



White Paper

# It's time for 100% Capacity Performance: Will PJM Prices be Higher?

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## Shareables

- PJM capacity prices are projected to be above \$100/MW-day for the 2020/2021 auction.
- The 100% Capacity Performance Product requirement is expected to offset downward pressure from increased supply and lower demand.
- Price separation is likely for the EMAAC, ComEd, and DAY Local Delivery Areas.

## 2020/2021 Auction Preview

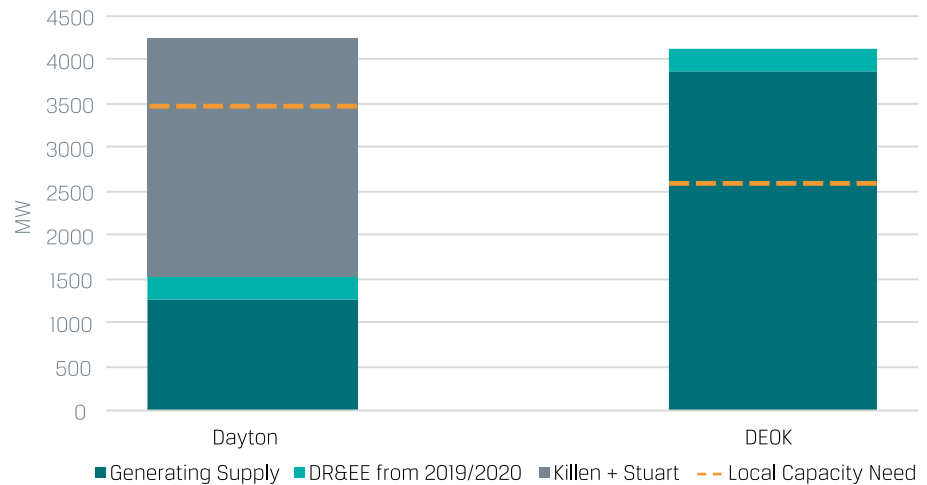
PJM's highly anticipated 2020/2021 Base Residual Auction is less than two months away. While the full transition to the Capacity Performance (CP) regime has been a source of much discussion several market parameters and dynamics will influence the auction results. Taken together, they indicate that RTO prices will be above \$100/MW-day for the 2020/2021 auction.



## Changes to Auction Parameters

- **100% CP Product Requirement:** The market transition to a 100% CP Product requirement means that PJM will not be able to procure the lower cost Base Product, which cleared 27 GW in the last auction. PJM has not raised the CP requirement from its 80% share of procurement since CP was first introduced. All else equal, PJM will need to procure capacity with higher CP bids than in the May 2016 auction to meet the higher CP product requirement. In the last two PJM capacity auctions, nearly all Demand Response (DR) participation in the market was as Base Product, and hence, cleared DR is expected to significantly decrease. This is because many DR resources only have summer capability. In its 2017 Load Forecast, PJM estimates that 3 GW will leave the auction because of tightened rules. Even more may leave because 5.7 GW of DR capacity submitted bids for and cleared as Base Product only; the DR that bid for both CP and Base cleared almost exclusively as Base. ICF's model projects approximately \$50 to \$60/MW-day uplift from the CP transition alone; however, several other mitigating factors discussed below will likely result in this uplift not being realized.
- **Lower demand forecast:** On February 1, 2017, PJM released the annual planning parameters for the upcoming Base Residual Auction for the 2020/2021 capacity year. While the installed reserve margin and pool-wide effective forced outage rate (EFORd) declined less than 0.1%, the forecast peak load declined 3.3 GW (2.1%) from the preliminary value of 157.2 GW to the final value of 153.9 GW. The decline is part of PJM's recently released 2017 load forecast and has been attributed primarily to worsened economics, solar growth, and forecast methodology adjustments. All else equal, ICF's analysis sees a \$15 to \$25/MW-day downward impact from the lower peak demand forecast.
- **New modeled Local Delivery Areas (LDA):** PJM defines new LDAs for the capacity market if the CETL/CETO ratio for a zone is less than 1.15 or if PJM has other reliability concerns. The creation of the Dayton and DEOK LDAs fall into the latter category. Two coal-fired facilities owned by Dayton Power and Light (DP&L), Killen and Stuart, constitute over half of the capacity in DP&L. DP&L announced that, in a deal with the Sierra Club, these plants would be retired in 2018. As illustrated in Exhibit 1, if these plants retire, Dayton will be short of capacity. This creates significant upside potential for capacity prices in Dayton in the upcoming auction. ICF's analysis shows DEOK to be less likely to see price separation than Dayton due to its level of surplus capacity.

EXHIBIT 1. DAYTON AND DEOK SUPPLY/DEMAND BALANCE



- Higher EMAAC CETL:** PJM has again increased EMAAC's Capacity Emergency Transfer Limit (CETL), the amount of capacity from outside EMAAC that can be used to satisfy EMAAC's reliability requirement. This 2.1 GW increase (to 11 GW) means that EMAAC will need to clear less local capacity, and decreases the likelihood (or magnitude) of EMAAC's price separation from the RTO capacity price. PJM bases this change on the expiration of the ConEd/PSEG Wheel Agreement which will allow more power to be imported into EMAAC from the rest of PJM.<sup>1</sup> PJM notes that the EMAAC import limits are still under consideration and may be revised before the auction. This parameter could be critical to EMAAC's clearing price.
- Lower COMED CETL:** PJM has lowered Commonwealth Edison's (COMED) CETL by 926 MW (to 4.2 GW), meaning that COMED will need to clear more local capacity. COMED cleared at a much higher price than RTO in the last auction (\$203/MW-day vs. \$100/MW-day), and this decrease in import ability bolsters price separation going forward.
- Inclusion of Price Responsive Demand:** Price responsive demand (PRD) represents retail electricity customers that can curtail demand in response to a given energy price. When a Load Serving Entity (LSE) elects to procure PRD, the Base Residual Auction (BRA) demand curve is shifted inward to reflect the reduction in peak demand. While this product has been allowed to participate in PJM's capacity auctions since 2013 (for the 2016/2017 auction period), this is the first year that LSEs have elected to procure PRD. The transition to the 100% CP Product requirement may have been a catalyst to the inclusion of PRD in this auction. With a large amount of DR capacity that only submitted Base Product bids in the last auction expected to leave the market, this opens the field for alternative forms of load management. However, the amount elected in the 2020/2021 auction is not economically significant at only 558 MW across PJM. This amount of capacity will have a minimal impact on the clearing price.

<sup>1</sup> Historically through the agreement, a fixed 1000 MW was scheduled to flow from NYISO to PJM through the Ramapo-Waldwick interface and from PJM to NYISO over the Hudson-Farragut and Linden-Goethals interface, essentially moving power from southeast New York into New York City through PJM

- Decrease in Balancing Ratio and Offer Caps:** The Balancing Ratio, the average actual unit performance during emergency hours over the past three years, has declined for the 2020/2021 auction to 78.5% from 81%. This results in lower unit offer caps. Because capacity market clearing prices have been significantly below the offer caps, ICF does not expect this change will impact capacity prices.

## Additional Market Developments

- Quad Cities State Subsidy:** In December, Illinois passed a bill to subsidize certain nuclear generators in the state based on the "social cost of carbon." The bill is aimed at supporting Exelon's Quad Cities (PJM) and Clinton (MISO) nuclear facilities. Quad Cities was previously slated for retirement in 2018. With this subsidy, Quad Cities is likely to bid lower and clear in the capacity market, something it hasn't done for three years. This will add more supply to the system and put downward pressure on prices in COMED. However, as only Quad Cities will receive the subsidy, ICF projects the other nuclear facilities in COMED will continue to bid high in the capacity market. The Byron facility did not fully clear in the 2019/2020 auction meaning that it bid in the range of \$203/MW-day and up. With no significant positive energy market changes in COMED over the past year, ICF projects Byron will continue to bid at this price level, likely setting the capacity price in COMED for the 2020/2021 auction. In addition, the decrease in COMED's CETL partially offsets this increase in lower cost supply.
- New builds:** Over the past few auctions, PJM has steadily added new combined-cycle capacity to the system, and this will likely continue with the next auction. 43 GW of new combined cycle capacity is currently planned or under construction in PJM. ICF projects approximately 4 to 5 GW of this capacity will clear as new capacity in the 2020/2021 auction. Several factors are contributing to new capacity being added to the system, even though capacity prices are half of Net CONE (Cost of New Entry). First, access to low cost Marcellus gas at hubs like Dominion South, Leidy, and Tennessee Zone 4 create favorable economics for new combined cycle facilities as marginal coal plants put a floor on energy market prices. Second, PJM's Net CONE calculations used in its demand curve were last updated in 2014, when gas prices and capital costs were higher. This creates a disconnect in the market which allows for economic new entries at higher reserve margin levels.
- Seasonal Capacity Resources:** Following major complaints from load aggregators and some LSEs, PJM created the Seasonal Capacity Resources Senior Task Force to analyze solutions that would facilitate continued participation of intermittent resources and demand response once the market transitions to the 100% CP requirement. In September 2016, the task force released a proposal stating that seasonal resources would now be allowed to aggregate across the Local Deliverability Areas (LDAs).



Most importantly, PJM's BRA clearing algorithm would be modified to ensure that the auction procures equal amounts of summer and winter capacity from seasonal resources so that these commitments, in aggregate, satisfy the year-round availability and performance requirements of a CP resource. In summary, PJM would facilitate the aggregation of resources through its auction clearing algorithm. Although the proposal received support from less than one-third of PJM stakeholders (load aggregators insisted in the continuation of the Base Product), PJM nonetheless filed this proposal with FERC. The proposal was contingently accepted in the absence of a FERC quorum at the end of March. PJM's preliminary analysis of the impact of this change is an additional 1 GW of supply from the aggregation of summer-only DR with winter capacity from wind resources; ICF estimates this could reach up to 2 GW that would have otherwise left the market because of the 100% CP Product requirement.

### RTO Prices Most Likely to Increase in the 2020/2021 Auction

Taking all of these factors into account, ICF expects RTO capacity prices to increase above \$100/MW-day in the 2020/2021 auction. In the 2019/2020 auction, CP prices cleared at \$100/MW-day because the market also used 27 GW of lower cost Base Product to meet the reliability requirements. Exhibit 2 illustrates the breakdown of cleared capacity in the 2019/2020 auction. Because this capacity did not clear as CP in the last auction, it means that it has CP bids of greater than \$100/MW-day. Of this 27 GW, 11 GW did not even submit bids for the CP Product in the last auction and might not participate in the upcoming auction. Thus, it is likely that 16% of PJM's cleared capacity from the 2019/2020 auction will only clear the market if the CP Product prices are above \$100/MW-day. This creates significant upward pressure on capacity prices for the next auction; however, the additional supply and demand changes in the market will temper this effect.

EXHIBIT 2. BREAKDOWN OF 2019/2020 CLEARED CAPACITY

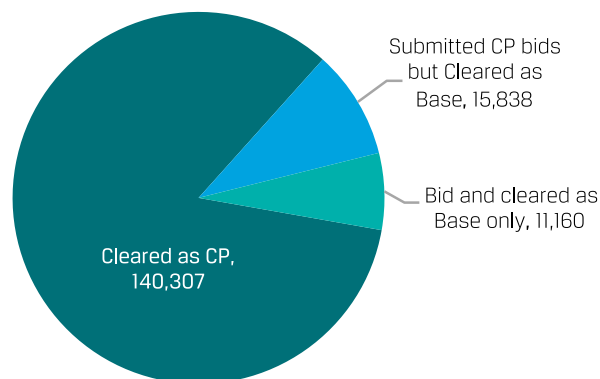


Exhibit 3 summarizes the major supply changes from 2019/2020 to 2020/2021, showing that the market could have a looser supply/demand balance in the range of 6.9 to 7.9 GW. Even with this additional supply, it will not completely offset the 27 GW of upward pressure from the elimination of the Base Product. Prices should only be at or below \$100/MW-day if there is underbidding or if there is a significant uptick in units' energy margin expectations, which would result in lower capacity revenue requirements. In terms of locational pricing, ICF pegs EMAAC, COMED, and DAY to see price separation in the next auction.

#### EXHIBIT 3. RTO SUPPLY AND DEMAND CHANGES

Factor	Capacity Impact
Reserve Margin Requirement	+3.4 GW
Price Responsive Demand	+0.6 GW
New Builds	+4 to 5 GW
Quad Cities Subsidies	+1.7 GW
Killen and Stuart Retirements	-2.7 GW
Net Change in Supply/Demand Balance	+6.9 to +7.9 GW

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