



White Paper

Watchlist for the ISO-NE FCA-12 Auction

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Shareables

- Several market developments will impact capacity prices in the upcoming ISO-NE forward capacity market auction.

Key Downside Factors

1. Lower Net ICR.
2. Implementation of lower Net CONE.
3. Further transition to convex-shaped demand curves.
4. Expected cost of marginal units to be below DDBT.

Key Upside Factors

5. Increase in Penalty Rates
 6. Retirements Delists
- ICF projects that capacity prices for FCA-12 will range between \$4.3-\$5.3/kW-mo. with no zonal separation.



Executive Summary

ISO-NE's eleventh Forward Capacity Auction (FCA-11) results were announced on February 6, 2017 with a clearing price of \$5.3/kW-mo., a 25% decrease relative to FCA-10. This was the second consecutive decline in the capacity prices and the trend could potentially continue in FCA-12. There are several developments that point to lower capacity prices for the upcoming forward capacity market (FCM) auction. These developments include, (i) the implementation of lower Net Cost of New Entry (CONE), (ii) further transition to convex-shaped demand curves, and (iii) lower Net Installed Capacity Requirements (ICR). The downward impact of these developments will be partially offset by higher penalty rates and the retirement of Bridgeport Harbor 3.

ICF projects that capacity prices for FCA-12 will range between \$4.3-\$5.3/kW-mo. with no zonal separation. The price range provided by ICF reflects the uncertainty around the participation and bidding behavior of the 6 GW of marginal thermal (oil/gas and coal) capacity in the system, some of which could potentially de-list from the auction. Furthermore, prices might exceed ICF's expectation in the highly unlikely scenario where (i) the Independent Market Monitor (IMM) approves 2.4 GW of static de-list bids and, (ii) FERC approves Calpine and LS Power's request of removing Clear River Energy Center Unit 1 from the upcoming auction

Market Developments since FCA-11

Over the last few auctions, ISO-NE capacity prices have been on the decline. This has been primarily driven by the growth in passive demand response (energy efficiency), and distributed solar generation along with 2.3 GW of new gas-fired capacity expansion.¹ This has resulted in ISO-NE market going from 13% reserve margin in 2017/2018 to 21% reserve margin in 2020/2021. Going forward, although we do not expect any new gas-fired capacity expansion in the ISO-NE region to be economical, we do expect the downward pricing trend to continue in the upcoming forward capacity auction. This is primarily driven by a number of market developments since FCA-11, which are discussed below in detail.

Developments with Negative Impact on Capacity Prices

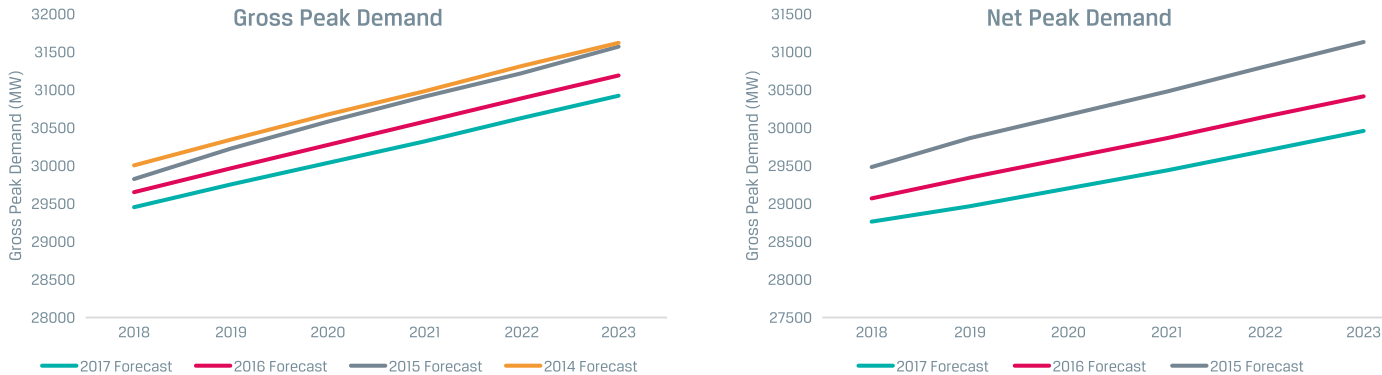
Reduction in Net ICR

This will be the third consecutive auction when ISO-NE will lower their installed capacity requirements. As shown in Exhibit 1, the declining requirements over the past three years have been primarily driven by the decrease in peak demand projections which is mostly a result of decrease in Moody's economic outlook and increasing penetration of distributed solar generation.



¹ CPV Towantic, Medway Peaker, Wallingford Unit 6&7, Burrillville Energy Center 3, Bridgeport Harbor 6 and Canal 3

EXHIBIT 1. SHIFT IN PEAK DEMAND FORECAST OVER THE PAST THREE YEARS



Source: ISO-NE CELT Forecast

Compared to FCA-11, ISO-NE has decreased its Net ICR for FCA-12 from 34,075 MW to 33,725 MW.² The biggest contributors to the drop are (a) the decrease in the projected peak demand, and (b) the marginal increase in tie-in-benefits, which result in a decrease of approximately -395 MW and -69 MW in the net ICR respectively. The largest offset is provided by the expected increase in the forced outage rate of generators that increases the net ICR by approximately 106 MW. The overall decrease in net ICR will shift the demand curves to the left (see Exhibit 2) and is expected to decrease the capacity prices in the range of -\$0.6/kW-mo. to -\$0.75/kW-mo.

Updated CONE

In contrast to PJM ISO and NYISO, where reference technologies reflect peaking units (CT), ISO-NE utilized a 2x1 combined cycle (CC) unit as the reference technology for its demand curves. However, following FCA-11, ISO-NE revised this assumption with a new bottom-up CONE study³ and will henceforth consider CT technology as the reference point for the Net CONE pricing, aligning it with other capacity markets.⁴ The updated Net CONE values are similar to the previous findings, but the shift to CT as the reference technology will lower the Net CONE used for demand curve design from \$11.64/kW-mo. in FCA-11 to \$8.04/kW-mo. in FCA-12.

The lower net CONE assumptions will shift the demand curves to the left (see Exhibit 2) and put downward pressure on the capacity prices. ICF anticipates that the impact of this change on the capacity prices will be in the range of -\$1/kW-mo. to -\$1.25/kW-mo.

² https://www.iso-ne.com/static-assets/documents/2017/08/a20_pspc_icr_proposed_values_08172017.pdf

³ ISO-NE Net CONE Study https://www.iso-ne.com/static-assets/documents/2017/01/cone_and_ortp_updates.pdf

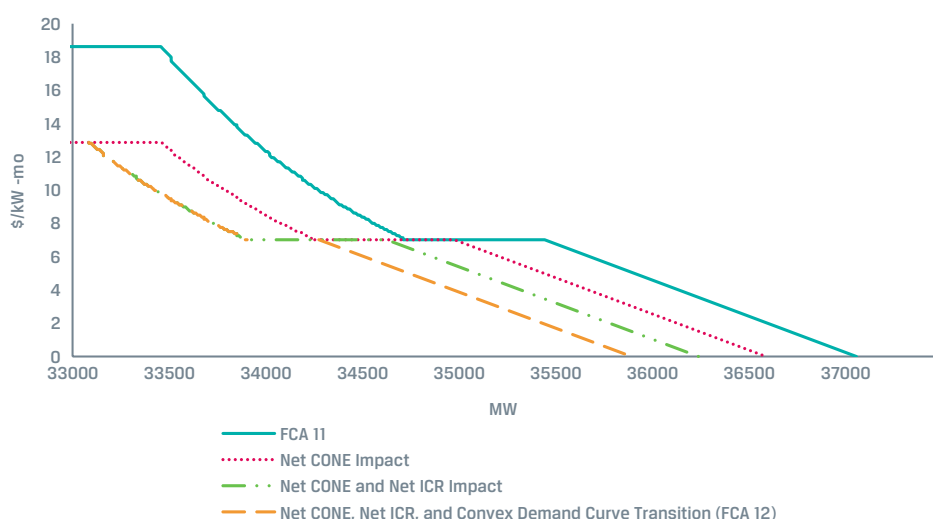
⁴ The updated net CONE assumption was filed with FERC on January 13, 2017 and was approved on October 6, 2017.



Transition to Convex Demand Curve

In 2016, FERC approved ISO-NE's proposal to implement a new system wide and zonal demand curve. ISO-NE replaced the linear demand curve with a convex to shape the diminishing value of an incremental MW as more supply is added to the system. Starting from FCA-11, the convex curve is proposed to be phased-in over three auctions (FCA-11-FCA-13). As shown in Exhibit 2, between FCA-11 and FCA-12, the linear portion of the curve will be shifted towards the left by approximately 347 MW to further transition to the convex shape. This will put downward pressure on the capacity prices which ICF expects to be in the range of $-\$0.7/\text{kW-mo.}$ to $-\$0.85/\text{kW-mo.}$

EXHIBIT 2. DEMAND CURVE CHANGES FROM FCA-11 TO FCA-12



Source: ICF

Average cost expected below the Dynamic de-list Bid Threshold (DDBT)

The DDBT reflects the price below which a resource can delist from the auction by submitting a dynamic de-list bid. Dynamic de-list bids are submitted by participants during an auction and are the only way for generators to de-list during the auction clearing process. Unlike other types of delist bids, dynamic delist bids are not overseen by the market monitor. If a resource is dynamically delisted, it can re-enter as existing resource in the next auction. Since resources are allowed to dynamically de-list from the auction if the prices fall below the DDBT, it can also be seen as a soft floor or support level for the auction prices.

The current DDBT of $\$5.5/\text{kW-mo.}$ reflects an average of the bids of the marginal units in FCA-9. However, since FCA-9 there have been number of changes to the system as excess supply and a significant decline in the expected scarcity hours.⁵ As a result, the marginal units have lower risk premiums and their average cost is lower than the current DDBT of $\$5.5/\text{kW-mo.}$ In other words, capacity prices can potentially clear below the soft floor of $\$5.5/\text{kW-mo.}$ because the DDBT does not



⁵ https://www.iso-ne.com/static-assets/documents/2016/12/iso_memo_operating_reserve_deficiency_dec_19_2016.pdf

reflect the most updated cost of the marginal units. This was also observed in FCA-11 when capacity prices cleared below \$5.5/kW-mo. ICF estimates that the average bid of the marginal units for FCA-12 will be around \$4.8/kW-mo. and significant de-listing if capacity prices fall below this level.

Consistent with ICF's observations, ISO-NE is also planning to update the DDBT to reflect the most recent cost of the marginal units. ISO-NE has proposed to update the DDBT from \$5.5/kW-mo. to \$4.3/kW-mo. for FCA 13 based on estimations provided by the Independent Market Monitor.

This is slightly lower than ICF's estimate of the average cost of the marginal units in the system. This proposal is yet to be approved and the motion to pass this proposal was recently failed by the Participant's Committee.

Developments with Positive Impact on Capacity Prices

Increase in Penalty Rates

The Performance Payment Rates (PPR), administratively set by ISO-NE, will see a step increase in the FCA-12 from \$2000/MWh to \$3500/MWh. A higher PPR implies that generators could potentially face higher penalties for non-performance during scarcity hours in the 2021/2022 period. ICF assumes that generators will exhibit rational behavior and adjust the penalty risk component of their capacity price bid to account for the higher penalty rate in the upcoming auction. This could potentially put upward pressure on the capacity prices in the range of +\$0.25/kW-mo. to +\$0.4/kW-mo.

Retirements Delists

Bridgeport Harbor 3 submitted a full retirement de-list bid for the upcoming auction and the request was approved by ISONE on August 2017. Retirement de-list bids are higher than the DDBT of \$5.5/kW-mo. and reflect the price levels below which the plant will retire from the system. ICF expects the capacity prices to clear below the DDBT therefore it is highly likely that Bridgeport Harbor 3 will retire. Additionally, there is approximately 186 MW of expected decrease in the existing Passive (EE) Demand Response (PDR) capacity. However, ICF estimates that there will addition of approximately 250 MW of new PDR that will more than offset the decrease in the existing PDR. The net loss of approximately 316 MW⁶ of capacity from the system is expected to have an upward impact on the capacity prices in the range of +\$1.6/kW-mo. to +\$1.9/kW-mo.

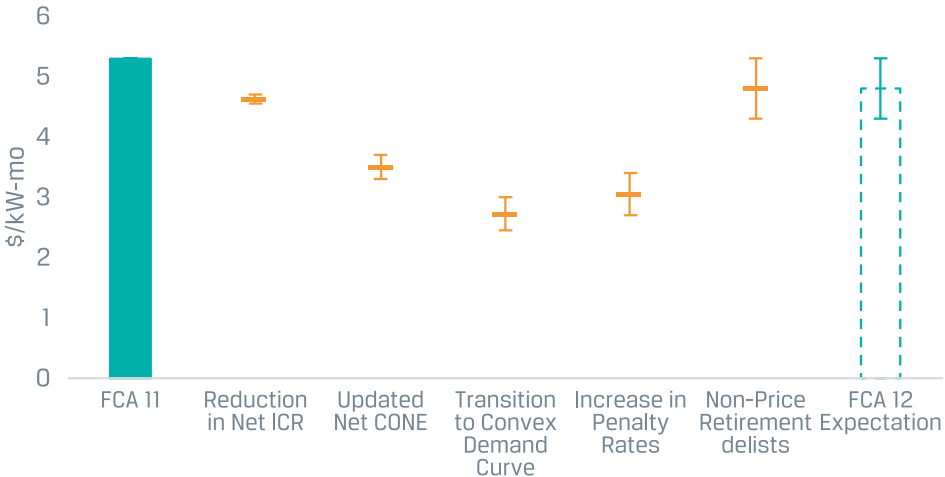
ICF's Expectations for FCA-12

ICF projects that capacity prices for FCA-12 will range between \$4.3-\$5.3/kW-mo. (as shown in Exhibit 3) with no zonal separation based on the factors described above. The price range provided by ICF reflects the uncertainty around the participation and bidding behavior of the 6 GW of marginal thermal (oil/gas and coal) capacity in the system, some of which could potentially de-list from the auction.

⁶ 380 (Bridgeport Harbor 3)+186 (decrease in Existing EE)-250 (New EE capacity) = 316

Note: For illustrative purposes, the impact of each change has been analyzed and shown independent of other changes. For example, the impact for non-price retirement delists assumes no other change from FCA-11. In reality the interplay between the changes and their sequence of implementation could result in different individual impacts.

EXHIBIT 3. BRIDGE BETWEEN FCA-11 AND EXPECTED FCA-12 CAPACITY PRICES



Source: ICF

In the unlikely case of significantly higher bidding and excessive de-listing of capacity from the auction, prices could clear higher than ICF's expected range. Eight static de-list bids amounting to ~2.4 GW of capacity have been implying that these units have bids higher than the DDBT of \$5.5/kW-mo. Although ISO-NE does not disclose the unit names for which static de-list bids have been submitted, ICF anticipates these could be marginal oil/gas units such as Yarmouth (Wyman Steam), Mystic 7, SO. Meadow etc. Static de-list bids have to be approved by IMM and this information is published after the auction results. In the case that all static de-list bids for FCA-12 are approved, they could provide some support for the prices and possibly result in capacity prices higher than ICF's expectations. However, it is unlikely that the IMM would approve all the static de-list bids. A case in point would be FCA-11, where out of 1.5 GW of submitted static de-list bids, only 250 MW were approved by the IMM. Furthermore, we expect that most of the marginal resources might delay their decision to retire or de-list from the auction in anticipation of ISO-NE's proposed Competitive Auction with Sponsored Resources (CASPR), which if implemented, would provide severance payment to marginal resources as they retire from the system.⁷

In addition to the uncertainty around static de-list bids, there are also some concerns around the participation of Clear River Energy Center (Burrillville Energy Center). 485 MW of Unit 1 of this plant cleared in FCA-10; however local opposition resulting in permitting delays has hampered the development of the plant.

As a result, Unit 2 of this plant is disqualified from participating in the upcoming FCA-12. Furthermore, Calpine and LS Power recently filed with ISO-NE to disqualify Unit 1 as well in light of the plant's challenges and low probability of the plant coming online.⁸ Given the past outcomes of such requests and ISO-NE's response to this filing, it is highly unlikely that FERC will approve this request.

⁷ This proposal was filed with FERC on January 8, 2018: https://www.iso-ne.com/static-assets/documents/2018/01/er18-619-000_caspr_filing.pdf

⁸ https://iso-ne.com/static-assets/documents/2018/01/answer_to_calpine_complaint_el18-53.pdf



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