

Review of the First T-4 Irish Capacity Auction



On 28th March 2019, EirGrid and SONI held the first four-year ahead Capacity Market auction under the new Irish Integrated Single Electricity Market (I-SEM) for delivery year 2022/23. In this bulletin, Frontier Economics and LCP provide our reflections on the final auction results published on 7th May 2019.¹

Headlines:

- The auction cleared at a price of €46,150/MW per year (or £43,030/MW per year), at exactly the Existing Capacity Price Cap (ECPC) that was set by the Irish regulatory authorities (RAs) as a parameter for the auction, equal to half of the updated estimate of Net Cost of New Entry (Net CONE) of €92,300/MW-derated per year.
- The aggregate de-rated capacity procured in the auction was 7,412 MW. This was more than the capacity demanded at Net CONE (6,770MW) and slightly below the capacity requirement set for the auction of 7,524 MW.
- The vast majority (90%) of the cleared capacity came from existing units, which was consistent with prequalified existing capacity (7,880 MW) significantly exceeding the capacity requirement (7,524 MW) set for the auction.
- An unexpectedly large volume of new capacity (710 MW) cleared in the auction, nearly all of it (98%) in the Republic of Ireland.
- Somewhat less surprising is that three-quarters (526 MW) of the new capacity cleared in the auction will be located in the Greater Dublin Area. The Locational Capacity Constraint Area (LCCA) minimum requirement set for Dublin was above the existing capacity in Dublin that prequalified for the auction.



The new capacity remuneration mechanism under I-SEM

With the move to the Integrated Single Electricity Market (I-SEM) that commenced on the 1st of October 2018, the old Capacity Payment Mechanism in Ireland was replaced with a Capacity Market. This requires capacity providers (including generators, energy storage, demand side units and interconnectors) to participate in Capacity Auctions.

Successful participants receive a payment per MW of capacity they sell within the auction. In return, capacity providers are obliged to make difference payments to Suppliers, when energy market prices exceed an administratively set Strike Price. These difference payments encourage capacity providers to make sure their awarded capacity is available at times of system stress.

Location, location, location

This was the first “T-4” auction under the I-SEM arrangements, securing capacity four-years in advance for the 2022/23 delivery year. Most significantly this meant that unlike the last two T-1 auctions held one-year in advance for the 2018/19 and 2019/20 delivery years, this was the first auction under I-SEM where new build capacity could bid for multi-year (up to ten-year) capacity contracts.

¹ EIRGRID/SONI. Capacity Market Overview & Final 2022/2023 T-4 Auction Results Summary. May 2019. Available here: <https://www.sem-o.com/documents/general-publications/T-4-2022-2023-Final-Capacity-Market-Auction-Overview.pdf>

The need for new capacity in Ireland in the medium- and long-term is guided by expected 57% growth in Irish electricity demand over the next 10 years.² This expected growth is driven by increasing numbers of large energy users, primarily data centres, and a significant proportion of

31%

Expected proportion of total electricity demand coming from data centres in 2027.

the additional future demand is expected to materialise in the Dublin region. Because there are physical constraints to how much power can flow on the existing network into Dublin, there is a need to reinforce the electricity transmission system around Dublin, and/or for new capacity to be located within Dublin over and above that required to replace existing plant retirements.

The Irish Regulatory Authorities (RAs) have previously argued that planned transmission system reinforcements and a review of locational signals through network charges (GTUoS and TLAFs) would provide a more lasting solution to location specific capacity needs in Ireland. In addition, providers of specific system services in the Dublin region receive additional DS3 revenues (their Locational Scarcity Scalar is above one). For 2018/2019, €12.5 million were allocated to cover the increased level of DS3 payments the higher locational scalars implies.³

The long-term solution to locational constraints is not expected to be implemented before 2025. Therefore, previous tenders and the latest capacity auction were designed to ensure sufficient capacity is secured for capacity constrained regions in Ireland, i.e. Dublin and Northern Ireland.

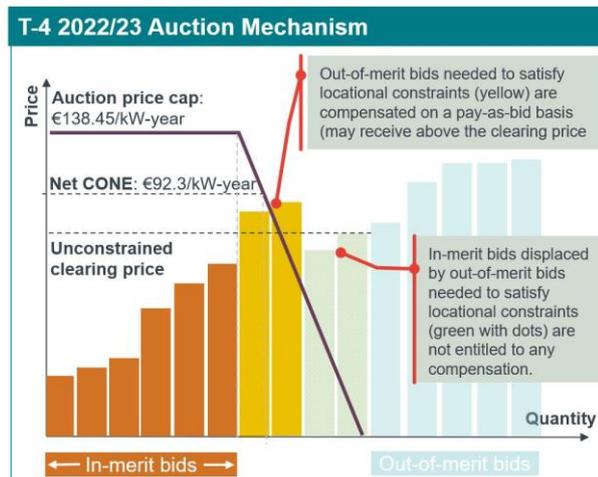
The last two transitional T-1 auctions for 2018/19 and 2019/20 were held on an All-Island, unconstrained basis and additional capacity needed for Dublin and Northern Ireland was procured *in addition* to the capacity cleared in the unconstrained auction. As a condition for receiving state aid approval for the new capacity mechanism from the European Commission, the Irish RAs agreed that from CY2020/21 onwards any capacity awarded to satisfy locational constraints will not be additional to the “in-merit” capacity secured in the All-Island, unconstrained auction.

This had an important implication for the design of the recently held T-4 auction. As in previous tenders, prior to the auction EirGrid and SONI specified the so-called Locational Capacity Constraint Area (LCCA) requirements which set out the minimum capacity needed to be secured in the auction for the Northern Ireland, Republic of Ireland (including Dublin), and the Greater Dublin regions.

However, the latest auction was designed so that any capacity needed to satisfy locational constraints would offset some of the in-merit capacity cleared in the unconstrained auction. The in-merit units displaced would be decided on the basis of the Net Social Welfare calculations and would not receive any compensation. The successful in-merit units would receive the clearing price in the unconstrained auction and capacity needed for locational reasons could be compensated on a “pay-as-bid” basis.



A new auction format



² EirGrid. All-Island Generation Capacity Statement. 2018-2027. Available at: http://www.eirgridgroup.com/site-files/library/EirGrid/Generation_Capacity_Statement_2018.pdf

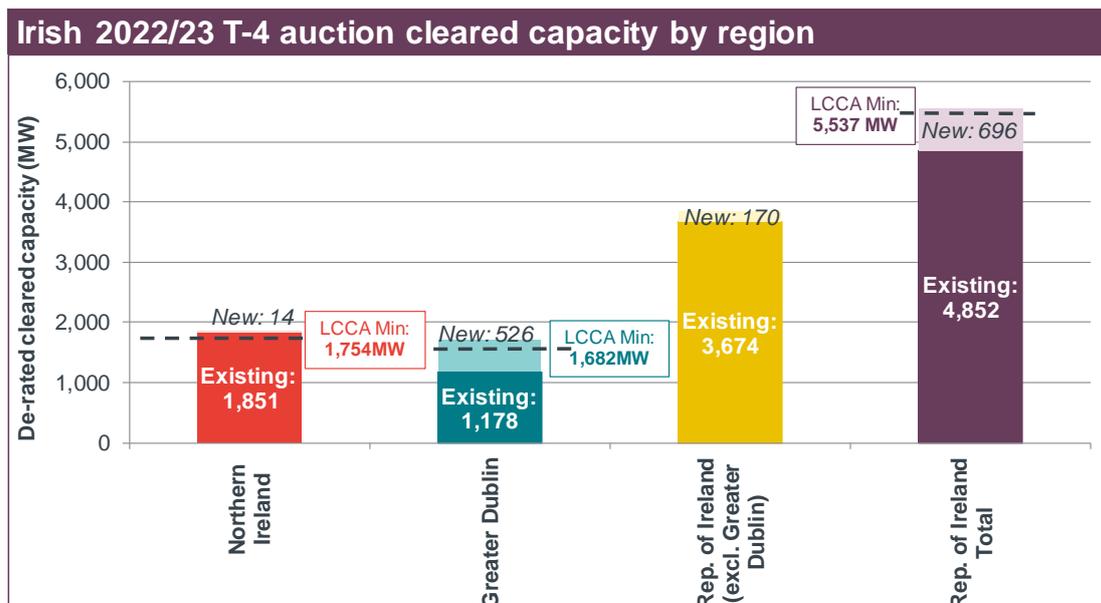
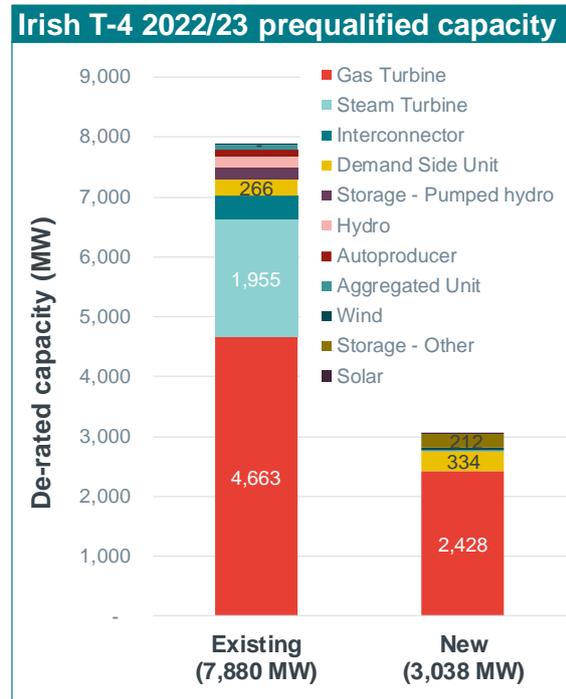
³ Commission for Regulation of Utilities. Dublin Security of Supply: Locational Scarcity Scalars for System Services in the Dublin Region. 4 February 2019. Available at: <https://www.cru.ie/wp-content/uploads/2019/02/CRU19011-Consultation-Paper-on-Locational-Scalars-in-the-Dublin-Region-updated.pdf>

Arguing that they wanted to avoid the risk that new plant was built to address temporary locational constraints in Dublin and Northern Ireland that are eventually resolved through transmission reinforcements, the RAs decided to award multi-year capacity contracts to new plant only under a few conditions:

- if the new plant cleared in the All-Island, unconstrained auction;
- if the LCCA minimum could not be met through any other means; and
- under exceptional circumstances, “out-of-merit” plant may be entitled to a higher price (pay-as-bid) to be determined on a case-by-case basis in discussion with the RAs.

The prequalification results published by EirGrid and SONI prior to the auction revealed that prequalified existing capacity (7,880 MW) was significantly in excess of the national capacity requirement (7,524 MW) set for the auction.⁴ This meant that barring locational constraints, there was more than enough existing capacity to meet the capacity requirement.

In addition, 3,038 MW of new capacity also prequalified. A significant proportion of this capacity was located in Dublin where the LCCA minimum (1,682 MW) was above the existing prequalified capacity (1,484MW).⁵ These new capacity providers faced a choice of either seeking to clear in the unconstrained auction (and securing a multi-year contract) or bidding higher, securing a high-priced 1-year contract and hoping that the annual clearing price in subsequent capacity auctions (along with energy and ancillary services margin) would be sufficient to cover their costs.



⁴ The capacity demanded at Net CONE was 6,770 MW or 754 MW lower which was held back from the T-4 capacity auction for the corresponding T-1 auction for the capacity year 2022/23.

⁵ This was in part due to the Irish RAs deciding to relax the requirement for new generators planning to locate in the Dublin region to have a connection offer or agreement in order to qualify for the auction. <https://www.cru.ie/wp-content/uploads/2018/10/CRU18229a-Letter-to-EirGrid-re-Duocational-Capacity-Constraints.pdf>

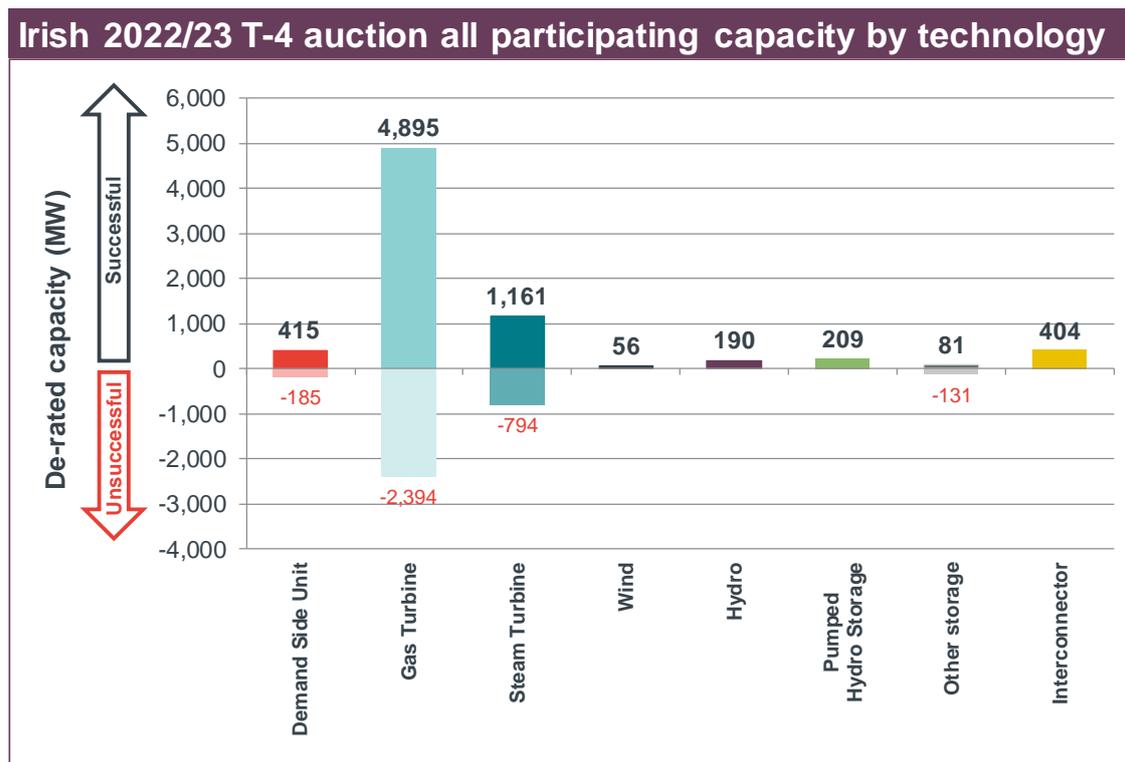
Evidence from the previous T-1 auctions indicated that the clearing price could be near the Existing Capacity Price Cap; the T-1 auction for delivery in 2018/19 cleared at €41,800/MW per year and the 2019/20 tender cleared at €40,645/MW per year, both close to the previous ECPC of €41,060/MW per year.

Winners and losers

In the T-4 auction held on 28 March 2019, existing capacity comprised 6,703MW or 90% of the total 7,412 MW cleared. All cleared capacity⁶ will receive the auction clearing price of €46,150/MW per year (or £43,030/MW per year), exactly equal to the Existing Capacity Price Cap (ECPC), for being available in 2022/23.

710 MW of new capacity cleared in the auction, three-quarters (526 MW) of which will be located in the Greater Dublin Area. The significant volume of new capacity that ended up clearing in Dublin was in part due to the 304 MW Huntstown gas turbine (HNC) in Dublin failing to clear, increasing the Dublin capacity gap and making way for additional new capacity. The 96 MW NorthWall gas turbine that ESB announced they were minded to retire by September 2019 cleared as a new 108 MW plant presumably to be built as a replacement for, and on the site of, the existing NorthWall plant. The Dublin situation to some extent represents a swap of new capacity for old.

In Dublin, with the exception of Statkraft Ireland’s 45 MW wind plant that cleared with a one-year contract, all new capacity cleared (489 MW across 9 ESB units) was awarded ten-year contracts. These plant would have needed to satisfy the constraints described above that the Irish RAs had set for granting multi-year contracts.

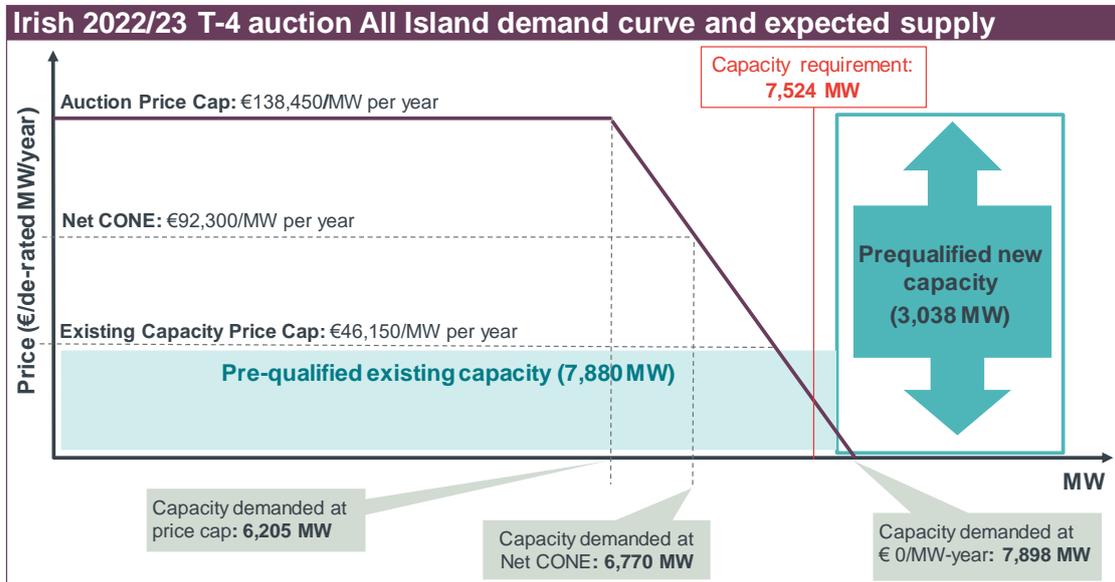


Looking at the technology breakdown of all capacity participating in the auction, existing gas turbines comprised more than half of the capacity successful in the auction, followed by steam turbines and demand side response. The same three technologies (in the same order) also saw the greatest volumes of capacity that failed to clear in the auction.

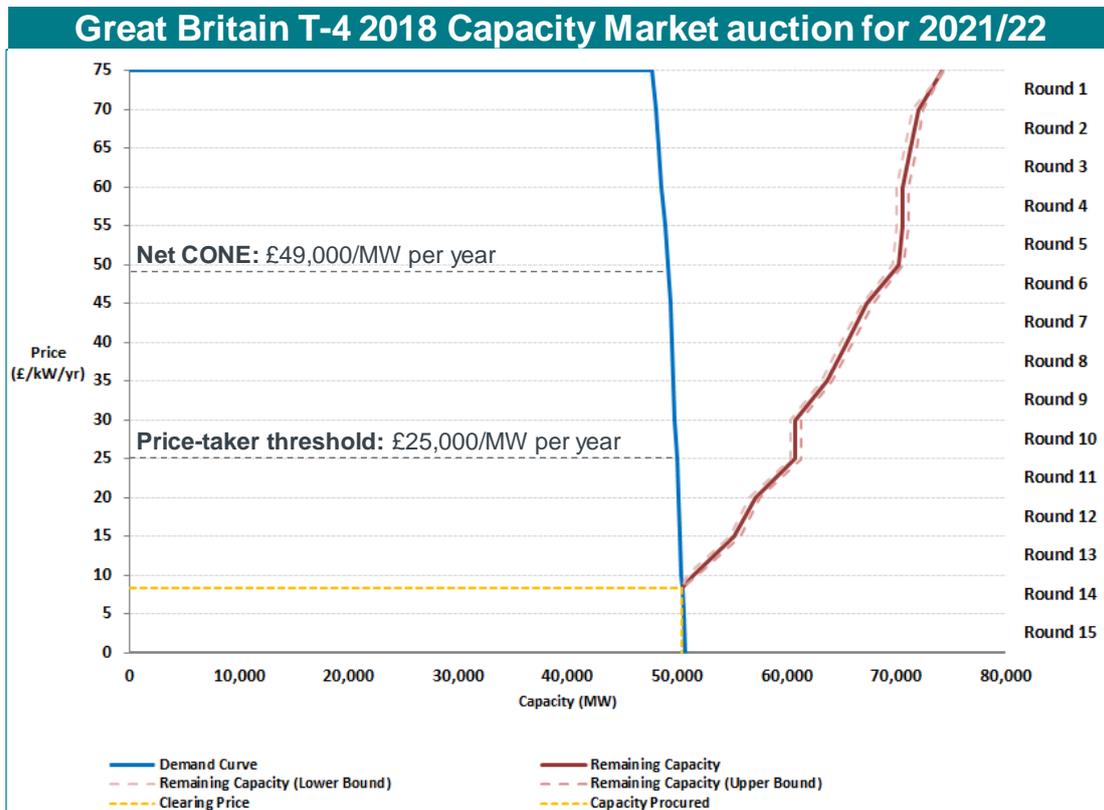
⁶ With the exception of two Kilroot units in Northern Ireland that will receive a slightly higher price of £43,730/MW per year and £43,274/MW per year.

Why so high?

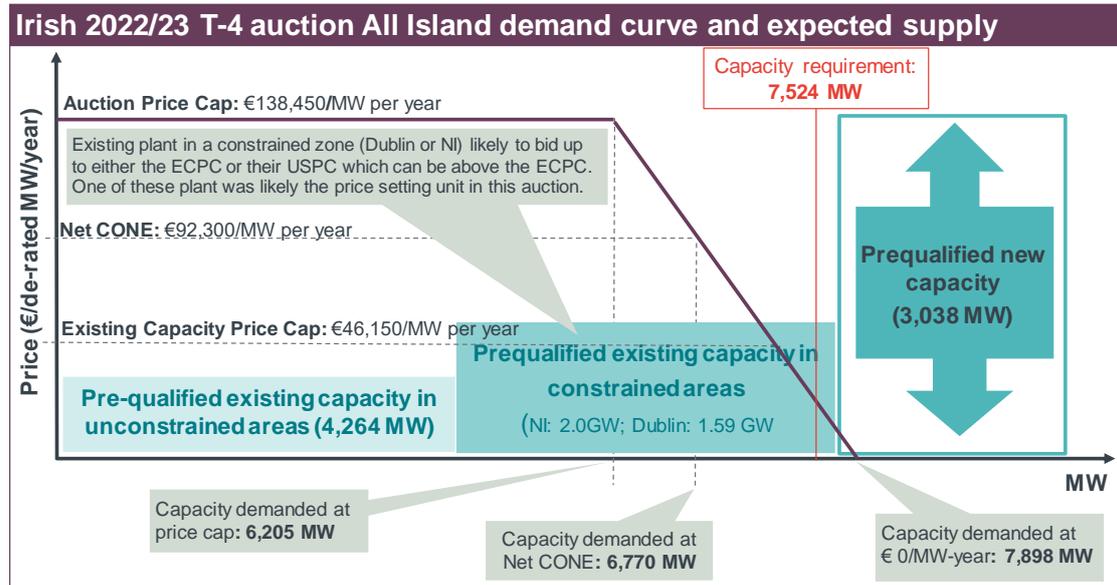
At first blush, the auction clearing price appears high given that the supply of existing capacity – 7,880 MW of existing capacity pre-qualified – was significantly more than the overall capacity requirement (7,540 MW) set for the auction, and very close to the capacity demanded at €0/MW per year (7,898 MW) set by the RAs.



In the last T-4 GB Capacity Market auction for delivery in 2021/22 held in February 2018, the amount of so-called price-taking capacity – existing capacity providers and interconnection – participating in the auction was in excess of the capacity requirement resulting in the auction clearing at a record low price of £8,400/MW per year, significantly below Net-CONE (£49,000/MW per year), and the clearing price observed in any of the previous T-4 auctions held in GB to date.



The pricing rules in the Irish T-4 capacity auction provide an explanation for why the same did not happen in Ireland.



In the Irish capacity market, existing capacity providers are subject to a bidding cap in the auction, known as the Existing Capacity Price Cap (ECPC), which Irish RAs have set at half of the estimated Net CONE which in turn represents an estimate of the costs of a Best New Entrant (BNE) peaking unit in Ireland. Capacity providers whose net going forward costs are in excess of the ECPC can apply for permission to submit a bid in excess of ECPC. The higher bid cap, known as a Unit Specific Price Cap (USPC), must be approved prior to the auction by the regulator. New capacity can bid up to the Auction Price Cap, set at 1.5 times Net CONE.

Knowing these pricing rules and looking at the prequalified capacity for the auction (figure above), the existing capacity providers in constrained regions (Dublin and Northern Ireland) could have been expected to set the auction price in the All-Island, unconstrained auction. Results of the last two T-1 auctions showed that material volumes of capacity in the constrained areas would be bidding around or just above the ECPC (via a USPC). While existing capacity in unconstrained areas would have been incentivized to bid low to guarantee clearing in the auction (to avoid being displaced by “out-of-merit” capacity needed to satisfy locational constraints), there was a strong chance that, consistent with the previous T-1 auctions, the All-Island unconstrained price would be close to the ECPC.

Realizing it would need to clear in the All-Island unconstrained auction, a new plant in the Dublin area could have reasonably formed the expectation that to secure a multi-year contract they would need to bid around the ECPC. The challenge would then have been to find the right plant type to be built in the right location, having an appropriate level of costs and revenue earning potential, that could be economically delivered. New plant clearing in this T-4 auction are clearly of the view that this is possible, so we now consider what revenue streams developers might have expected a peaking plant to earn.

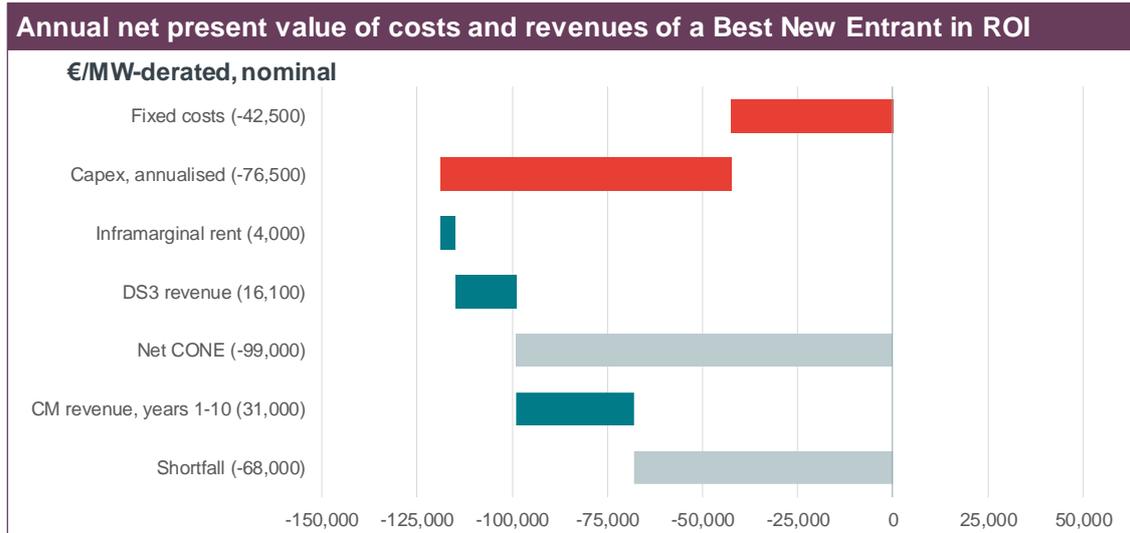
Making the sums add up

The Net CONE of €92,300/MW per year for the T-4 auction was based on the cost of a distillate OCGT located in Northern Ireland – the so-called Best New Entrant (BNE) – assessed by Poyry in September 2018 (BNE analysis).⁷ For a more direct comparison with new plant clearing in this auction, we take another plant assessed in the BNE analysis – namely a dual-fuel OCGT based

⁷ SEMC. T-4 Capacity Auction for 2022/23. Best New Entrant Net Cost of New Entrant. Decision Paper. 28 September 2018. Available here: <https://www.semcommittee.com/sites/semc/files/media-files/SEM-18-156%20CRM%20T-4%20CY202223%20BNE%20Decision%20Paper%20FINAL.pdf>

in Republic of Ireland. This plant was assessed to imply a Net CONE of €99,000/MW per year (although developers' actual costs might have been above or below this level).

The chart below shows the cost and revenue components assumed in calculating the €99,000/MW per year Net CONE figure and compares these to a ten year capacity market revenue at €46,150/MW per year (which translates to €31,000/MW per year over the 20-year lifetime of the project). The analysis is based on a pre-tax Weighted Average Cost of Capital (WACC) of 7.4% nominal (5.3% real) consistent with the selected WACC for Republic of Ireland in the BNE analysis.⁸



This shows that a developer of the BNE in Republic of Ireland with a ten-year capacity market contract at €46,150/MW per year would need to expect around €68,000/MW-derated per year of revenues in addition to those assessed in the BNE analysis. We examine below where might this additional revenue come from.

Inframarginal rent

Inframarginal rent (IMR) is defined as the electricity market revenue net of the short-run cost of operation, and is hence the operating margin achieved through dispatch in the wholesale and balancing markets. The BNE analysis assumes a level of €3,600/MW per year for the IMR earned by the best new entrant. This is conservative compared to actual market results for the 2018/19 period, for which we estimate an inframarginal rent of approximately €22,500/MW-derated-year (based on revenues available in the wholesale and balancing markets to a unit with the characteristics of the BNE assuming the upper 38% efficiency estimate). If we assume this level of IMR over a 20-year life, the estimated €68,000/MW-derated-year shortfall decreases by about one third.

That said, assuming the higher IMR for the duration of the plant life would not take into consideration several key factors, including:

- price cannibalisation due to more efficient, new peaking plant coming onstream;
- market developments such as the increasing renewable capacity share; and
- dissipation of high balancing prices observed during the first few months of I-SEM captured in the €22,500/MW-derated-year estimate based on 2018/19 market outcomes.

DS3 revenues

Estimate for DS3 revenues in the BNE analysis is based on implied average annual revenues available to different technologies as published by the TSOs. While this estimation makes an

⁸ Ibid. p.23.

allowance for the application of temporal scalars to system service payments at times of high System Non-Synchronous Penetration (SNSP), it does not account for the application of locational scalars in the Dublin region.

We noted above that for 2018/19, €12.5 million were set aside by the Irish RAs to increase the locational scarcity scalars for the Dublin region for a number of DS3 services, including TOR2, RRS, RRD, RM1, RM3 and SSRP. Providing for higher locational scarcity scalars for plant located in Dublin, we estimate may increase DS3 revenues from the baseline assumption of €16,100/MW per year in the BNE analysis to €25,800/MW per year, reducing the estimated shortfall further.

On one hand, enhanced capabilities of newer peaking units may allow new plant to capture even higher DS3 revenues, though such units may also have higher capital costs. On the other, developers would need to consider the risks that:

- cannibalisation may decrease DS3 earning potential, as more new flexible capacity comes online; and
- the duration of higher DS3 revenues from locational scarcity scalars is uncertain: there may no longer be a need for higher Dublin scalars once on-going transmission system reinforcements come online.

Future capacity revenue

The shortfall estimate does not take into account any future capacity revenue beyond the ten-year contract period (2022/23 – 2031/32). Assuming that the plant is able to earn capacity revenues for the remaining lifespan of the unit (i.e., years 11 to 20 of its assumed 20 year lifetime) would reduce the estimated shortfall and may remove it entirely depending on the level of assumed capacity payment.

Rising demand and plant retirements may act to support higher capacity prices in the future. However, developers would also need to weigh up the uncertain timing of new capacity requirements, and the interpretation of the European Commission's recent energy market policy (the Clean Energy for all Europeans package) in relation to capacity mechanisms. The package requires that capacity mechanisms are "temporary", but at this stage it is not clear what this means, particularly if it can be shown that there is an ongoing need for capacity additions.⁹

Other technologies

The analysis above has focused on the revenues and costs associated with a gas peaking plant (specifically a dual-fuel OCGT in Republic of Ireland). The T-4 results show that 81 MW of new "Other storage" plant (presumably batteries) cleared in the auction. The revenue streams available to these storage units may be different from the peaking plant considered above. For example, they are likely to be able to more competitively capture DS3 revenues from providing faster response services, and could also benefit from the arbitrage of increasingly volatile wholesale prices.

Conclusion

The opportunity to secure a multi-year contract for new build in the Dublin area was clear prior to the auction. The question was whether developers could make the sums add up, and the auction outcomes indicate that developers of new plant in Dublin were more optimistic about expected revenue streams than what was assumed in the 2018 Best New Entrant analysis.

Only the developers themselves will know the areas in which they expected revenue streams to be higher (and whether they also believed costs could be lower). Developers' views will have

⁹ "Capacity mechanisms shall be temporary. They shall be approved by the Commission for no longer than 10 years." And applies to existing capacity mechanisms: "Capacity mechanisms that are in place should be reviewed in light of this Regulation." REGULATION (EU) 2019/943 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 5 June 2019 on the internal market for electricity. Article 21(8). Available here: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0943&from=EN>

been influenced by the overall context of the sector, which would include the need for peaking units given increasing levels of renewable generation, and the overall outlook for electricity demand from conventional loads such as data centres as well as new loads from the electrification of the heat and transport sectors. Our analysis suggests that optimism in relation to IMR, DS3 revenues and future capacity income could credibly close the gap which the BNE analysis would otherwise imply.