extended lives of existing plants, potentially in conflict to the Industrial Emissions Directive.

47 ACER Decision No. 23/2020

- **The approach does not "account for expected developments that may affect the economic and technical parameters":**[48] In Particular, as described below, the IMR estimate is done for one year and then extrapolated over the lifetime of the asset, rather than estimated for each year to account for changing market dynamics.
- **The approach does not account for differences in risk**:[49] The ACER methodology states that, where possible, different WACCs should be calculated for each reference technology to account for differences in risks. However, the CEPA/Ramboll study applies the same WACC to each technology.
- **The approach is not fully transparent, and the calculations are not possible to verify**:[50] For example, the ACER approach requires publishing data that was used to calculate Net CONE such as fuel prices and carbon prices. These have not been published as part of the study.

For these reasons, and the material underestimation of certain parameters, as explained below, we consider that the approach taken in the CEPA/Ramboll study deviates significantly from the requirements of a rational private investor.

10.3 The increased uncertainty has been recognised in the paper but not incorporated into the approach taken

The consultation paper and CEPA/Ramboll's study have recognised the significant uncertainty in estimating the parameters that go into the Net CONE estimate. However, this uncertainty and the risks it brings has not been accounted for in the estimates.

This is particularly the case where CEPA/Ramboll's study indicates that plausible range for IMR range. For example, the IMR range for CCGT is between €24.27/kW/year and €106.48/kW/year, yet the higher figure only is used in the final estimate of Net CONE. Had the lower end of the IMR range been used the resulting final estimate of Net CONE for a CCGT (based on adjusting this parameter alone), would increase by €82.21/kW/year for CCGT.

Given the existing situation in the capacity market and the wider uncertainty in the market, it feels appropriate to take a cautious approach to choosing estimates within a range.

10.4 Insufficient time and detail has been provided to allow for stakeholders to adequately respond to the consultation

The consultation document asks for views and responses from stakeholders on the cost estimates, revenue structures, and the methodology used to estimate BNE Net CONE in the CEPA/Ramboll report.

48 ACER Decision No. 23/2020, Article 9.5

49 ACER Decision No. 23/2020, Article 14.3.

50 ACER Decision No. 23/2020, Article 17.

However, the CEPA/Ramboll report does not provide the necessary detail for stakeholders to realistically be able to comment on many of the key aspects. In particular, **no detail is provided on how IMR is calculated**. This is a material omission as IMR accounts for approximately 59% of the required revenues for a CCGT plant (which is the reference plant for the Best New Entrant).

10.5 There are several issues with individual parameter estimates and assumptions

We think, at a minimum, the Net CONE calculation needs to be updated to account for issues with the estimation of:

- capital costs;
- IMR;
- DS3 revenues;
- cost of capital;
- inflation adjustment to costs; and
- inflation adjustments to revenues.

The IMR estimate is of particular concern as the IMR has not been estimated for the lifetime of the asset. Rather, IMR has been estimated (from our understanding) based on a 2025/26 model run. These same results have then been extrapolated over the 20-year life of the asset. This is inconsistent with increasing RES penetration, changing load factors and merit order over time. Accounting for these issues would result in a Net CONE that is significantly higher than that proposed.

10.6 The SEM Committee should consider how Net CONE is applied, to ensure that the objectives of the CRM are met

Our review finds that:

- the proposed Net CONE risks exacerbating security of supply problems;
- the approach taken is inconsistent with best practice and inconsistent with how a rational investor would consider such an investment; and
- several parameters within the Net CONE estimate have been materially underestimated.

Given the issues identified, we consider that it would be appropriate for the Net CONE analysis to be updated and undertaken more fully in line with best practice. The updated analysis should be consulted on in full with industry stakeholders.

However, we also consider that the SEM Committee should consider how Net CONE is applied within the capacity market auction and whether the continuation of the current BNE methodology is appropriate. It is not clear that the current application – if continued – will deliver either the required capacity by 2030 or an efficient mix and type of plant over the coming decades required for Ireland to move towards net zero emissions. This is in the context of:

- increased uncertainty in parameter estimation;
- the ongoing need for efficient existing units to have signals to implement retrofits and refurbishments;
- failure to previously secure sufficient capacity in all locations; and
- the need to secure significant amounts and types of new capacity to 2030 to account for growing demand, increasing RES, and retiring units (mindful of the identified need for 2GW of new flexible CCGT and peaker plants by 2030).

There is a material risk that failure to secure sufficient capacity would not only lead to potential security of supply concerns but would also have adverse economic consequences (we have already seen a moratorium on new datacentres, despite datacentres being identified as having economic and social benefits[51]).

We have identified five potential ways in which the SEM Committee could consider changing the relationship between Net CONE and the auction price caps, which are:

- change the multiplier for the Auction Price Cap;
- change the multiplier in the Existing Price Cap;
- allow default Unit Specific Price Caps for existing capacity;
- introduce Unit Specific Price Caps for new capacity; and
- use Net CONE (and its multiples) as a guide rather than a fixed cap.

51 https://enterprise.gov.ie/en/news-and-events/department-news/2022/july/new-statement-on-the-role-of-data-centres-in-irelands-enterprise-strategy-published.html

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