# Potential Impacts of the Creation of a ComEd FRR

The Independent Market Monitor for PJM

December 18, 2019

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## Summary

The IMM analyzed the impacts of ComEd/Exelon electing to not participate in the PJM Capacity Market and to use the Fixed Resource Requirement (FRR) option to satisfy its capacity obligation. Under the FRR option, ComEd/Exelon would need to meet its FRR capacity obligation through a combination of self supply and bilateral contracts with other owners of capacity, primarily within the ComEd Zone. The IMM analyzed two scenarios. Under Scenario 1, the IMM assumes that ComEd/Exelon procures its entire capacity obligation at a rate equal to the current offer cap applicable to the ComEd LDA ($254.40 per MW-day). Given Exelon's assertions that the current total revenue from energy, ancillary and capacity markets is not adequate for its nuclear plants, this is a reasonable scenario. The IMM concludes that under Scenario 1 net load charges for the ComEd Zone under the FRR alternative would increase by $414.4 million or 23.6 percent compared to the results of the PJM RPM Base Residual Auction (BRA) for the 2021/2022 Delivery Year. Under Scenario 2, the IMM assumes that ComEd/Exelon procures its entire capacity obligation at a rate equal to the ComEd LDA clearing price in the 2021/2022 BRA ($195.55 per MW-day). Given Exelon's assertions that the current total revenue from energy, ancillary and capacity markets is not adequate for its nuclear plants, Scenario 2 represents a lower bound on potential outcomes. The IMM concludes that under Scenario 2 the net load charges for the ComEd Zone under the FRR alternative would decrease by $87.9 million or 5.0 percent compared the results of the RPM Base Residual Auction for the 2021/2022 Delivery Year. The decrease in net load charges in Scenario 2 is the result of a lower capacity obligation for the ComEd Zone under the FRR rules versus the rules that apply for an LDA in the PJM RPM.

For both Scenarios 1 and 2, the IMM also analyzed the impacts on the RTO excluding the ComEd LDA. In both Scenarios, the rest of RTO clearing price would decrease by $61.77 per MW-day to $78.23 per MW-day, or 44.1 percent compared to the results of the RPM Base Residual Auction for the 2021/2022 Delivery Year, the DEOK clearing price would decrease by $11.53 per MW-day, or 8.2 percent, while the clearing price would remain unchanged for the other LDAs that were constrained in the 2021/2022 BRA. Net load charges for the RTO excluding ComEd would be lower by $2.1 billion or 27.8 percent compared to the 2021/2022 BRA net load charges.

The role of the ZECs subsidies must be included in any evaluation of total payments for capacity by customers in the ComEd LDA. As part of Illinois Future Energy Jobs Act, Exelon has received subsidies in the form of Zero Emission Credits (ZECs) for its Quad Cities nuclear power plant in the ComEd LDA since June 1, 2017. The subsidy to Quad Cities was approximately $125.4 million in 2018.[1] Exelon has also indicated that it wants

1 Exelon reported revenue associated with Zero Emission Credits (ZECs) for its share of ownership in Quad Cities (PJM) and Clinton (MISO) nuclear power plants in 2018 was $223

subsidies for its other ComEd nuclear plants. If Exelon receives comparable subsidies for the Quad Cities, Byron, Braidwood, Dresden and LaSalle nuclear power plants, the total annual subsidies would be approximately $924.9 million, an increase of $799.5 million. The cost of the subsidies should be included in the evaluation of both scenarios.

Based on the analysis, the creation of a ComEd FRR is likely to increase payments for capacity by customers in ComEd, and to decrease payments for capacity by customers in the rest of the RTO LDA, in the DEOK LDA, and to not affect payments for capacity by customers in the other LDAs that were constrained in the 2021/2022 BRA. The increase in payments by customers in ComEd would be significantly larger if the suggested increase in subsidies is also implemented. It is assumed that the actual price for capacity in ComEd and the actual subsidies for nuclear plants in ComEd would be the result of a negotiation between ComEd/Exelon and Illinois, and/or a negotiation between ComEd/Exelon and/or Illinois and the other owners of capacity in the ComEd LDA.[2]

# Introduction

In this report, the IMM analyzes the rules governing the fixed resource requirement (FRR) alternative to direct participation in the PJM Capacity Market and a range of potential impacts of creating a ComEd FRR service area both on payments by customers in the ComEd LDA and by customers in the balance of the RTO, based on explicitly stated assumptions.[3] The public discussion of a ComEd FRR and potential FRRs in other LDAs has not been supported by analysis to date. The IMM will provide analyses of the outcomes under different assumptions and of other potential FRRs, upon request. The IMM previously provided comparable analysis of FERC's resource specific FRR approach and of PJM's extended resource carve out proposal or repricing approach.[4] The American Electric Power Company, Inc. (AEP) created the first FRR service area based on the original RPM tariff rules adopted in 2007. AEP was a vertically integrated utility (transmission, generation and distribution assets) which participated in all the other PJM markets, but which, rather than participating in the PJM Capacity Market,

million. Of the $223 million, Exelon's estimated share of ZEC revenue for Quad Cities nuclear power plant based on installed capacity was $125.4 million. See Exelon Corporation Form 10-K <https://www.sec.gov/Archives/edgar/data/8192/000162828019001107/exc-20181231x10k.htm> (published February 8, 2019) at 81.

2 This could also include the owners of capacity that could be imported, limited by the CETL.

3 See "Reliability Assurance Agreement Among Load Serving Entities in the PJM Region," Article 1 and Schedule 8.1.

4 See Monitoring Analytics, LLC "MOPR/FRR Sensitivity Analyses of the 2021/2022 RPM Base Residual Auction," <http://www.monitoringanalytics.com/reports/Reports/2018/IMM_MOPR_FRR_Sensitivity_Analyses_Report_20180926.pdf> (September 26, 2018).

received payment for generation capacity well in excess of capacity market prices, based on a cost of service model, under a regulatory arrangement with Ohio. In order to create a new FRR service area, both the state in which the FRR exists and the transmission owner whose zone would be the FRR service area would have to agree to create the FRR and agree on the terms of payment for the capacity required to meet the FRR unforced capacity (UCAP) obligation. Commonwealth Edison Company (ComEd), as an IOU, could elect to become an FRR entity.[5] Illinois could require that ComEd elect FRR status.[6] In the AEP case, AEP owned enough generation assets to meet its PJM defined UCAP obligation. Regardless of the existence of retail choice, the FRR entity must include all load in the FRR service area and must provide adequate capacity to meet that load. In the ComEd LDA, Exelon does not own enough capacity resources to meet the PJM defined FRR UCAP obligation. In order to create a viable FRR, ComEd/Exelon would need to contract with other capacity resource owners in the ComEd LDA, and potentially capacity resource owners external to the ComEd LDA, limited by CETL, to meet the FRR UCAP obligation for the ComEd Zone.

The analysis in this report is based on the actual auction inputs and results for the Reliability Pricing Model (RPM) Base Residual Auction (BRA) for the 2021/2022 Delivery Year, the last BRA run.[7]

The IMM evaluated the results of creating a ComEd FRR service area for ComEd, and for the rest of the capacity market, under two scenarios:

- Scenario 1: ComEd/Exelon contracts with capacity resource owners in the ComEd LDA based on capacity market MW offers in the 2021/2022 BRA to meet the entire FRR UCAP obligation for the ComEd Zone. The capacity price in the ComEd LDA FRR is assumed to be the defined offer cap in the capacity market, net CONE times B ($254.40 per MW-day).

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5 Commonwealth Edison Company is a subsidiary of Exelon Corporation.

6 An FRR entity is required to meet the capacity obligations of all alternative retail LSEs in the FRR service area. The alternative retail LSEs are required to compensate the FRR entity based on a state mandated compensation mechanism or based on the rest of RTO capacity price, in the absence of a state compensation mechanism. For any delivery year subsequent to those addressed in the FRR entity's current FRR capacity plan, the alternative retail LSE may satisfy the load payment to the FRR entity with capacity resources.

7 Participant behavior and market performance were evaluated as not competitive in the 2021/2022 RPM Base Residual Auction. See Monitoring Analytics, LLC, "Analysis of the 2021/2022 RPM Base Residual Auction - Revised," <http://www.monitoringanalytics.com/reports/Reports/2018/IMM_Analysis_of_the_20212022_RPM_BRA_Revised_20180824.pdf> (August 24, 2018).

- Scenario 2: ComEd/Exelon contracts with capacity resource owners in the ComEd LDA based on capacity market MW offers in the 2021/2022 BRA to meet the entire FRR UCAP obligation for the ComEd Zone. The capacity price in the ComEd LDA FRR is assumed to be the 2021/2022 BRA clearing price ($195.55 per MW-day).

## Assumptions

1. The PJM Capacity Market would not include the ComEd LDA.
2. The FRR service area is the ComEd Zone.
3. There would be no capacity transfers from the rest of RTO to the ComEd LDA, or the price of imports to the ComEd LDA from the RTO would be the same as the LDA price.
4. Only annual generation, annual demand resources and annual energy efficiency resources would be eligible for bilateral contracting with ComEd/Exelon. (This excludes seasonal resources.)
5. All seasonal resources, including those owned by Exelon, would offer their capacity in the PJM Capacity Market. These resources would be mapped to the rest of RTO LDA.
6. All resources that do not enter a bilateral contract with ComEd/Exelon would offer their capacity resources in the PJM Capacity Market under the must offer requirement. These resources would be mapped to the rest of RTO LDA.

Table 1 shows the ownership of annual capacity resources in terms of installed capacity (ICAP) in the ComEd LDA. Exelon owns 41.0 percent of the annual generation capacity resources in the ComEd LDA.[8] The FRR UCAP obligation for ComEd Zone is defined as the zonal forecast peak load (21,458.0 MW) times the forecast pool requirement (1.0898), or 23,384.9 MW, and not as the ComEd LDA reliability requirement of 26,112.0 MW.[9] ComEd/Exelon would need to secure capacity from other resource owners in the ComEd LDA to meet the FRR UCAP obligation for the ComEd FRR service area.

In the 2021/2022 RPM Base Residual Auction, 22,358.1 MW UCAP of internal ComEd resources cleared. Including the 5,574.0 MW UCAP of imports from the rest of RTO, the total capacity cleared in the 2021/2022 RPM Base Residual Auction to meet the ComEd

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8 Although the obligations are measured in UCAP, ICAP data is reported here because company specific UCAP data may be confidential.

9 The reliability requirement for an LDA is the projected internal capacity in the LDA plus the capacity emergency transfer objective (CETO) for the delivery year. The CETO is calculated to meet 1 day in 25 year loss of load expectation for an LDA. See "PJM Manual 18: PJM Capacity Market," § 2.4.2 Reliability Requirement in Locational Deliverability Areas, Rev. 43 (Dec. 3, 2019). The FPR is calculated to meet 1 day in 10 year loss of load expectation for an LDA. See "PJM Manual 20: PJM Capacity Market," § 1.7 Compliance with ReliabilityFirst (RF), Rev. 10 (March 21, 2019).

LDA reliability requirement was 27,932.1 MW UCAP, or 1,820.1 MW UCAP above the reliability requirement of 26,112.0 MW. However, the preliminary zonal UCAP obligation used as the basis for ComEd load charges is only 24,983.0 MW UCAP. The RPM zonal unforced capacity obligation of the ComEd Zone was lower than the cleared capacity plus CETL because of PJM's allocation rules. The ComEd RPM zonal unforced capacity obligation is ComEd's share of the RTO's RPM unforced capacity obligation.[10] The RTO's unforced capacity obligation is allocated to the zones on a prorata basis based on the zonal peak load forecasts.

If a ComEd FRR service area were created, that FRR would be required to meet its full FRR UCAP obligation of 23,384.9 MW and would not receive capacity transfer rights (CTR) offsets.

The FRR UCAP obligation for the ComEd Zone (23,384.9 MW UCAP) is lower than the RPM zonal unforced capacity obligation (24,983.0 MW UCAP) for the ComEd Zone as a result of the RPM auction clearing results, the differences in reliability standards in RPM and FRR, and the RPM zonal UCAP obligation allocation rules. The ComEd RPM zonal unforced capacity obligation is the ComEd Zone's share of the RTO's RPM unforced capacity obligation. The RTO's RPM unforced capacity obligation, which is same as the total cleared capacity for the entire RTO, reflects 1 day in 10 years loss of load expectation of the rest of the RTO region and 1 day in 25 years loss of load expectation of all price separated LDAs. The FRR UCAP obligation calculated using the forecast pool requirement reflects only 1 day in 10 years loss of load expectation.[11]

**Table 1 Ownership of annual generation capacity resources in the ComEd LDA**

| Owner | ICAP (MW) | Percent |
|---|---|---|
| Exelon | 10,358.7 | 41.0% |
| Other owners | 14,932.5 | 59.0% |
| Total | 25,291.2 | 100.0% |

# Existing FRR Design

The existing FRR approach remains an option for utilities with or without retail choice, including both investor owned and publicly owned utilities.[12] [13] Such utilities have had

10 See "PJM Manual 18: PJM Capacity Market," § 7.2 Unforced Capacity Obligations, Rev. 43 (Dec. 3, 2019).

11 This result, which has been part of the RPM design from its inception, should be reviewed to ensure its consistency with the design of FRRs and the capacity market.

12 "Reliability Assurance Agreement Among Load Serving Entities in the PJM Region," Schedule 8.1.

and continue to have the ability to opt out of the capacity market and provide their own capacity. There is no reason for any special exemptions for such utilities. Such utilities have the option to use the existing FRR option if they plan to continue to be cost of service based or wish to become cost of service based.

The Reliability Assurance Agreement (RAA) defines the purpose of the FRR alternative.[14]

> The Fixed Resource Requirement ("FRR") Alternative provides an alternative means, under the terms and conditions of this Schedule, for an eligible Load-Serving Entity to satisfy its obligation hereunder to commit Unforced Capacity to ensure reliable service to loads in the PJM Region.

The Reliability Assurance Agreement also defines the eligibility criteria for the FRR election.[15]

> A Party is eligible to select the FRR Alternative if it (a) is an IOU, Electric Cooperative, or Public Power Entity; and (b) demonstrates the capability to satisfy the Unforced Capacity obligation for all load in an FRR Service Area, including all expected load growth in such area, for the term of such Party's participation in the FRR Alternative.
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> A Party eligible under B.1 above may select the FRR Alternative only as to all of its load in the PJM Region; provided however, that a Party may select the FRR Alternative for only part of its load in the PJM Region if (a) the Party elects the FRR Alternative for all load (including all expected load growth) in one or more FRR Service Areas; (b) the Party complies with the rules and procedures of the Office of the Interconnection and all relevant Electric Distributors related to the metering and reporting of load data and settlement of accounts for separate FRR Service Areas; and (c) the Party separately

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[13] The current FRR rules address areas with retail choice. See "Reliability Assurance Agreement Among Load Serving Entities in the PJM Region," Schedule 8.1.D.8.

[14] See "Reliability Assurance Agreement Among Load Serving Entities in the PJM Region," Schedule 8.1.A.

[15] See "Reliability Assurance Agreement Among Load Serving Entities in the PJM Region," Schedule 8.1.B.

> allocates its Capacity Resources to and among FRR Service Areas in accordance with rules specified in the PJM Manuals.

An IOU is defined in the PJM RAA as "an investor-owned utility with substantial business interest in owning and/or operating electric facilities in any two or more of the following three asset categories: generation, transmission, distribution."

An entity must request to elect the existing FRR option no later than four months prior to the Base Residual Auction for the first delivery year of the election. An entity must under the existing FRR option submit its FRR capacity plan no later than one month prior to the Base Residual Auction for the effective delivery year. The minimum term for election of the existing FRR option is five consecutive delivery years. Under the existing FRR option, an entity may terminate its FRR election following the minimum term by providing written notice to PJM no later than two months prior to the Base Residual Auction for the effective delivery year. In the event of a State Regulatory Structural Change, an entity may elect or terminate its FRR election by providing written notice to PJM no later than two months prior to the Base Residual Auction for the effective delivery year.[16]

Public power entities and electric cooperatives could use the existing FRR option if they plan to continue to be cost of service based. To request the existing FRR option, public power entities or electric cooperatives need to demonstrate that the identified service area meets the definition of FRR Service Area as defined in the RAA. The definition of FRR Service Area provides that "In the event that the service obligations of an Electric Cooperative or Public Power Entity are not defined by geographic boundaries but by physical connections to a defined set of customers, the FRR Service Area in such circumstances shall be defined as all customers physically connected to transmission or

16 State Regulatory Structural Change is defined as "to any Party, as a state law, rule, or order that, after September 30, 2006, initiates a program that allows retail electric consumers served by such Party to choose from among alternative suppliers on a competitive basis, terminates such a program, expands such a program to include classes of customers or localities served by such Party that were not previously permitted to participate in such a program, or that modifies retail electric market structure or market design rules in a manner that materially increases the likelihood that a substantial proportion of the customers of such Party that are eligible for retail choice under such a program (a) that have not exercised such choice will exercise such choice; or (b) that have exercised such choice will no longer exercise such choice, including for example, without limitation, mandating divestiture of utility-owned generation or structural changes to such Party's default service rules that materially affect whether retail choice is economically viable." See "Reliability Assurance Agreement Among Load Serving Entities in the PJM Region," Article 1.

distribution facilities of such Electric Cooperative or Public Power Entity within an area bounded by appropriate wholesale aggregate metering as described above."

Under the current rules, an FRR entity can sell excess capacity in RPM auctions for a delivery year subject to a cap equal to the lesser of (a) 25 percent of the unforced capacity equivalent of the installed reserve margin for such delivery year multiplied by the preliminary forecast peak load for which such FRR entity is responsible under its FRR capacity plan(s) for such delivery year, or (b) 1,300 MW. For the ComEd Zone, this cap would equal 1,300 MW. In order to sell excess capacity in RPM auctions for a delivery year, an FRR entity must commit additional capacity resources above its defined FRR UCAP obligation in an amount equal to the lesser of three percent of the FRR UCAP obligation or 450 MW. For the ComEd Zone, this additional threshold quantity would equal 450 MW.

## Scenario 1

In Scenario 1, ComEd/Exelon would need to contract for a significant amount of capacity with other capacity resource owners in the ComEd Zone to establish its FRR plan and meet its FRR UCAP obligation of 23,384.9 MW.[17] The remaining capacity resources in the ComEd Zone that are not owned by ComEd/Exelon nor contracted with under the FRR would remain in PJM as capacity resources. For comparison, in the Base Residual Auction, ComEd Zone purchased 24,983.0 MW UCAP to meet its zonal UCAP obligation. If a ComEd FRR service area were created, the load in the ComEd region would be required to procure 23,384.9 MW UCAP, 1,598.1 MW (6.4 percent) less than if the ComEd LDA remained in the PJM capacity market. The remaining annual resources in the ComEd LDA would be required to offer in the PJM Capacity Market under the must offer requirement. Consistent with PJM's current implementation, the remaining annual resources and seasonal resources would be mapped to the rest of RTO LDA. In Scenario 1, the capacity price in the ComEd LDA is assumed to be the current offer cap in the capacity market, net CONE times B ($254.40 per MW-day). This is a sensitivity analysis based on the assumption that the owners of capacity resources in ComEd would request payment at the existing offer cap and that all capacity resources would be paid the same price. If the AEP model were followed, the price for capacity resources could substantially exceed the capacity market clearing price and the capacity market offer cap. Given Exelon's assertions that the current total revenue from energy, ancillary

17 The FRR UCAP obligation is defined as the [(obligation peak load * final zonal FRR scaling factor) – nominal PRD value committed by the FRR entity] * forecast pool requirement. The final zonal FRR scaling factor equals the final zonal peak load forecast for the delivery year / zonal weather normalized peak load for the summer concluding prior to the start of the delivery year. See "Reliability Assurance Agreement Among Load Serving Entities in the PJM Region," Schedule 8.1.F.

and capacity markets is not adequate for its nuclear plants, this is a reasonable scenario that demonstrates the impact of the assumed price paid for capacity under the FRR approach.[18] It is assumed that the actual price for capacity in ComEd and the actual subsidies for nuclear plants in ComEd would be the result of a negotiation between ComEd/Exelon and Illinois, and/or a negotiation between ComEd/Exelon and/or Illinois and the other owners of capacity in the ComEd LDA.[19]

Table 2 shows the clearing prices for the rest of the PJM Capacity Market by LDA for the 2021/2022 RPM Base Residual Auction if the ComEd LDA became an FRR service area outside the PJM Capacity Market. All binding constraints would have remained binding and the DEOK LDA would also be binding. The rest of RTO LDA clearing price would decrease by $61.77 per MW-day from $140.00 per MW-day to $78.23 per MW-day, or 44.1 percent, from the rest of RTO clearing price in the 2021/2022 RPM Base Residual Auction, the DEOK clearing price would decrease by $11.53 per MW-day, or 8.2 percent, while the clearing price would remain unchanged for the other LDAs that were constrained in the 2021/2022 BRA. In the 2021/2022 RPM Base Residual Auction, higher priced resources in the ComEd LDA did not clear. In their place, lower priced resources were imported from the rest of RTO.

Table 3 shows the net load charges for the ComEd LDA if ComEd/Exelon contracts with capacity resource owners in the ComEd LDA in the 2021/2022 Delivery Year to meet the FRR UCAP obligation and the capacity price for the ComEd region were equal to the offer cap, net CONE times B. The net load charges when the ComEd LDA is included in the PJM Capacity Market are net of the payments to load due to Capacity Transfer Rights (CTRs). CTRs are used to return capacity market congestion revenues to load. Load pays for the transmission system through firm transmission charges and pays for congestion. Capacity market congestion revenues are the difference between the total dollars paid by load for capacity and the total dollars received by capacity market sellers. Load pays for all capacity at the single LDA clearing price, including the lower cost capacity imported into the LDA, consistent with the CETL.[20] The CETL for the ComEd LDA in the 2021/2022 BRA was 5,574.0 MW. Capacity transfer rghts payments

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18 See Exelon Corporation Form 10-K <https://www.sec.gov/Archives/edgar/data/8192/000162828019001107/exc-20181231x10k.htm> (published February 8, 2019) at 82.

19 This could also include the owners of capacity that could be imported, limited by the CETL.

20 The MW of CTRs available for allocation to LSEs in an LDA is equal to the unforced capacity imported into the LDA determined based on the results of the Base Residual Auction and Incremental Auctions, less any MW of CETL paid for directly by market participants which include Qualifying Transmission Upgrades (QTUs) cleared in an RPM Auction and Incremental Capacity Transfer Rights (ICTRs).

will not exist under the FRR arrangement because the CTR payments are based on the operation of an integrated capacity market with locational pricing.

Based on actual auction clearing prices and quantities, make whole MW and RPM zonal UCAP obligation, gross load charges for the 2021/2022 RPM Base Residual Auction for the ComEd LDA were $1,788,042,829. The ComEd LDA imported 5,574 MW of capacity from the rest of the RTO, based on the CETL value for ComEd. The clearing price for ComEd LDA was $55.55 per MW-day higher than the clearing price of the rest of the RTO. The load in ComEd Zone received $30,978,820, the value of CTRs. After accounting for CTRs, the net load charges for the 2021/2022 RPM Base Residual Auction for the ComEd LDA were $1,757,064,009. If ComEd/Exelon were to establish its FRR plan and the capacity price for the ComEd region were the offer cap, net CONE times B ($254.40 per MW-day), the load charges for the ComEd LDA would have been $2,171,428,274, an increase of $414,364,265, or 23.6 percent higher than in the 2021/2022 BRA.

Table 4 shows the net load charges for the RTO excluding the ComEd LDA if ComEd/Exelon contracts with capacity resource owners in the ComEd LDA to meet the FRR UCAP obligation. Based on actual auction clearing prices and quantities, make whole MW and RPM zonal UCAP obligation, the gross load charges for the 2021/2022 RPM Base Residual Auction, for the RTO excluding ComEd LDA, were $7,926,928,343. After accounting for payments due to CTRs valued at $297,147,677, the net load charges for the 2021/2022 RPM Base Residual Auction for the RTO excluding ComEd LDA were $7,629,780,666. If ComEd/Exelon were to establish its FRR plan, the gross load charges for the 2021/2022 RPM Base Residual Auction, for the RTO excluding ComEd LDA, would have been $6,231,181,803. After accounting for payments due to CTRs that would be valued at $720,600,778 or 142.5 percent higher, the net load charges for the 2021/2022 RPM Base Residual Auction, for the RTO excluding ComEd LDA, would be $5,510,581,025, a reduction of $2,119,199,641 or 27.8 percent.

The role of the ZECs subsidies must be included in any evaluation of total payments for capacity by customers in the ComEd LDA. As part of Illinois Future Energy Jobs Act, Exelon has received subsidies in the form of Zero Emission Credits (ZECs) for its Quad Cities nuclear power plant in the ComEd LDA since June 1, 2017. The subsidy to Quad Cities was approximately $125.4 million in 2018. Exelon has also indicated that it wants subsidies for its other ComEd nuclear plants. If Exelon receives comparable subsidies for the Quad Cities, Byron, Braidwood, Dresden and LaSalle nuclear power plants, the total annual subsidies would be approximately $924.9 million. The cost of the subsidies should be included in the evaluation of both scenarios.

**Table 2 Clearing prices in Scenario 1 and Scenario 2 compared to the actual BRA results**

| LDA | BRA | Scenario 1 and Scenario 2 | Change | Percent |
|---|---|---|---|---|
| RTO | $140.00 | $78.23 | ($61.77) | (44.1%) |
| ATSI | $171.33 | $171.33 | $0.00 | 0.0% |
| ComEd | $195.55 | NA | NA | NA |
| MAAC | $140.00 | $78.23 | ($61.77) | (44.1%) |
| ATSI Cleveland | $171.33 | $171.33 | $0.00 | 0.0% |
| DAY | $140.00 | $78.23 | ($61.77) | (44.1%) |
| DEOK | $140.00 | $128.47 | ($11.53) | (8.2%) |
| EMAAC | $165.73 | $165.73 | $0.00 | 0.0% |
| PPL | $140.00 | $78.23 | ($61.77) | (44.1%) |
| SWMAAC | $140.00 | $78.23 | ($61.77) | (44.1%) |
| DPL South | $165.73 | $165.73 | $0.00 | 0.0% |
| PSEG | $204.29 | $204.29 | $0.00 | 0.0% |
| BGE | $200.30 | $200.30 | $0.00 | 0.0% |
| Pepco | $140.00 | $78.23 | ($61.77) | (44.1%) |
| PSEG North | $204.29 | $204.29 | $0.00 | 0.0% |

**Table 3 Net load charges for ComEd LDA (Scenario 1)[21]**

| ComEd LDA | BRA | Scenario 1 | Change | Percent |
|---|---|---|---|---|
| Base Zonal UCAP Obligation (MW) | 24,983.0 | 23,384.9 | (1,598.1) | (6.4%) |
| Zonal Capacity Price ($/MW-day) | $196.08 | $254.40 | $58.32 | 29.7% |
| Gross Load Charges | $1,788,042,829 | $2,171,428,274 | $383,385,446 | 21.4% |
| Value of CTRs | $30,978,820 | $0 | ($30,978,820) | (100.0%) |
| Net Load Charges | $1,757,064,009 | $2,171,428,274 | $414,364,265 | 23.6% |

**Table 4 Net load charges for RTO excluding ComEd LDA (Scenario 1)**

| RTO (Excluding ComEd LDA) | BRA | Both Scenarios (1 and 2) | Change | Percent |
|---|---|---|---|---|
| Base Zonal UCAP Obligation (MW) | 138,644.30 | 140,007.20 | 1,362.90 | 1.0% |
| Gross Load Charges | $7,926,928,343 | $6,231,181,803 | ($1,695,746,540) | (21.4%) |
| Value of CTRs | $297,147,677 | $720,600,778 | $423,453,101 | 142.5% |
| Net Load Charges | $7,629,780,666 | $5,510,581,025 | ($2,119,199,641) | (27.8%) |

21 The net load charges for the BRA include make whole payments made in the 2021/2022 BRA. The gross load charges for the delivery year are calculated using the unrounded zonal capacity price.

## Scenario 2

In Scenario 2, ComEd/Exelon would need to contract with other capacity resource owners in the ComEd Zone to establish its FRR plan and meet its FRR UCAP obligation of 23,384.9 MW. The remaining capacity resources in the ComEd Zone that are not owned by ComEd/Exelon nor contracted with under the FRR would remain in PJM as capacity resources. For comparison, in the Base Residual Auction, ComEd LDA purchased 24,983.0 MW UCAP to meet its RPM zonal unforced capacity obligation. If a ComEd FRR service area were created, the load in the ComEd region would be required to procure 23,384.9 MW UCAP, 1,598.1 MW (6.4 percent) less than if the ComEd LDA remained in the PJM Capacity Market. The remaining annual resources in the ComEd LDA would be required to offer in the PJM Capacity Market under the must offer requirement. Consistent with PJM's current implementation, the remaining annual resources and seasonal resources would be mapped to the rest of RTO LDA. In Scenario 2, the capacity price in the ComEd LDA is assumed to be the clearing price in the BRA for the ComEd LDA in the 2021/2022 BRA ($195.55 per MW-day). This is a sensitivity analysis based on the assumption that the owners of capacity resources in ComEd would request payment at the ComEd clearing price from the 2021/2022 BRA and that all capacity resources would be paid the same price. It is assumed that the actual price for capacity in ComEd and the actual subsidies for nuclear plants in ComEd would be the result of a negotiation between ComEd/Exelon and Illinois, and/or a negotiation between ComEd/Exelon and/or Illinois and the other owners of capacity in the ComEd LDA.[22]

Table 2 shows the clearing prices for the rest of the PJM Capacity Market by LDA for the 2021/2022 RPM Base Residual Auction if the ComEd LDA became an FRR service area outside the PJM Capacity Market. All binding constraints would have remained and the DEOK LDA would also be binding. The rest of RTO LDA clearing price would decrease by $61.77 per MW-day from $140.00 per MW-day to $78.23 per MW-day, or 44.1 percent, from the rest of RTO clearing price in the 2021/2022 RPM Base Residual Auction, the DEOK clearing price would decrease by $11.53 per MW-day, or 8.2 percent, while the clearing price would remain unchanged for the other LDAs that were constrained in the 2021/2022 BRA. In the 2021/2022 RPM Base Residual Auction, higher priced resources in the ComEd LDA did not clear. In their place, lower priced resources were imported from the rest of RTO.

Table 5 shows the net load charges for the ComEd LDA if ComEd/Exelon contracts with capacity resource owners to meet the FRR UCAP obligation and the capacity price for the ComEd region were the clearing price for the ComEd LDA in the 2021/2022 BRA.

[22] This could also include the owners of capacity that could be imported, limited by the CETL.

The net load charges when the ComEd LDA is included in the PJM Capacity Market are net of the payments to load due to Capacity Transfer Rights (CTRs).

Based on actual auction clearing prices and quantities, make whole MW and RPM zonal UCAP obligation, gross load charges for the 2021/2022 RPM Base Residual Auction for the ComEd LDA were $1,788,042,829. The ComEd LDA imported 5,574 MW of capacity from the rest of the RTO. The clearing price for the ComEd LDA was $55.55 per MW-day higher than the clearing price of the rest of the RTO. The load in the ComEd Zone received $30,978,820, the value of CTRs. After accounting for CTRs, the net load charges for the 2021/2022 RPM Base Residual Auction for the ComEd LDA were $1,757,064,009. If ComEd/Exelon were to establish its FRR plan and the capacity price for the ComEd region were the ComEd clearing price in the BRA ($195.55 per MW-day), the load charges for the ComEd LDA would have been $1,669,114,776, a decrease of $87,949,233, or 5.0 percent lower than in the 2021/2022 BRA.[23]

The lower load charges in Scenario 2 compared to the results of the 2021/2022 BRA are the result of the lower FRR UCAP obligation for the ComEd Zone partly offset by the absence of CTRs. In the 2021/2022 RPM Base Residual Auction, ComEd load was charged for 24,983.0 MW UCAP, the ComEd RPM zonal unforced capacity obligation. If a ComEd FRR service area were created, the ComEd load would need to procure 23,384.9 MW UCAP, the FRR UCAP Obligation for the ComEd Zone. The counterintuitive results are due to PJM's rules for calculating reliability requirements and allocation rules. Under the current rules for every LDA, the calculated reliability requirement reflects 1 day in 25 years loss of load expectation. The calculated RTO wide reliability requirement reflects 1 day in 10 years loss of load expectation. The difference in reliability standards for an individual LDA and the RTO is intended to capture the diversity benefit. However, if a ComEd FRR service area were created, the FRR UCAP obligation only reflects 1 day in 10 years loss of load expectation, which is a less stringent reliability standard than the 1 day in 25 years that would apply if ComEd were an LDA.

Table 6 shows the net load charges, for the RTO excluding ComEd LDA, if ComEd/Exelon contracts with capacity resource owners to meet the FRR UCAP obligation, and the capacity price in the ComEd LDA were the ComEd LDA clearing price in the 2021/2022 BRA. The net load charges for the RTO excluding the ComEd LDA, are the same as the net load charges under Scenario 1.

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23 The $196.08 per MW-day is the zone net load price, the capacity price charged to the load in the ComEd Zone. In the 2021/2022 BRA, the resource clearing price for ComEd LDA was $195.55 per MW-day. The difference of $0.53 per MW-day was due to ComEd's portion of funding for cleared Price Responsive Demand (PRD) credits and make whole payments to the seasonal resources.

The role of the ZECs subsidies must be included in any evaluation of total payments for capacity by customers in the ComEd LDA. As part of Illinois Future Energy Jobs Act, Exelon has received subsidies in the form of Zero Emission Credits (ZECs) for its Quad Cities nuclear power plant in the ComEd LDA since June 1, 2017. The subsidy to Quad Cities was approximately $125.4 million in 2018.[24] Exelon has also indicated that it wants subsidies for its other ComEd nuclear plants. If Exelon receives comparable subsidies for the Quad Cities, Byron, Braidwood, Dresden and LaSalle nuclear power plants, the total annual subsidies would be approximately $924.9 million. The cost of the subsidies should be included in the evaluation of both scenarios.

**Table 5 Net load charges for ComEd LDA (Scenario 2)[25]**

| ComEd LDA | BRA | Scenario 2 | Change | Percent |
|---|---|---|---|---|
| Base Zonal UCAP Obligation (MW) | 24,983.0 | 23,384.9 | (1,598.1) | (6.4%) |
| Zonal Capacity Price ($/MW-day) | $196.08 | $195.55 | ($0.53) | (0.3%) |
| Gross Load Charges | $1,788,042,829 | $1,669,114,776 | ($118,928,053) | (6.7%) |
| Value of CTRs | $30,978,820 | $0 | ($30,978,820) | (100.0%) |
| Net Load Charges | $1,757,064,009 | $1,669,114,776 | ($87,949,233) | (5.0%) |

**Table 6 Net load charges for RTO excluding ComEd (Scenario 2)**

| RTO (Excluding ComEd LDA) | BRA | Both Scenarios (1 and 2) | Change | Percent |
|---|---|---|---|---|
| Base Zonal UCAP Obligation (MW) | 138,644.30 | 140,007.20 | 1,362.90 | 1.0% |
| Gross Load Charges | $7,926,928,343 | $6,231,181,803 | ($1,695,746,540) | (21.4%) |
| Value of CTRs | $297,147,677 | $720,600,778 | $423,453,101 | 142.5% |
| Net Load Charges | $7,629,780,666 | $5,510,581,025 | ($2,119,199,641) | (27.8%) |

24 Exelon reported revenue associated with Zero Emission Credits (ZECs) for its share of ownership in Quad Cities (PJM) and Clinton (MISO) nuclear power plants in 2018 was $223 million. Of the $223 million, Exelon's estimated share of ZEC revenue for Quad Cities nuclear power plant based on installed capacity was $125.4 million. See Exelon Corporation Form 10-K <https://www.sec.gov/Archives/edgar/data/8192/000162828019001107/exc-20181231x10k.htm> (published February 8, 2019) at 81.

25 The net load charges for the BRA includes make whole payments. The gross load charges for the delivery year are calculated using the unrounded zonal capacity price.