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October 1, 2021

The Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E. Room 1A
Washington, D.C. 20426

Re: *PJM Interconnection L.L.C., Docket No. ER22-___-000*
Revisions to Administrative Cost Recovery Charges

Dear Secretary Bose,

PJM Interconnection, L.L.C. ("PJM"), pursuant to section 205 of the Federal Power Act ("FPA"),[1] and part 35 of the Federal Energy Regulatory Commission's ("FERC" or the "Commission") regulations,[2] hereby submits for filing proposed revisions to PJM's Open Access Transmission Tariff ("Tariff")[3] to update the manner in which PJM recovers its administrative costs to better ensure both rate equity among PJM's Service Categories and revenue adequacy. PJM proposes to change its administrative cost recovery from the current practice of initial charges at stated rate levels with a varying quarterly refund that reduces each customer's effective rate, to a new practice of monthly rates based on that month's costs and that month's billing determinants.

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[1] 16 U.S.C. § 824d.

[2] 18 C.F.R. part 35.

[3] The Tariff is currently located under PJM's "Intra-PJM Tariffs" eTariff title. *See PJM Interconnection, L.L.C. - Intra-PJM Tariffs*, https://etariff.ferc.gov/TariffBrowser.aspx?tid=1731 (last visited Oct. 1, 2021). Terms not otherwise defined herein shall have the same meaning as set forth in the Tariff, and the Amended and Restated Operating Agreement of PJM Interconnection, L.L.C. ("Operating Agreement").

This filing is the culmination of a lengthy process marked by extensive review by, and collaboration with, PJM's Finance Committee, comprised of representatives of each sector of the PJM membership. PJM also retained independent consultants for a comprehensive review of the costs properly recovered by each of PJM's Service Categories,[4] the Service Category definitions, the billing determinants, and the rate form. As the culmination of this process, the Finance Committee unanimously recommended the proposal embodied in this filing, and the PJM Members Committee endorsed the proposal by a sector-weighted vote of 3.84 (equivalent to 76.8%) in favor.

In support of this filing, PJM includes the direct testimony of its Vice President, Chief Financial Officer and Treasurer, Ms. Lisa M. Drauschak ("Drauschak Testimony"), as Exh. No. PJM-0001, and the direct testimony of Mr. A. Joseph Cavicchi and Dr. Megan H. Accordino of Analysis Group, Inc. ("Analysis Group") ("Cavicchi/Accordino Testimony"), as Exh. No. PJM-0011.

PJM also includes the cost of service statements and other information prescribed by the Commission's regulations, to the extent applicable to this rate change proposal. However, because PJM's costs fall into a relatively narrow portion of the typical public utility cost categories, i.e., mostly administrative and general, with no owners' equity or rate base, and because this Tariff filing proposes rate formulas, rather than stated rates, many of the standard rate change statements described in the Commission's part 35 regulations are inapplicable to this filing. Therefore, as discussed below in section VIII.B

[4] As discussed further below, Service Categories provide separate administrative charges for PJM's various activities, such as Balancing Area operations, energy market administration, capacity obligation and market administration, and Financial Transmission Rights ("FTR") administration.

of this transmittal, PJM requests that the Commission waive (as it has for PJM's prior rate filings[5]) these inapplicable requirements.

PJM also asks, as detailed in section VIII.A below, that the Commission waive its rate filing regulations to allow PJM to use 2019, the last calendar year before the COVID-19 pandemic, as Period I for this filing. As explained in section VIII.A, there is good cause to grant the waiver and permit PJM to use 2019 as Period I, because PJM's operations and costs were significantly affected during 2020 by the first year of the COVID-19 pandemic, and that experience will not be reflective of PJM's operations and costs during the post-pandemic period when these formula rates are in effect.

PJM requests that the enclosed revisions become effective on January 1, 2022, which is ninety-two days after the date of this filing.[6] However, to provide notice to customers, and allow PJM a period of time to implement the rate change, PJM respectfully requests that the Commission issue its order on this filing on or before December 1, 2021, which is sixty-one days after the date of this filing. To that end, PJM has assigned an effective date of December 2, 2021, to one of the non-substantive eTariff records submitted with this filing, while marking each other record with a January 1, 2022 effective date.

I. INTRODUCTION AND SUMMARY

By this filing, PJM is proposing several significant changes to its administrative cost recovery mechanisms in Tariff, Schedule 9.

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[5] *PJM Interconnection, L.L.C.*, 157 FERC ¶ 61,236, at P 20 (2016).

[6] As explained below, PJM further asks that, if the Commission suspends the enclosed rates at all, it do so on only a nominal basis, so that the rates still take effect on January 1, 2022 (albeit subject to refund).

First, PJM is changing the form of its rate. The shorthand description of this change is that PJM is moving from a current "stated" rate to a proposed "formula" rate. But that shorthand version requires additional explanation. There currently are stated rates for each Service Category, but they are coupled with a Tariff-prescribed mechanism that refunds to customers any amounts above PJM's *actual costs* and a reserve equal to 6% of projected annual revenues.[7] If PJM anticipates that projected revenues under the stated rates will be *less* than PJM's actual costs, PJM can only increase the stated rates through an FPA section 205 filing with the Commission. In practice, however, stated-rate revenues (aided by the Member-funded reserve which provides PJM funds to draw upon if and when its costs are greater than the stated-rate revenues) have always been high enough to cover PJM's costs, so customers' final charges are, in practice, set by the refund mechanism, as a deduction from what they pay initially via the stated rates.[8]

In place of this current approach, PJM proposes a formula that determines each Service Category's rate each month by dividing actual costs for that month by the billing determinants for that month. Instead of the current approach of a stated rate, with a formulaic method to refund amounts in excess of actual costs, each Service Category will now have a formula with a numerator representing each month's costs, and a denominator representing each month's billing determinants.

This revised approach has multiple benefits, as detailed in this filing.[9] It ensures that PJM recovers its actual costs, and that customers under each Service Category pay no

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[7] *See* Tariff, Schedule 9, section (d).

[8] *See* Drauschak Testimony at 18.

[9] *See* section III.A of this transmittal; Drauschak Testimony at 10-23.

more than PJM's actual costs for that Service Category. It supports rate equity by avoiding the cost shifts that have arisen between Service Categories under the stated rates approach due to, for example, billing determinant changes. The proposed approach also will likely *reduce* rate volatility compared to the stated rate approach, because quarterly refunds under the current method can exacerbate rate variations from seasonal changes in billing determinants. Lastly, the formula rate approach also allows PJM to eliminate the current Member-funded reserve, and refunds that entire reserve amount to Members. Each of these benefits are further described below.

Importantly, PJM's existing arrangements provide strong assurance that PJM will control its costs, notwithstanding adoption of a formula rate that recovers all of PJM's costs. PJM regularly reviews and discusses with the PJM Finance Committee, PJM's budgets, planned capital projects, financial statements, and projected expenses, among other data. The Finance Committee plays an active role in PJM's budget process, with the right to submit comments and recommendations on PJM's budget and have those comments and recommendations considered by the PJM Board. PJM has proposed to the Finance Committee changes to the PJM Finance Committee Financial Review, Reporting and Communications Protocol ("Finance Committee Protocol")[10] to further enhance accountability and transparency in connection with the transition to formula rates. Specifically, the proposed changes would require PJM to provide the Finance Committee with five-year projections of the tariff rates for Schedules 9-1 through 9-4, and Schedule 9-PJMSettlement; information on the assignments of projected caital expenses to the five

[10] Included as Exh. No. PJM-0003.

Service Categories; advance notice of material changes to PJM's services, and an updated cost of service study every five years beginning in 2027, to inform PJM stakeholders on the possible need for changes to the cost assignment and allocation percentages. The Finance Committee, which is vested with the right to amend the Finance Committee Protocol, will consider these proposed additions in November 2021. In short, those who bear the administrative costs of the RTO have direct oversight of its operations through their participation, by sector, on the Finance Committee.

Second, PJM is adding stated percentage values to the Tariff to assign PJM's costs among the Service Categories.[11] These percentages are an integral part of the formula rate, as they define the share of PJM's costs each month (i.e., the numerators in the formula rates) that are borne by each Service Category that month. Stating the percentages in the Tariff helps provide administrative charge certainty to the customers under each Service Category, because PJM cannot depart from or change these percentages without filing for a Tariff change under FPA section 205.

This approach is an echo of the method PJM used for its administrative rates from 2001 to 2006. During that time, i.e., after PJM unbundled its administrative cost recovery into Service Categories, but before PJM adopted stated rates, the Tariff included stated percentages to assign costs to Service Categories where they could be directly assigned, and percentages to allocate overheads, which support all Service Categories, among the Service Categories.[12] PJM developed those percentage allocations in 1999 based on analysis of cost incurrence and benefit for each of PJM's corporate divisions and cost

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[11] *See* section III.C of this transmittal; Cavicchi/Accordino Testimony at 16-25.

[12] *See* section II of this transmittal.

centers, including manager interviews about activities conducted in each cost center. Those percentage assignments and allocations did not disappear when PJM moved to stated rates in 2006.[13] They were reflected until 2020 in the Tariff's stated percentages for allocating refunds among the Service Categories. PJM also continued to rely on those assignment and allocation percentages for PJM's internal purposes whenever PJM needed to estimate the costs associated with each Service Category.[14]

For purposes of this rate change effort, Analysis Group performed its own analysis of PJM's costs, similar to PJM's study in 1999. Thus, Analysis Group considered PJM's costs by corporate division and cost center, and interviewed managers to understand the activities performed by those cost centers, and which PJM services those activities benefit.[15] Analysis Group's final percentage values resulting from this study are broadly similar to the percentages PJM has been using (even while stated rates have been in effect) to track costs associated with each Service Category.[16]

Third, PJM is consolidating two of its Service Categories, i.e., Market Support Service and Regulation and Frequency Response Administration Service, into a single Service Category. Analysis Group found that the members that rely on these two services are the same, and that the PJM staff and resources that support these two services are the same.[17] Therefore, there is no need to keep them separate.

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[13] *See* Drauschak Testimony at 13.

[14] *Id.*

[15] *See* Cavicchi/Accordino Testimony at 11, 16.

[16] *See id.* at 23-24, and Exh. No. PJM-0015.

[17] *See* Cavicchi/Accordino Testimony at 12-14.

Fourth, PJM is changing how it bills for the services provided by PJM Settlement, Inc. ("PJM Settlement"), so that all those who use its services pay for those services—which is not the case today. Currently, Tariff, Schedule 9-PJMSettlement relies solely on the same billing determinant as one of the two Market Support Service rates, i.e., energy input into the PJM system and energy withdrawn from the PJM system, plus accepted Increment Offers, Decrement Bids, and Up-to Congestion Transactions.[18] That approach ignores activity in the FTR/Auction Revenue Rights ("ARR") and capacity markets, even though activity in those markets relies on PJM Settlement's credit, billing, treasury, and settlement responsibilities in the same way as activity in the energy market does. It is reasonable, therefore, to change how PJM Settlement charges for its services, so that all customers which use those service pay for them. Because the cost of service study found that PJM Settlement's costs are more related to the number of invoices PJM Settlement issues, PJM is proposing to charge for the services provided under Tariff, Schedule 9-PJMSettlement based on the number of invoices issued for a customer in a given month.[19]

Fifth, because PJM will no longer use the stated rates approach, it no longer needs the reserve that provided a financial cushion in case costs temporarily exceeded the revenues produced by the stated rates. PJM therefore proposes to refund the full amount of its existing reserve which accrued under the stated rate, as of December 31, 2021, to customers over the first three months of 2022.[20] For that purpose, PJM will use Tariff,

[18] *See* Tariff, Schedule 9-PJMSettlement, section (c) & Schedule 9-3.

[19] *See* Cavicchi/Accordino Testimony at 25-26.

[20] *See* Drauschak Testimony at 20.

Schedule 9's current effective refund mechanism, with minor modifications, to focus in on winding down the reserve.[21]

PJM also notes what is *not* changing:

- Annual membership fees remain the same;
- the Finance Committee Protocol continues in effect and provides the same level of transparency and coordination;
- Service Category billing determinants remain the same—the only change is the per-invoice charge for Schedule 9-PJMSettlement, as explained above; and
- the pass-through schedules in Schedules 9 and 10, e.g., for the Independent Market Monitor, the Organization of PJM States, Inc., Consumer Advocates of PJM States, Inc., NERC, and FERC annual charges, are all unchanged.

II. BACKGROUND AND HISTORY OF PJM'S ADMINISTRATIVE COST RECOVERY CHARGES

By PJM's nature as an RTO, PJM's costs are mostly administrative and general, with no physical assets aside from buildings, equipment, fixtures, and information systems, and no equity or return on equity. Like all other regional transmission organizations ("RTOs") and independent system operators ("ISOs"), PJM's administrative rates are (and always have been) designed to recover actual costs on a more or less current basis.

Currently, PJM's rates are stated in the Tariff for each Service Category, and are set at levels that increase every year and that are designed to provide reasonable assurance PJM will recover its costs.[22] In practice, PJM's costs have been less than the revenues produced by those rates, and (as contemplated and required by the Tariff) PJM provides its customers quarterly refunds for any such difference (less amounts needed to maintain the

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[21] *Id.*

[22] *See* Tariff, Schedules 9-1 through 9-5.

reserve that acts as a financial cushion).[23] Thus, the rates customers ultimately pay are not the stated rates, but the stated rates less a refund that can vary each calendar quarter. Currently, PJM's stated rates apply to five unbundled Service Categories (some including multiple charges) set forth in Schedules 9-1 through 9-5 of the Tariff. These Service Categories cover nearly all of PJM's administrative services and costs.[24]

The current Tariff also has separate charges to fund the administrative activities of certain other parties. As particularly relevant to this filing, Tariff, Schedule 9-PJMSettlement recovers costs of PJM's subsidiary PJM Settlement, which provides certain billing, settlement, treasury, and credit management functions for transactions in the PJM markets.[25] Other schedules recover costs for the Commission's Annual Charges, the region's Independent Market Monitor, and other entities that benefit the PJM Region.[26]

From 1998 through 2000, PJM recovered its administrative costs through a single monthly formula rate under Tariff, Schedule 1.[27] Beginning in 2001, PJM unbundled its single administrative cost recovery charge into multiple service category rates to align the cost recovery for PJM's varied services with the parties that benefit from those services and allow customers to pay only for those services that they use.[28] While PJM unbundled

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[23] *See* Drauschak Testimony at 18-19.

[24] PJM recovers directly from affected customers PJM's costs of performing interconnection and transmission upgrade studies, and costs arising from customer defaults on their payment obligations to PJM. *See* Tariff, sections 37, 203.1, 206.4; Operating Agreement, section 15.1.

[25] *See* Tariff, Schedule 9-PJMSettlement.

[26] *See* Tariff, Schedule 9-FERC, Schedule 9-OPSI, Schedule 9-CAPS, Schedule 9-FINCON, Schedule 9-MMU, Schedule 10-NERC & Schedule 10-RFC.

[27] *PJM Interconnection, L.L.C.*, Submittal of PJM Interconnection, L.L.C., Docket No. ER00-298-000, at 9 (Oct. 29, 1999) ("ER00-298 Filing").

[28] ER00-298 Filing at 10; *PJM Interconnection, L.L.C.*, Offer of Settlement, Docket Nos. ER00-298-003, EL00-41-002 (May 12, 2000) ("ER00-298 Settlement"); *PJM Interconnection, L.L.C.*, Letter Order Approving Settlement, Docket Nos. ER00-298-000, -001, -002, -003, EL00-41-000, -001, -002 (July 31,

its administrative charge into several service category rates, PJM's rates maintained a monthly formula rate design.[29]

Under this approach, all Service Categories, save one, had rates set annually by specified formulae. The exception, Control Area Administration Service, used a monthly formula rate, which also was the vehicle to capture variances between budgeted and actual values from the annual rates for the other Service Categories.[30] PJM recovered the costs assigned to Control Area Administration Service in accordance with assignment percentages stated in the Tariff to assign costs from PJM's functional divisions, plus that service's assigned share of Non-Divisional Costs.[31]

With regard to PJM's overhead costs, PJM included a separate Tariff, Schedule 9-6, for "Management Services Costs" that governed the allocation of such costs among the Service Categories.[32] Schedule 9-6 included a cost assignment matrix with stated percentages for annually apportioning costs from the PJM cost centers to this Management Services Cost category.[33] Schedule 9-6 then provided for the annual allocation of these

2000).

[29] ER00-298 Settlement, Explanatory Statement at 1. Initially, PJM established seven service categories and rates, but, in Docket No. ER03-118, PJM consolidated the services into the five service categories currently in the Tariff. *See PJM Interconnection, L.L.C.*, Submittal of PJM Interconnection, L.L.C., Docket No. ER03-118-000, at 2 (Oct. 31, 2002) *PJM Interconnection, L.L.C.*, Letter Order, Docket No. ER03-118-000 (Dec. 19, 2002).

[30] ER00-298 Settlement, Explanatory Statement at 1.

[31] ER00-298 Settlement at Tariff, Schedule 9-1. Non-Divisional Costs referred to costs PJM incurs that do not fall into individual cost centers. The Tariff specified three categories of such costs: (1) the cost of operating projects, which typically take the form of special purpose teams that draw employees and costs from among the established cost centers; (2) certain costs incurred during the development of software for PJM's internal use, which Generally Accepted Accounting Principles required PJM to expense; and (3) costs for operating reserves, working capital reserves, and amounts needed to comply with covenants in financial documents. *Id.*

[32] ER00-298 Settlement at Tariff, Schedule 9-6.

[33] *Id.*

overhead costs to the services generally in proportion to the salaries and wages associated with each service.[34]

In 2005-2006, PJM proposed in Docket No. ER05-1181 to adopt stated rates for each of its Service Categories.[35] A settlement in that case established the stated rate structure essentially as it exists today, i.e., stated rates, a financial reserve to provide PJM a cushion against cost under-recoveries, and a refund mechanism for when PJM over-recovers its costs.[36] Because the rates to be charged were stated in the Tariff, the formulaic cost assignment matrix and Management Services Costs schedule were no longer needed and were accordingly removed.

The 2006 stated rate settlement also established the PJM Finance Committee Protocol. The Finance Committee has thirteen members: ten elected by, and representing, the five PJM Member sectors (i.e., two representatives elected by each Member sector), two PJM Board Members, and one PJM representative.[37] The purpose of the PJM Finance Committee is: (1) to review PJM's and its subsidiaries' financial statements, budgeted and actual costs, operating budgets, and expense management initiatives; and (2) to make recommendations to the PJM Board on matters pertaining to the appropriate level of PJM's rates, proposed major new investments and allocation and disposition of funds consistent with PJM's duties and responsibilities under the PJM Operating Agreement.[38] As

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[34] *Id.*

[35] *PJM Interconnection, L.L.C.*, Submittal of PJM Interconnection, L.L.C., Docket No. ER05-1181-000 (July 1, 2005).

[36] *PJM Interconnection, L.L.C.*, Settlement Agreement and Offer of Settlement, Docket No. ER05-1181-000 (Apr. 18, 2006); *PJM Interconnection, L.L.C.*, 115 FERC ¶ 61.249 (2006).

[37] *See* Drauschak Testimony at 6; *see also* Operating Agreement, Section 7.5.1(a).

[38] *Id.* at 6-7.

explained by Ms. Drauschak, the Finance Committee Protocol was developed almost entirely by the Members, and it can be amended only by a vote of a majority of the total Finance Committee representatives, including at least one PJM Board Member.[39] As noted, ten of the committee's thirteen participants are Member representatives.

Under the Finance Committee Protocol, a copy of which is provided as Exh. No. PJM-0003, the Finance Committee reviews and discusses with PJM, on a quarterly or annual basis, PJM's financial statements, material budget variances, PJM's major capital projects, capital and operating expense forecasts, annual and five-year projected revenues, operating budgets, and significant expenses, by Service Categories, annual and five-year projected capital spending, actual capital spending, and past and present year financial performance relative to the PJM Board's approved goals and objectives.[40]

PJM must submit its proposed annual budgets to the Finance Committee each year for the Member representatives' review and comment.[41] PJM must respond to any concerns they raise.[42] The Member representatives provide their recommendations on the budget in writing to the PJM Board.[43] The PJM Board will consider those recommendations in its budget deliberations, and if it approves a budget that is not consistent with those recommendations, it must provide in writing the reasons for doing so.[44]

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[39] *Id.* at 7.

[40] *See* Drauschak Testimony at 7-8; Finance Committee Protocol at 2-3.

[41] *See* Drauschak Testimony at 8-9; Finance Committee Protocol at 6.

[42] *See* Drauschak Testimony at 8-9; Finance Committee Protocol at 6.

[43] *See* Drauschak Testimony at 8-9; Finance Committee Protocol at 6.

[44] *See* Drauschak Testimony at 8-9; Finance Committee Protocol at 6.

The Member representatives on the Finance Committee have the exact same review and comment role (as summarized above for the budget process) for any changes PJM proposes to Tariff, Schedules 9-1 through 9-5.[45]

PJM last filed to update its stated rates in 2016. In Docket No. ER17-249, PJM filed to increase its stated rates over an eight-year period, with an immediate 7.5% increase in rates the first year (2017) and a 2.5% per year increase in rates between 2019 and 2024.[46] PJM required the rate increase because its stated-rate revenues had fallen below the level needed to recover PJM's administrative costs. The Commission accepted PJM's current stated rates in December 2016.[47]

III. THE PROPOSED TARIFF CHANGES ARE JUST AND REASONABLE

A. The Proposed Change in Rate Form Is Reasonable.

By this filing, PJM proposes to shift from:

i) charging rates at Tariff-stated levels, with a quarterly-lagging refund formula that brings overall charges down to PJM's aggregate actual costs and the reserve,

to

ii) charging formula rates that divide each month's actual costs by each month's actual billing determinants.

This revised approach is just and reasonable. As detailed in the following subsections of this transmittal, the proposed approach ensures that PJM recovers its actual costs, and that customers under each Service Category pay no more than PJM's actual costs for that Service Category. It supports rate equity, by avoiding costs shifts that can arise

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[45] *See* Drauschak Testimony at 9; Finance Committee Protocol at 6.

[46] *PJM Interconnection, L.L.C.*, Submittal of PJM Interconnection, L.L.C., Docket No. ER17-249-000 (Oct. 31, 2016).

[47] *PJM Interconnection, L.L.C.*, 157 FERC ¶ 61,236 (2016).

between Service Categories due to, for example, billing determinant changes. While a formula rate that changes each month can introduce rate volatility, the current "stated" rates can be just as volatile—if not more so—because quarterly refunds can exacerbate rate variations from seasonal changes in billing determinants. The formula rate also eliminates the need for (and returns to Members) the Member-funded reserve. Last, other RTOs and ISOs also have administrative cost recovery charges that recover their actual costs on a relatively current basis.

1. Rate equity

As Ms. Drauschak explains, "[t]he current stated rate approach can lead to inequities for PJM Members served under different Service Categories."[48] The stated rates are based on billing determinant projections that "may turn out to be significantly below, or significantly above, the actual billing determinants experienced in the years when those stated rates are in effect."[49] Consequently, "the revenues produced by a Service Category stated rate may be well above, or well below, the costs to PJM of providing that service."[50] These over- and under-recoveries "can occur even if PJM in the aggregate, based on all stated rates, is revenue adequate."[51]

Although the current Tariff, Schedule 9 provides refunds when PJM's aggregate revenues exceed PJM's aggregate costs and the reserve, that refund mechanism may "only partially offset[] these inequities."[52] The refund mechanism targets refunds to the Service

[48] Drauschak Testimony at 11.

[49] *Id.*

[50] *Id.*

[51] *Id.*

[52] *Id.*

Categories with the highest relative degree of excess revenues in the preceding twelve months, "but that does not mean that all excess revenues produced by a given Service Category's stated rates will be returned to the members served under that Service Category."[53] Because the available refund pool is determined by PJM's aggregate revenues and costs, refunds of that pool are not designed to, and cannot, reconcile differences between each Service Category's costs and revenues. Consequently, "[w]hen one Service Category produces substantial excess revenues, while another Service Category results in under collections, the refund mechanism can fall well short of returning all overcollections to customers of that Service Category."[54]

These rate inequity shortcomings of the current stated rate approach are not hypothetical. As Ms. Drauschak explains, "stated rates for [FTR] Administration Service have produced Service Category revenues far in excess of Service Category costs due to a dramatic increase in both the volume of FTRs held and the FTR bidding activity over the time-period stated rates have been in effect."[55] She illustrates this with Exh. No. PJM-0004, which is copied into Figure 1 below. That exhibit shows percentage comparisons between the net revenues produced by each Service Category's rates compared to PJM's costs associated with each Service Category, with 0% marking the point where net revenues equal costs. As Ms. Drauschak notes, "the comparison for FTR Administration Service (i.e., Schedule 9-2) reached 100% in 2017, meaning net revenues were double the costs, and grew to 140% by 2019."[56] By contrast, as shown on Exh. No. PJM-0004, PJM's

[53] *Id.*

[54] Drauschak Testimony at 12.

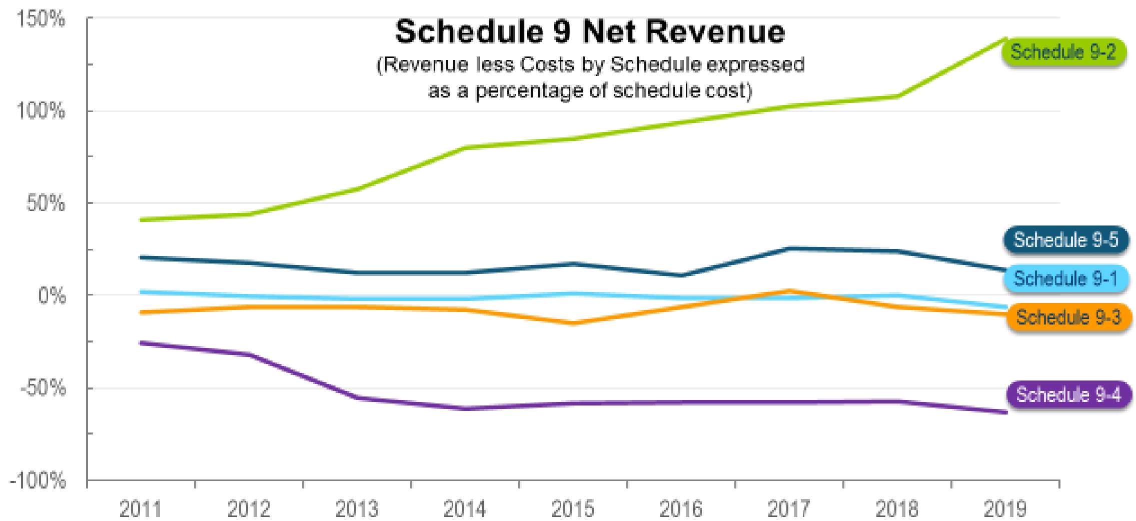
[55] *Id.*

[56] *Id.*

Frequency Response and Regulation Control Administration Service (i.e., Schedule 9-4), has yielded since 2014 revenues that are about 60% below its costs.

Figure 1

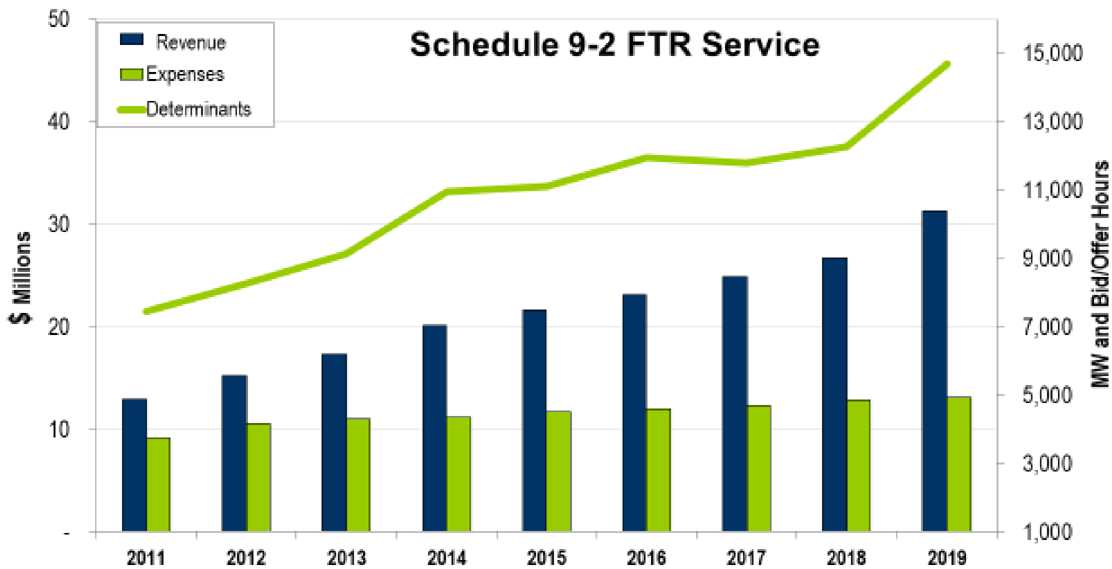
<u>Service Category Net Revenues as a Percentage Increase to, or Percentage Decrease from, Service Category Costs, 2011-2019</u>



Ms. Drauschak provides further details of "this cost-revenue mismatch for Schedule 9-2," in her Exh. No. PJM-0005 (copied below as Figure 2), which plainly shows for FTR Administration Service the relationship between increasing billing determinants and increasing cost over recoveries.

Figure 2

Schedule 9-2 Billing Determinants, Net Revenues, and Expenses, 2011-2019



Beginning January 1, 2021, with Commission approval, PJM eliminated the fixed percentages that had been stated in Tariff, Schedule 9 to allocate among the Service Categories PJM's aggregate revenue overcollections and replaced them with the refund method now in effect, which targets refunds to the Service Categories that experienced excess revenues in the preceding twelve months.[57] However, as Ms. Drauschak explains, the revised refund allocation methodology "do[es] not attempt to redistribute all PJM revenues to track PJM's underlying estimates of the costs associated with each Service Category."[58] Recognizing that limitation, "PJM expressly described that refund

[57] *PJM Interconnection, L.L.C.*, Changes to Administrative Charge Refund Provisions, Docket No. ER21-274-000 (Oct. 30, 2020); *PJM Interconnection, L.L.C.*, Letter Order, Docket No. ER21-274-000 (Dec. 16, 2020).

[58] Drauschak Testimony at 14.

methodology change to stakeholders in 2020 as an interim measure until new rates or a new rate structure could be developed by 2021."[59]

As Ms. Drauschak explains, the present filing "eliminates that source of inequity" because "Service Category charges will now be based on the actual billing determinants each month, as well as the actual costs each month."[60] Citing the FTR Administration Service as an example, Ms. Drauschak observes that "[i]f . . . bid quantities are high in a given month, but Schedule 9-2 costs are stable, the Schedule 9-2 rate formula will reduce the unit rate for that month to reflect the higher billing determinants."[61]

This exemplifies one of the "key economic differences between a formula rate and a stated rate," as described by Mr. Cavicchi and Dr. Accordino, i.e., "a formula rate maintains ratepayer equity; the rate aligns costs and revenues on a monthly basis ensuring system users are charged based on actual costs incurred by PJM to provide the services."[62]

2. Revenue adequacy

The proposed formula rate also ensures revenue adequacy for PJM, given that "PJM will collect its actual costs each month for each Service Category, no more and no less."[63] As Ms. Drauschak explains, "[t]he proposed rate form protects PJM not only against the risk of under-recovery from unexpected cost changes, but also the risk of under-recovery from unexpected billing determinant changes."[64]

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[59] Drauschak Testimony at 14-15.

[60] Drauschak Testimony at 15.

[61] *Id.*

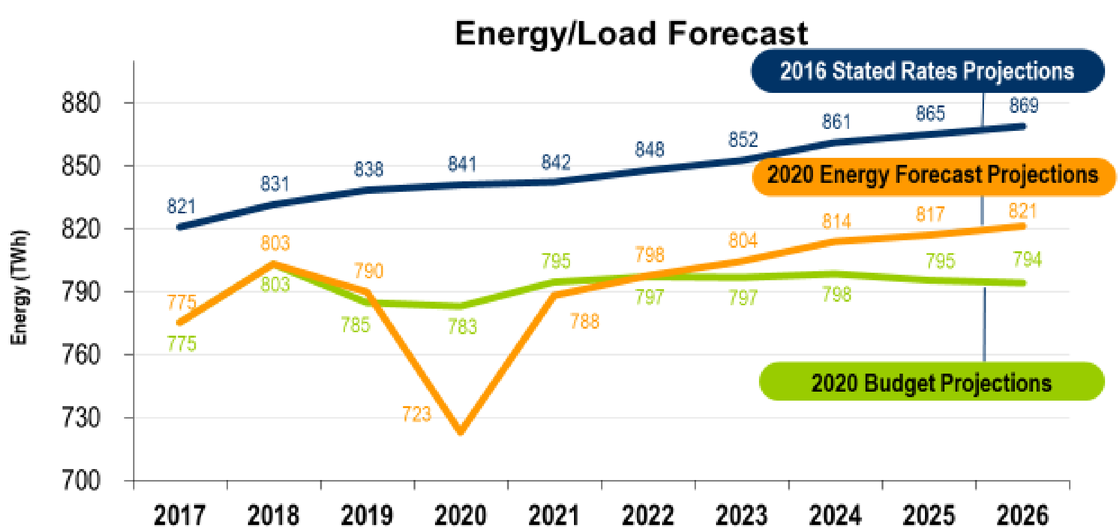
[62] Cavicchi/Accordino Testimony at 32.

[63] Drauschak Testimony at 15.

[64] *Id.*

This risk is real. Exh. No. PJM-0006, copied as Figure 3 below, shows the large divergence between PJM's energy forecast in 2016, used to set the current stated rates, and PJM's 2021 energy forecast. As can be seen, PJM projected in 2016 that annual load would range from 838 Terawatts ("TW") in 2019 to 869 TW in 2026. However, as Ms. Drauschak notes, "[p]ost-pandemic, and with other ongoing industry changes, future loads look quite different."[65] The 2020 forecast projects annual energy of 811 TW in 2021, increasing to 829 TW in 2026, well below the 869 TW projected for 2026 when the stated rates were set.

Figure 3
Change in Annual Energy Forecasts from 2016 to 2020



These significant changes in system loads matter because "[e]nergy input into and withdrawn from the system is by far the main billing determinant for Schedule 9."[66] As

[65] Drauschak Testimony at 15-16.

[66] Drauschak Testimony at 16.

Ms. Drauschak explains, "with expected major long-term trends towards both distributed generation (tending to reduce PJM loads) and greater electrification in both the transportation and building sectors (tending to increase PJM loads), it is reasonable to have a rate form that protects PJM from the impacts of load changes that are greater than initially projected and that are beyond PJM's control."[67]

3. Cost Accountability and Rate Certainty

Ms. Drauschak acknowledges a potential concern that a formula rate "could reduce the service provider's incentive to control its costs."[68] However, as she explains, in PJM's case, "the Finance Committee's ongoing review of PJM's budgets, expenses and major projects helps ensure PJM is accountable to its Members and has a strong incentive to keep costs contained."[69] Because the Finance Committee is composed of representatives from all Member sectors, who bear the Schedule 9 costs, they have a strong incentive to monitor any proposed increases in PJM's expenditures. And because the Finance Committee also regularly reviews PJM's actual and budgeted capital expenditures and operating expenses, as well as PJM's budget process and five-year budget and capital projections, it has ample ability to monitor and question any proposed increases in expenditures.[70] As noted, and as reflected in their recommendation letter in Exh. No. PJM-0002, the Member representatives on the Finance Committee unanimously recommended adoption of the

[67] Drauschak Testimony at 16.

[68] *Id.*

[69] *Id.*

[70] *Id.*

changes now embodied in this filing as "acheiv[ing] the jointly developed objectives of the 2021 administrative rate review."[71]

In addition, as explained above, PJM has proposed several additions to the Finance Committee Protocol in connection with the transition to formula rates. PJM developed these proposals based on input from Member representatives on the committee. The full committee is expected to act on PJM's proposed additions to the protocol in November 2021—and as can be seen from their endorsement letter, the ten Member representatives on the PJM Finance Committee have already recommended these protocol changes. Specifically, the proposed changes would require PJM to (i) provide to and discuss with the PJM Finance Committee five years of projected rates for Tariff, Schedules 9-1 through 9-4 and Schedule 9-PJMSettlement; (ii) identify cost assignment of budgeted capital expenditures as part of the annual and five-year projected capital spending PJM provides the PJM Finance Committee; (iii) give the PJM Finance Committee advance notice of material changes to services provided by PJM to the membership; and (iv) conduct a cost of service study every five years beginning in 2027, to examine the assignment of costs among Tariff, Schedules 9-1 through 9-4 and Schedule 9-PJMSettlement.[72]

Ms. Drauschak lastly cites on this point PJM's "established track record of carefully monitoring and controlling its costs."[73] In that connection, she shows in Exh. No. PJM-0007 (copied into Figure 4 below) "PJM's long-term maintenance of the lowest unit cost . . . for administrative services among all RTOs and ISOs."[74] While she acknowledges

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[71] Exh. No. PJM-0002 at 8.

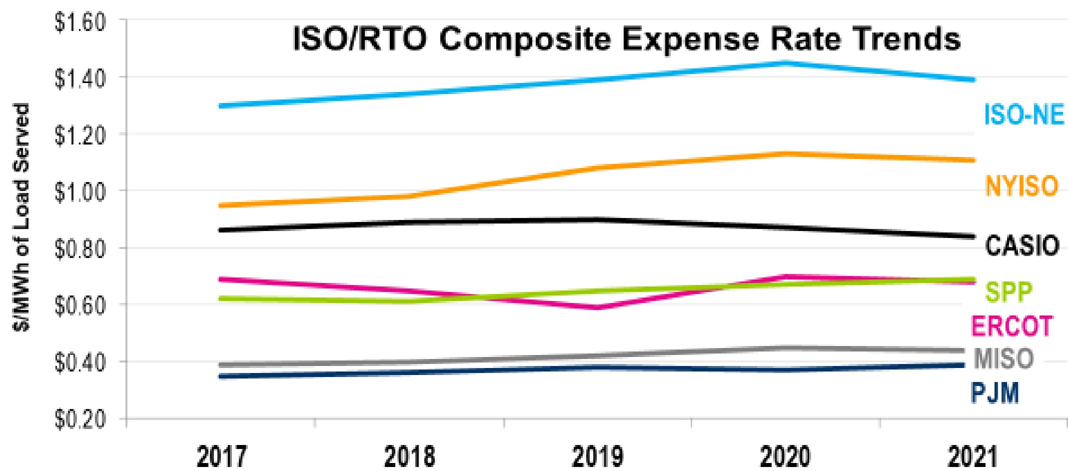
[72] *See* Drauschak Testimony at 17.

[73] Drauschak Testimony at 17.

[74] *Id.*

that PJMs unit-cost reflects economies of scale due to PJM's size and loads, she testifies that it "also reflects the effects of PJM's cost control measures;"[75] And she provides numerous examples of such measures.[76] As she also notes, the graph shows that PJM's unit cost "has been quite stable over time, which speaks to PJM's consistent approach to cost control."[77]

Figure 4
ISO/RTO Composite Expense Rate Comparison



4. Rate variability

One potential downside of a charge that can vary each month to track actual costs and actual billing determinants is that the variation makes the charges more volatile or unpredictable. Here, however, monthly charges under the proposed formula rate are "likely to be *less* volatile than the stated rates it is replacing."[78]

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[75] *Id.*

[76] *Id.* at 17-18.

[77] *Id.* at 18.

[78] *Id.*

As Ms. Drauschak explains, Members' final rate under the current method is not the stated rate, but rather the stated rate less any refund paid in one quarter for any aggregate Tariff, Schedule 9 revenue over-recoveries experienced in the prior quarter.[79] This current approach is prone to rate volatility because the primary billing determinant, load, changes significantly due to seasonal variations from quarter to quarter. By avoiding the impacts of those lagging quarterly refund adjustments, the proposed approach will likely reduce intra-year variability in PJM's administrative service billings.

Ms. Drauschak presents Exh. No. PJM-0008 (copied below as Figure 5) to demonstrate this. Figure 5 shows two estimates of 2021 monthly billings for administrative services: one under the current effective stated rate approach, and one under the proposed formula rate approach. The bar chart then displays the dollar difference between the highest and lowest monthly charges under the stated rate approach, and the dollar difference between the highest and lowest monthly charges under the formula rate approach. As can be seen, for stated rates, the highest charge, in July, is $33.4 million and the lowest charge, in October, is $19.5 million.[80] The difference between these two monthly charges is $13.9 million, or about a 71% increase above the lowest charge.[81]

By contrast, with the proposed formula rate, the highest charge, in March, is $28.7 million and the lowest charge, in February, is $22.8 million.[82] The difference between these two monthly charges is $5.9 million, or about a 26% increase above the lowest

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[79] *Id.*

[80] *Id.* at 19.

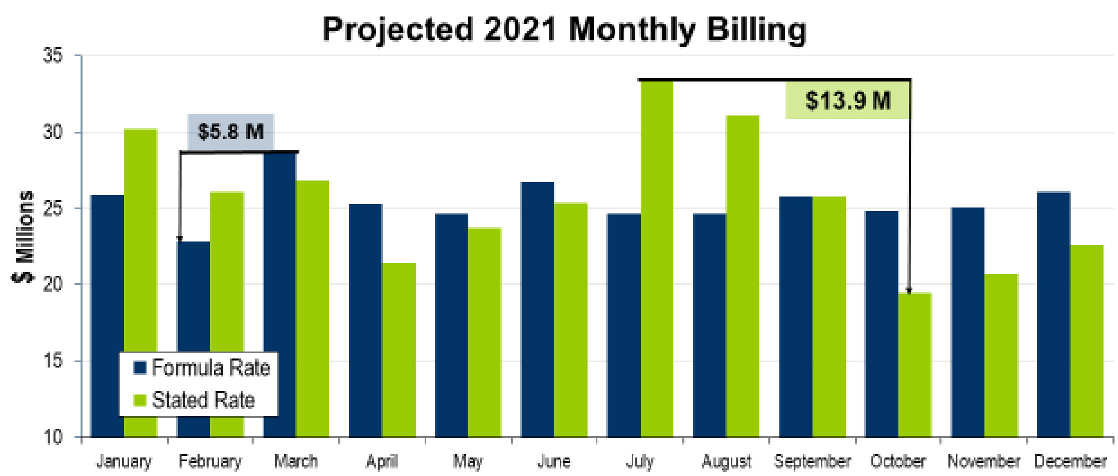
[81] *Id.*

[82] *Id.*

charge.[83] Ms. Drauschak also points out the consistency in this data of lower highs, and higher lows, for the formula rate billings versus the stated rate billings.[84] Three months of stated rate billings are each higher than the highest month of formula rate billings. Yet, three months of stated rate billings are also each lower than the lowest month of formula rate billings. In short, despite the name, stated rate billings are more variable than formula rate billings.

Figure 5

<u>Variations in Monthly Billings: Formula Rate vs Stated Rate</u>



As noted above, PJM also has agreed to provide forward estimates of expected monthly formula rates, which will aid market participant planning and help mitigate rate uncertainty.

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[83] *Id.*

[84] *Id.*

5. Elimination of reserve

The proposed formula rate also benefits ratepayers by eliminating the reserve that is an important component of the current stated rate approach. Under that approach, PJM cannot charge customers more than the stated rate specified in the Tariff. This poses a risk if PJM encounters unexpectedly high costs or unexpectedly low billing determinants. PJM cannot charge more than the stated rate in such a case, but PJM has no equity it could use to cushion the impact of under-recovering its administrative costs. The reserve, which can range as high as 6 % of PJM's annual revenues, provides that cushion.

No such cushion is needed, however, under the formula rate that allows PJM to recover its actual costs each month from its actual billing determinants each month. PJM therefore can eliminate the reserve, and refund all amounts in that reserve to Members. For reference, the reserve has ranged as high as $38 million in the last three years. Section III.E of this transmittal describes PJM's specific proposal for refunding to Members the funds in the reserve.

6. Comparability to rate forms used by other RTO/ISOs

Finally, as shown by Mr. Cavicchi and Dr. Accordino, PJM's formula rate proposal is closely aligned with the rate designs used by other RTO/ISOs.[85] Indeed, the Midcontinent Independent System Operator, Inc. recovers its administrative costs through formula rates that are recalculated monthly.[86] Plus, Southwest Power Pool, Inc., New York Independent System Operator, Inc., and California Independent System Operator ("CAISO") recover their administrative charges through a formula derived rate that is

[85] Cavicchi/Accordino Testimony at 33-34.

[86] MISO Tariff, Schedule 10, section III.

recalculated annually,[87] and CAISO's rates may be adjusted quarterly if certain circumstances are present.[88] In contrast, as a result of a rate case settlement specific to ISO New England, Inc. ("ISO New England") that ISO recovers its administrative costs through stated rates, updated annually through FPA section 205 filings at the Commission.[89] However, similar to the other ISOs and RTOs, ISO New England's tariff includes a true-up provision to account for any over- or under-recoveries from the prior year.[90]

B. The Proposed Change in Service Categories Is Reasonable.

Tariff, Schedule 9 currently unbundles PJM's administrative services into five Service Categories: Schedule 9-1, Control Area Administration Service; Schedule 9-2, FTR Administration Service; Schedule 9-3, Market Support Service; Schedule 9-4, Regulation and Frequency Response Administration Service; and Schedule 9-5, Capacity Resource and Obligation Management Service.[91]

PJM tasked Analysis Group with reviewing these Service Categories to ensure they remain reasonable. Analysis Group did so, and concluded that the Service Categories generally corresponded with PJM's distinct administrative services, but would better "align[] with the services that PJM provides its membership" if Market Support Service

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[87] CAISO Tariff, Appendix F, Schedule 1, Part A; NYISO Tariff, Rate Schedule 6.1.2.; SPP Tariff, Schedule 1-A; *see also* SPP Tariff, Schedule 1-A, Addendum 1 (formula rate template).

[88] CAISO Tariff, Appendix F, Schedule 1, Part B.

[89] *See* ISONE Tariff, Section IV.A; *see also ISO New England, Inc*., Letter Order, Docket No. ER21-106-000 (Dec. 18, 2020) (accepting stated rates for 2021).

[90] ISONE Tariff, Section IV.A.2.2.

[91] Tariff, Schedule 9.

and Regulation and Frequency Response Administration Service were combined.[92] PJM adopts that recommendation here.

Combining these two Service Categories is reasonable. First, Market Support Service already recovers the costs of PJM's administration of other ancillary services. Regulation and Frequency Response is the only ancillary service that currently has its own separate PJM administrative Service Category. Only a very small share of PJM's costs (less than 2%) is directly assigned to Schedule 9-4.

Second, "the beneficiaries of Regulation and Frequency Response Administration Service and of Market Support Service are the same."[93] As Mr. Cavicchi and Dr. Accordino found, "load serving entities purchase energy and ancillary services" which PJM administers under Schedule 9-3, "and use regulation and frequency response services (another ancillary service)," which PJM administers under Schedule 9-4.[94] At the same time, "generators both sell energy and ancillary services," using the administrative services PJM provides under Schedule 9-3, "and provide regulation and frequency response services," using the administrative services PJM provides under Schedule 9-4.[95]

Third, Analysis Group found that "the activities performed by PJM to provide Regulation and Frequency Response Administration Service are performed by the same people and by the same systems that administer other ancillary services provided under Schedule 9-3."[96]

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[92] Cavicchi/Accordino Testimony at 15.

[93] *Id.*, at 13.

[94] *Id.* at 13.

[95] *Id.* at 13.

[96] *Id.* at 13.

Fourth, "other RTO/ISOs include the administration of ancillary services as part of their energy market administrative tariffs."[97]

Given this overlap between the beneficiaries of Schedules 9-3 and 9-4, and the overlap between the PJM resources providing the administrative services charged under Schedules 9-3 and 9-4, "there is no basis for billing PJM customers separately for Regulation and Frequency Response Administration Service and for Market Support Service;" and "PJM can simplify the administration of its tariff schedules by collapsing Schedule 9-4 into Schedule 9-3."[98]

Aside from this change, Analysis Group found that the Service Categories, in conjunction with Tariff, Schedule 9-PJMSettlement, appropriately correspond with PJM's distinct administrative services. Mr. Cavicchi and Dr. Accordino summarized PJM's distinct administrative services as "reliably operating and planning the bulk power system[;] . . . operat[ing] markets for the exchange of FTRs, energy and ancillary services, and capacity obligations[;] and . . . and provid[ing] billing, settlement, and credit management functions."[99] Those activities correspond, respectively, to Schedule 9-1, Schedule 9-2, combined Schedules 9-3/9-4, Schedule 9-5, and Schedule 9-PJMSettlement.

More specifically, PJM's "activities necessary to operate the bulk power system reliably . . . are generally separated from the activities necessary to administer the

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[97] *Id.* at 13 (citing *Cal. Indep. Sys. Operator Corp.*, 2020 Grid Management Charge – Cost of Service Study Update, Docket No. ER21-112-000, at 4 (Oct. 15, 2020); MISO Tariff, Schedule 17, section I, *Southwest Power Pool, Inc.*, Amendment to Tariff Filing, Docket No. ER20-3008-001, at Tariff, Schedule 1-A, section 5 (Dec. 3, 2020); *Glossary: Ancillary Services*, Southwest Power Pool, Inc. https://www.spp.org/glossary/?term=Ancillary%20Services (last visited Oct. 1, 2021)).

[98] *Id.* at 13.

[99] *Id.* at 14.

wholesale markets."[100] This separation is "reflected in PJM's divisional organization where there are separate divisions for Operations and Planning, whose activities are primarily attributable to reliably operating and planning the bulk power system, and Market Services, whose activities are primarily attributable to the remaining market-related service categories."[101] Moreover, "the activities PJM performs to provide each of the market-related services are generally distinct, with particular people and systems administering the FTR markets, the energy and ancillary services markets, the capacity markets, and the billing, settlement, and credit functions associated with PJM Settlement, Inc."[102]

The distinct Service Categories also appropriately account for distinct beneficiaries: "not all wholesale market participants participate equally in each of the different types of markets [i.e., energy/ancillary services, capacity, and FTRs], some participate in only one market, while others participate in multiple markets;" and "some of PJM's members participate in its wholesale markets as financial participants, and thus do not benefit directly from the reliable operation of the bulk power system."[103]

In sum, the proposed combination of Market Support Service and Regulation and Frequency Response Administration Service recognizes that the same market participants use both services, and that the same PJM resources provide both resources; but no other changes are needed in PJM's Service Categories.

[100] *Id.* at 14.

[101] *Id.* at 14.

[102] *Id.* at 15.

[103] *Id.* at 15, 14.

C. The Proposed Cost Assignments and Allocations Are Reasonable.

PJM's proposed formula rates include stated percentage values to directly assign, or allocate, various PJM costs to the Service Categories and to Tariff, Schedule 9-PJMSettlement. The percentage values proposed for the Tariff are the culmination of extensive work over many months by Mr. Cavicchi and Dr. Accordino and their colleagues at Analysis Group. As shown in this section of the transmittal letter, the end result of their work, i.e., the percentage values proposed here for insertion in Tariff, Schedule 9, are just and reasonable. This section describes their approach, the steps in their cost assignment and allocation analyses, and the just and reasonable final products.

1. Approach

As explained by Mr. Cavicchi and Dr. Accordino, their analyses of PJM's Service Categories, cost assignments and allocations, and billing determinants "were informed by interviews [they] conducted with PJM personnel and data [they] gathered from PJM."[104] They conducted those interviews "with PJM managerial staff with direct knowledge of PJM processes across all PJM divisions."[105] They also gathered and analyzed "details regarding the services provided by PJM, the activities performed by PJM staff, the purposes for which PJM's information technology equipment and software applications are used, the factors that influence the magnitude of PJM's costs, expected changes in PJM's costs in the near future, and the beneficiaries of the services PJM provides," as well as PJM's organizational chart.[106]

[104] Cavicchi/Accordino Testimony at 12.

[105] *Id.* at 12.

[106] *Id.* at 12.

They adopted 2019 as the Period I test year, rather than 2020 "to avoid including the impact of the pandemic," and gathered actual expense data for that test year.[107] They then used budgeted 2021 costs to capture known and measurable changes to the 2019 costs.[108]

2. Assignment of PJM divisional costs

As Mr. Cavicchi and Dr. Accordino explain, PJM's activities "are organized under nine divisions . . . [and] [w]ithin each division, PJM's activities are further subdivided into a number of cost centers based on the activities performed."[109] They therefore "evaluated the function of each cost center and the services each provides through our interviews with PJM staff and gathering and analyzing data PJM made available to [them]."[110] Based on that information, they found that "the activities of certain cost centers are closely aligned with specific service categories, while other cost centers' activities span multiple service categories or are limited to providing support services (e.g., facilities management or administrative services)."[111]

Where they could, they "directly assigned cost centers, or portions thereof, to specific service categories based on the data [they] gathered from PJM."[112] As an example, they relate that "PJM's Information & Technology division tracks the equipment and software applications in service as well as the purpose for which the equipment and

[107] *Id.* at 11.

[108] *Id.* at 11.

[109] *Id.* at 17.

[110] *Id.* at 17.

[111] *Id.* at 17.

[112] *Id.* at 17.

software is used, which allows it to be directly assigned to service categories."[113] They also found "many instances" where "particular staff can be directly assigned to PJM service categories" or where "a cost center's expenses can be assigned on a percentage basis to PJM service categories based on its responsibilities."[114]

They classified costs from cost centers providing support services to other areas of PJM as divisional overhead or Management Service Costs "depending on the specific areas of PJM supported by these cost centers."[115]

3. Allocation of overheads

To allocate Management Service Costs (i.e., overheads), Mr. Cavicchi and Dr. Accordino first allocated 2.1% of total Management Service Costs to Schedule 9-PJMSettlement based on information received from PJM. They then allocated the remaining Management Service Costs "proportionally to Schedules 9-1 to 9-4 based on the shares of Schedules 9-1 to 9-4 costs that were assigned to each of these four service categories either directly or proportionally from divisional overhead."[116] These allocations were based on PJM's data on the amount of Management Service Costs, i.e., overhead and administrative costs, attributable to PJM Settlement services. Because the costs of PJM Settlement, Inc. "are tracked and billed to members separately . . . data were available on the overhead and administrative costs specifically attributable to Schedule 9-PJMSettlement."[117]

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[113] *Id.* at 17.

[114] *Id.* at 17.

[115] *Id.* at 18.

[116] *Id.* at 18.

[117] *Id.* at 19.

4. Test period adjustments and use of 2021 budgeted data

As explained in their testimony, Mr. Cavicchi and Dr. Accordino used 2021 budgets to develop their final recommended cost assignments and allocations to account for known and measurable changes in PJM's division-level budgets since 2019.[118] As they note, "certain minor organizational changes within PJM" and changes in the budgets for the affected PJM cost centers and divisions, reflecting changes in their responsibilities, resulted in changes in the divisional cost assignments.[119] Their final recommendations appropriately account for these changes.[120]

5. Division of costs between differing rates in Schedules 9-2 and 9-3.

Tariff, Schedules 9-2 and 9-3 each contain two distinct rates, with distinct billing determinants. In particular, each of these Service Categories includes a rate component based on offer and bid activity.[121] The proposed rate formulae maintains the separate rates for each of these schedules, and states a percentage for dividing Service Category costs between the two different rates. Specifically, 1.3% of the overall costs assigned and allocated to Market Support Services will be recovered using the bid/offer based rate in that schedule, and 40% of the overall costs assigned and allocated to FTR Administration Service will be recovered using the bid/offer based rate in that schedule.

As Ms. Drauschak testifies, these percentages reflect PJM's "long-standing practice of assigning 40% of Schedule 9-2's costs to the bid-based rate in that schedule, and 1.3%

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[118] Cavicchi/Accordino Testimony at 20.

[119] *Id.* at 20.

[120] *Id.* at 21.

[121] *See* Tariff, Schedule 9-2, sections (b)(ii) & (d); Schedule 9-3, sections (b)(ii) & (f).

of Schedule 9.3's costs to the bid-based rate in that schedule."[122] She states that PJM reviewed those percentage assignments, and found that they remain reasonable.[123] She explains that "PJM employs automated procedures and systems to receive bids and offers, and the expenses and capital costs associated with those procedures and systems represent the costs incurred by PJM for the benefit of those that submit bids and offers in the energy and FTR/[ARR] markets."[124] Her staff reviewed those costs for each schedule, compared them to all costs assigned or allocated to each of the schedules, and found that "the resulting percentage shares were very close to the 40% and 1.3% values PJM has long used to identify bid-based costs for those schedules, thus affirming that those values remain reasonable."[125]

D. The Proposed Change in Billing Determinants for Schedule 9-PJM Settlement Is Reasonable.

PJM proposes to change the billing determinants for Tariff, Schedule 9-PJMSettlement. PJM Settlement is the counterparty to transactions in PJM's centralized markets and to FTR and ARR instruments held by Market Participants. PJM Settlement also conducts financial settlements (issuing over 170,000 invoices annually), and administers PJM's credit policy and risk monitoring under Tariff, Attachment Q. PJM Settlement is a distinct corporate entity, but is reliant on PJM resources. All PJM costs used to support PJM Settlement are therefore tracked and directly assigned to PJM Settlement.

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[122] Drauschak Testimony at 25.

[123] *Id.* at 25-26.

[124] *Id.*

[125] *Id.* at 26.

Those directly assigned costs are recovered under Tariff, Schedule 9-PJMSettlement. Schedule 9-PJMSettlement currently uses the same volumetric billing determinants as Schedule 9-3, Market Support Service, i.e., the volume of energy input into and withdrawn from PJM's system, plus the quantities in Increment Offers, Decrement Bids, and Up-to Congestion Transactions. As Mr. Cavicchi and Dr. Accordino explain, "[t]his means that while nearly all of PJM's members use PJM's settlement services, only customers participating in the energy and ancillary services markets pay the costs of [PJM Settlement]."[126] Consequently, market participants do not bear any PJM Settlement costs for their activity in the capacity market or FTR/ARR markets, even though that activity relies on PJM Settlement's billing, credit, treasury and settlement functions in the same way as does energy market activity.

Moreover, Analysis Group found in their interviews with PJM staff that Tariff, Schedule 9-PJMSettlement's current volumetric billing determinants "are not significant determinants of [PJM Settlement's] costs."[127] They found instead that "the main driver of the costs of [PJM Settlement's] services is the number of bills sent out each month."[128] Mr. Cavicchi and Dr. Accordino therefore recommend using the number of bills issued per month by PJM Settlement as the billing determinant for Schedule 9-PJMSettlement, and PJM adopts that recommendation here and proposes to update Schedule 9-PJMSettlement accordingly.[129]

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[126] Cavicchi/Accordino Testimony at 28.

[127] *Id.*

[128] *Id.* at 28-29.

[129] *See* proposed Tariff, Schedule 9-PJMSettlement, section (c).

E. The Reserve Provided in the Current Rates Is No Longer Needed and Will Be Fully Refunded to Customers.

With the adoption of rates designed to recover PJM's actual costs each month, there is no need for PJM to maintain the reserve that was added to Tariff, Schedule 9 in 2006 to manage any cost under-recoveries from the stated rates. PJM is therefore revising Schedule 9 to eliminate the reserve, and to refund to customers in the first quarter of 2022, all amounts held in that reserve.[130]

To return the reserve, PJM will employ the same approach it uses now to provide and apportion refunds among the customers under Schedules 9-1 through 9-5 when there are excess amounts in the reserve—except that with the proposed change in rate form as of January 1, 2022, 100% of the reserve will be excess. Under the current reserve refund rule, PJM evaluates whether, during the prior twelve-month period, cumulative revenues for each such schedule exceeded the cumulative expenses for that schedule. Then, PJM refunds to each schedule's customers "based on the ratio of each such Schedule's excess revenues to the sum of the excess revenues of all Schedules that had excess revenues for such 12-month period."[131]

As Ms. Drauschak explains,[132] PJM will use the twelve months ending December 31, 2021, to perform these calculations for the Schedule 9 Service Categories.[133] PJM will then apportion the resulting refund over the first three months of 2022, and will adjust the refund amount in the third month to ensure PJM refunds no less, and no more, than the

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[130] *See* Drauschak Testimony at 20; proposed Tariff, Schedule 9, section (i).

[131] Proposed Tariff, Schedule 9, section (i).

[132] Drauschak Testimony at 21-22.

[133] *Id.*

final amount of the reserve as of December 31, 2021. Since there will be no additions to the reserve after December 31, 2021, this refund will close out the reserve and return it to customers.

As Ms. Drauschak also explains, the proposed refund mechanism will also close out any regulatory assets or liabilities booked for PJM Settlement, via an adjustment to the reserve refund amount otherwise calculated for Market Support Services customers.[134] Specifically, PJM proposes that any amount to be refunded under Schedule 9-3 will be "adjusted by any regulatory asset or regulatory liability balance recorded pursuant to Schedule 9-PJMSettlement as of December 31, 2021."[135]

This provision is designed to ensure that PJM Settlement remains revenue neutral (i.e., cumulative revenues match cumulative expenses) in the administrative rate change proposed in this filing.[136] PJM proposes Market Support Service (Tariff, Schedule 9-3) for this adjustment current Schedule 9-3 and Schedule 9-PJMSettlement share the same customers. Accordingly, when determining any reserve refunds to Schedule 9-3 customers, PJM shall first determine whether PJM Settlement is over- or under-funded as of December 31, 2021. If PJM Settlement is over-funded, PJM shall include in the refunds to Schedule 9-3 customers an amount equal to the amount (if any) in PJM Settlement's regulatory asset account as of December 31, 2021. Conversely, if PJM Settlement is under-funded, PJM shall reduce the refunds to Schedule 9-3 customers by an amount equal to the

[134] Drauschak Testimony at 22.

[135] Proposed Tariff, Schedule 9, section (i).

[136] Drauschak Testimony at 22-23.

amount (if any) in PJM Settlement's regulatory liability account as of December 31, 2021.[137]

F. Resulting Cost Assignment and Allocation Percentages, and Estimated Rates

1. Cost Assignment and Allocation Percentages

As the end result of the cost assignment work done by Mr. Cavicchi and Dr. Accordino, PJM is applying the following cost assignment and cost allocation percentages for determining PJM's monthly formula rates:

Directly assigned divisional costs:

- 33.5% to Schedule 9-1 Control Area Administration Service,
- 2.4% to Schedule 9-2 FTR Administration Service,
- 11.8% to Schedule 9-3 Market Support Service,
- 4.2% to Schedule 9-4 Capacity Resource and Obligation Management Service,
- 4.0% Schedule 9-PJMSettlement PJM Settlement, Inc. Administrative Services, and
- 44.1% to Schedule 9-5 Management Service Cost.

Allocation of Schedule 9-5 Management Service Cost:

- 63.3% to Schedule 9-1,
- 4.5% to Schedule 9-2,
- 22.3% to Schedule 9-3,
- 7.8% to Schedule 9-4, and
- 2.1% to Schedule 9-PJMSettlement.

2. Estimated Rates and Charges

Ms. Drauschak presents Exh. No. PJM-0009, which compares PJM's projected monthly 2021 rates (on a bundled-equivalent basis for all Service Categories combined)

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[137] *Id.* at 23.

using the current stated rates method versus the proposed formula method. As she notes, that exhibit (copied here as Figure 6) shows that the monthly unit rates under both methods fall in roughly the same range (i.e., about $0.31 per Mwh to $0.44 per Mwh).[138] She explains that the unit rates under the formula rate approach vary during the year based largely on changes in billing determinants.[139] Thus, since load is the primary billing determinant and is highest in the summer, the lowest unit rate under the formula rate approach is in July.[140] By contrast, she explains, the stated rate approach "produces its highest unit rates during the summer, because there typically are not significant over collections in the second quarter to be refunded in the third quarter, so third quarter rates typically see less reduction due to refunds."[141]

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[138] Drauschak Testimony at 26.

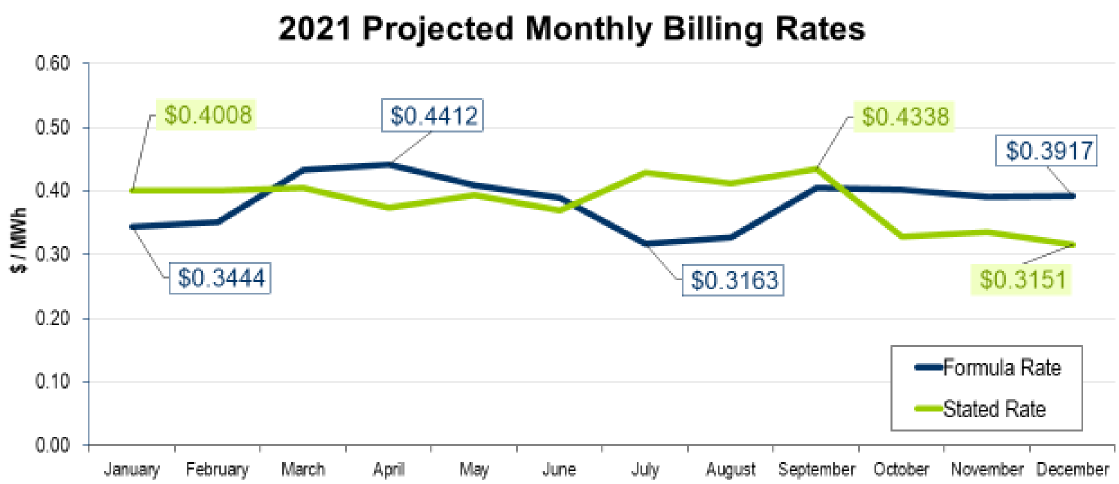
[139] *Id.*

[140] *Id.*

[141] *Id.*

Figure 6

Comparison of PJM's Projected Monthly 2021 Rates
(on a bundled-equivalent basis for all Service Categories combined)



Ms. Drauschak next looks at the relative changes for charges under the Service Categories from the proposed change to formula rates. Her Exh. No. PJM-0010 compares the impacts of stated rates and formula rates on the annual average rates and the annual revenues for each separate rate under the Service Categories. As Ms. Drauschak observes, "the pattern of the changes exemplifies correction of the current (inequitable) condition of over collection by some Service Categories (i.e., Schedule 9-2 and Schedule 9-3) and under collection by other Service Categories (i.e. Schedule 9-1 and Schedule 9-5)."[142] In other words, this underscores that PJM's proposal corrects the current cost/revenue mismatch among the Service Categories under the stated rates approach.

[142] *Id.* at 27.

IV. TARIFF REVISIONS TO IMPLEMENT FORMULA RATE COST RECOVERY MECHANISM

To implement the changes discussed topically above, PJM is revising Tariff, Schedule 9, which provides an overview of and the general rules for PJM's recovery of its administrative costs, Schedules 9-1 through 9-4, and Schedule 9-PJMSettlement. In particular, PJM is removing the stated rates set forth on Schedules 9-1 through 9-4 and replacing them with similar formulas in each such schedule that determine a monthly rate based on monthly costs divided by monthly billing determinants.[143] The cost component of each formula is the sum of each Schedule's (1) allocated divisional costs, (2) assigned non-divisional costs, and (3) allocated share of overhead costs. Accordingly, PJM is revising Schedule 9 to include the following three rules for PJM's implementation of the formula rate design:

- PJM shall allocate to each Service Category PJM's actual costs for all of PJM's divisions in accordance with the percentages stated in the applicable rate formula;[144]

- PJM shall assign to each Service Category an appropriate share of Non-Divisional Costs, which include, but are not limited to Actual Costs associated with (i) financial costs; (ii) operating projects or portions of operating projects; and (iii) capital projects;[145] and

- PJM shall not recover any costs through the formula rates for specific requests under the Tariff, like costs for System Impact Studies, etc., but only "to the extent such costs are specifically recovered pursuant to other provisions of this Tariff."[146]

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[143] *See* proposed Tariff, Schedule 9-1, section (c); Schedule 9-2, section (c); Schedule 9-3, section (c); Schedule 9-4, section (c). As discussed, PJM proposes to simplify the formula for determining Schedule 9-PJMSettlement's rate. *See* proposed Tariff, Schedule 9-PJMSettlement, section (c).

[144] Proposed Tariff, Schedule 9, section (e)(1).

[145] Proposed Tariff, Schedule 9, section (e)(2).

[146] Proposed Tariff, Schedule 9, section (e)(3).

As noted above, Actual Costs from PJM's divisions will be assigned using the percentages determined by the Analysis Group—which percentages PJM has added to each Service Category, as applicable.[147]

Overhead costs are allocated using new Tariff, Schedule 9-5, Management Services Costs. PJM's Divisional costs that support all Service Categories are assigned to Schedule 9-5 in accordance with the percentage stated in that schedule.[148] Each of Schedules 9-1 through 9-4 and Schedule 9-PJMSettlement is allocated a percentage share of the overhead costs from Schedule 9-5 using percentages stated for that purpose in each of those Schedules.[149]

Non-Divisional Costs will be directly assigned to the Service Categories they support. Thus, for operating and capital project costs, PJM shall assign such costs "on the basis of the service for which such projects are instituted."[150] Financial costs will track the assignment of PJM's assets. Proposed Tariff, Schedule 9 provides that PJM shall assign financial costs to each Service Category in accordance with the ratio of "the projected gross value of the assets assigned to such Schedule" to "the projected gross value of all assets of PJM that are assigned to any subsidiary schedule of this Schedule 9," where the gross value is determined "as of the final day of the month for which the rates are applicable."[151]

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[147] *See* proposed Tariff, Schedule 9-1, section (c); Schedule 9-2, section (c); Schedule 9-3, section (e); Schedule 9-4, section (d); Schedule 9-5, section (a); Schedule 9-PJMSettlement, section (c).

[148] Proposed Tariff, Schedule 9-5.

[149] *See* proposed Tariff, Schedule 9-1, section (c); Schedule 9-2, section (c); Schedule 9-3, section (e); Schedule 9-4, section (d); Schedule 9-PJMSettlement, section (c).

[150] Proposed Tariff, Schedule 9, section (e)(2).

[151] Proposed Tariff, Schedule 9, section (e)(2).

In addition, to provide rate and cost transparency, PJM proposes to post on its website all the rates charged under Schedule 9, including Schedules 9-1 through 9-4 and all the other Schedule 9 subsidiary schedules designed to recover specific costs, like Schedule 9-FERC which recovers PJM's annual FERC charges.[152]

V. REQUEST FOR EFFECTIVE DATE OF JANUARY 1, 2022

PJM requests that the enclosed revisions become effective on January 1, 2022, which is more than sixty days after the date of this filing.

As noted above, PJM also requests that the Commission issue its order on this filing on or before December 1, 2021, which is sixty-one days after the date of this filing. To that end, PJM has assigned an effective date of December 2, 2021, to one of the non-substantive eTariff records submitted with this filing, while marking each other record with a January 1, 2022 effective date.

PJM further asks that, if the Commission suspends the enclosed rates at all, it do so on only a nominal basis, so that the rates still take effect on January 1, 2022 (albeit subject to refund). If the Commission suspends the enclosed Tariff changes at all, a nominal suspension and January 1, 2022 effective date would be consistent with the Commission's suspension policy as set forth in *West Texas Utilities Co*.[153] There, the Commission explained that it will suspend a rate change for only a nominal period where a longer suspension may lead to "harsh and inequitable results"[154] or the rate increase was not

[152] Proposed Tariff, Schedule 9, section (g). To be clear, each month, PJM will post the rates charged under Schedule 9-1 (Control Area Administration Service), Schedule 9-2 (Financial Transmission Rights Administration Service), Schedule 9-3 (Market Support Service), Schedule 9-4 (Capacity Resource and Obligation Management Service), Schedule 9-FERC, Schedule 9-OPSI, Schedule 9-CAPS, Schedule 9-MMU, Schedule 9-FINCON, and Schedule 9-PJMSettlement. *See id.*

[153] *W. Tex. Utils. Co.*, 18 FERC ¶ 61,189 (1982).

[154] *Id.* at 61,374.

"substantially excessive."[155] The Commission clarified that only rate increases that may be more than 10% excessive would be suspended for the maximum five-month period.[156] Here, PJM proposes to implement a new rate form that recovers only PJM's actual costs each month, so by definition the rates cannot exceed PJM's costs—by 10% or otherwise.[157]

VI. COMMUNICATIONS

PJM requests that all communications regarding this filing be directed to the following persons:

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VII. ADDITIONAL INFORMATION

In accordance with section 35.13(a)(1) of the Commission's regulations, 18 C.F.R. § 35.13(a)(1), PJM provides the following information:

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[155] *Id*. at 61,375.

[156] *Id*.

[157] A nominal suspension would also be consistent with the Commission's practice regarding suspension of other RTO rate change filings. *See, e.g.*, *ISO New England, Inc.*, 141 FERC ¶ 61,272, at PP 28, 30 (2012) (nominally suspending ISO New England's rate increase of "almost 10 percent" for one day over protests).

A. General Information

1. List of documents submitted (18 C.F.R. § 35.13(b)(1))

This filing consists of the following:

a. This transmittal letter;

b. Attachment A – Revisions to the PJM Tariff (marked);

c. Attachment B – Revisions to the PJM Tariff (clean);

d. Attachment C – Exhibit No. PJM-0001, Prepared Direct Testimony of Lisa M. Drauschak, including the officer attestation required by 18 C.F.R. § 35.13(d)(6) and accompanying Exhibit Nos. PJM-0002 through PJM-0010;

e. Attachment D – Exhibit No. PJM-0011, Prepared Direct Testimony of A. Joseph Cavicchi and Megan H. Accordino, Ph.D and accompanying Exhibit Nos. PJM-0012 through PJM-0020; and

f. Attachment E – Period I and Period II Cost of Service statements and schedules.

2. Proposed effective date—January 1, 2022 (18 C.F.R. § 35.13(b)(2))

PJM requests that the revised PJM Tariff sections be accepted for filing effective January 1, 2022, as discussed above in Part V.

3. Persons receiving notice (18 C.F.R. § 35.13(b)(3))

See Part VI, above.

4. Brief description of rate change (18 C.F.R. § 35.13(b)(4))

See Part IV, above.

5. Reasons for rate change (18 C.F.R. § 35.13(b)(5))

See Parts III and IV, above, and the attached testimonies of Ms. Drauschak and Mr. Cavicchi and Dr. Accordino.

6. Agreement to rate change (18 C.F.R. § 35.13(b)(6))

While PJM is not required to obtain agreement of any party or parties in order to make the instant filing, given that PJM retains FPA section 205 rights to modify the Tariff, PJM nonetheless developed the instant proposal through its stakeholder process and based on the input and recommendations of its Members.

As discussed in Part IV above, the PJM Members Committee endorsed the Tariff proposal reflected in this filing. The PJM Finance Committee, composed of ten elected member representatives, also unanimously recommended PJM Board approval of the rate proposal in this filing.

7. Statement as to expenses or costs (18 C.F.R. § 35.13(b)(7))

No PJM expenses or costs that PJM used to support its proposed rates "have been alleged or judged in any administrative or judicial proceeding to be illegal, duplicative, or unnecessary costs that are demonstrably the product of discriminatory employment practices."[158]

B. Information Relating to the Effect of the Rate Change (18 C.F.R. § 35.13(c))

Information relating to the effect of the rate change is provided in Ms. Drauschak's testimony.[159]

C. Cost of Service Information (18 C.F.R. §§ 35.13(d), (e)(1)(i), & (h))

Cost of service information and statements and schedules supporting PJM's proposed rate increase are included in this filing.

[158] 18 C.F.R. § 35.13(b)(7).

[159] *See* Exh. No. PJM-0001.

D. Testimony and Exhibits (18 C.F.R. §§ 35.13(e)(1)(ii) & (e)(2))

Testimony supporting PJM's rate increase is provided by (1) Ms. Lisa M. Drauschak, Vice President, Chief Financial Officer and Treasurer of PJM; and (2) Mr. A. Joseph Cavicchi and Dr. Megan H. Accordino of the Analysis Group, Inc. In the event that this matter is set for hearing, the material submitted as part of this filing shall comprise PJM's case in chief, subject to the Presiding Judge permitting the submission of amended or additional materials.

VIII. REQUEST FOR WAIVERS

A. Request for Waiver of Section 35.13(d)(3)(i) Period I Regulation to Allow for Use of Pre-COVID-19 Representative Data

PJM requests waiver of the Commission's requirement in 18 C.F.R. § 35.13(d)(3)(i) that Period I data supporting a rate change filing cover a period ending no more than fifteen months prior to the filing date. Specifically, PJM requests waiver to file Period I data composed of calendar year 2019, which ended twenty-one months before the date of this filing, to ensure that the Period I data is representative of PJM's costs and operations.

The Commission has granted waiver of the Period I timing requirement in other cases for good cause shown.[160] While, under the Natural Gas Act, the Commission has rejected waiver of its base period regulations where the utility did not justify use of the older data,[161] under the FPA, the Commission has repeatedly found good cause to waive this regulation and allow use of an alternate Period I. In fact, the Commission recently has

[160] *See, e.g.*, *Miss. Power Co.*, 171 FERC ¶ 61,200, at P 8 (2020); *Ameren Servs. Co.*, 166 FERC ¶ 61,184, at P 8 (2019); *Miss. Power Co.*, 164 FERC ¶ 61,239, at P 12 (2018).

[161] *See Nat'l Fuel Gas Supply Corp.*, 69 FERC ¶ 61,253, at 61,955 (1994).

found good cause for waiver to use earlier Period I data when the public utility used that earlier period in pre-filing negotiations with customers.[162]

Good cause exists here to grant such waiver. The purpose of the regulation's fifteen-month is "[t]o avoid stale test period data."[163] Stated another way, the purpose is to ensure that test period data is representative for the purpose of setting a utility's rates. That is PJM's objective in basing Period I on calendar year 2019, i.e., the last calendar year before widespread disruptions, as a result of the novel coronavirus pandemic, that began in the first quarter of 2020 and continued throughout that year. As the Commission recognized early in 2020, the pandemic could "disrupt, complicate, or otherwise change [public utilities'] normal course of business operations."[164] The pandemic significantly affected PJM's business operations, with an anomalous drop in PJM's operating expenses of about 5% in a single year from 2019 to 2020. In addition to that aggregate drop in expenses, as Ms. Drauschak testifies, PJM experienced "large changes in various types of costs."[165] In particular, the pandemic resulted in "cessation of PJM's extensive program of on-campus training for operator certification and other Member training [and] cessation of PJM's prior practice of hundreds of in-person stakeholder meetings each year," which reduced PJM's costs, as did "a dramatic reduction of employee travel, unprecedented shifts to widespread remote work for most employees, and sequestration of control center and other critical employees."[166]

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[162] *See, e.g.*, *Miss. Power*, 171 FERC ¶ 61,200, at P 8; *Ameren Servs.*, 166 FERC ¶ 61,184, at P 8; *Miss. Power*, 164 FERC ¶ 61,239, at P 12.

[163] *Miss. Power*, 171 FERC ¶ 61,200, at P 2.

[164] *Bus. Continuity of Energy Infrastructure*, 171 FERC ¶ 61,007, at P 1 (2020).

[165] Drauschak Testimony at 28.

[166] *Id.*

Moreover, calendar year 2019 was the source of the data for the comprehensive cost of service study performed by Mr. Cavicchi and Dr. Accordino. At the time they performed their study, calendar year 2019 was the latest data available. As a key milestone in PJM's nearly two-year engagement with the PJM Finance Committee on administrative rate reform, the results of the 2019 calendar year cost of service study were provided to the PJM Finance Committee early in 2021, and formed the basis for PJM Finance Committee discussions throughout the rest of this year. Thus, waiver of Period I time requirements here would be consistent with the Commission's recent waiver of the Period I rule to track an earlier period used by the public utility in its pre-filing discussions with customers.[167]

Accordingly, it is appropriate in this instance to grant waiver of the Period I timing requirement, so as to allow PJM to use calendar year 2019 as Period I.

B. Request for Waiver of Section 35.13(h) Requirements for Certain Statements and Schedules Inapplicable to PJM

PJM submits with this filing all Period I and Period II statements identified in 18 C.F.R. § 35.13(h); however, a number of those statements, i.e., Statements AL, AM, AN, AR, AU, AW (Period II only), AX, BB, BC, BD, BE, BF, BI, BJ, and BM are not applicable to PJM for the reasons explained by PJM in each such statement (e.g., because PJM does not have the costs at issue). To the extent necessary, PJM seeks waiver of 18 C.F.R. § 35.13(h) to permit submission of the statements in this manner. PJM also seeks waiver of 18 C.F.R. § 35.13(h) as necessary to excuse PJM from submitting revenue comparisons in Statements BG and BH by customer and customer class, given that PJM

[167] *See, e.g.*, *Miss. Power*, 171 FERC ¶ 61,200, at P 8; *Ameren Servs.*, 166 FERC ¶ 61,184, at P 8; *Miss. Power*, 164 FERC ¶ 61,239, at P 12.

has over 1,000 Member-customers.[168] The Commission has previously granted PJM similar waivers for rate filing statements because "these statements do not have the costs at issue or that the costs do not apply or both, and that given the number of customers, providing statements for each would be burdensome."[169]

Lastly, PJM requests waiver of any provision of the Commission's regulations required for the Commission to accept this filing effective January 1, 2022.

IX. SERVICE

PJM has served a copy of this filing on all PJM Members and on all state utility regulatory commissions in the PJM Region by posting this filing electronically. In accordance with the Commission's regulations,[170] PJM will post a copy of this filing to the FERC filings section of its internet site, located at the following link: https://www.pjm.com/library/filing-order.aspx with a specific link to the newly-filed document, and will send an email on the same date as this filing to all PJM Members and all state utility regulatory commissions in the PJM Region[171] alerting them that this filing has been made by PJM today, and is available by following such link.

[168] *See Member List*, PJM Interconnection, L.L.C., https://www.pjm.com/about-pjm/member-services/member-list (last visited Oct. 1, 2021).

[169] *PJM Interconnection, L.L.C.*, 157 FERC ¶ 61,236, at P 20 (2016).

[170] *See* 18 C.F.R §§ 35.2(e) and 385.2010(f)(3).

[171] PJM already maintains, updates, and regularly uses email lists for all PJM Members and affected commissions.

X. CONCLUSION

In accordance with the foregoing, PJM respectfully requests that the Commission accept the proposed revisions to the Tariff effective January 1, 2022, as discussed herein.

Respectfully submitted,

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On behalf of
PJM Interconnection, L.L.C.

Attachment A

Revisions to the
PJM Open Access Transmission Tariff

(Marked/Redline Format)

SCHEDULE 9
PJM Interconnection, L.L.C. Administrative Services

a) PJM Interconnection, L.L.C. is the Transmission Provider under this Tariff. It also operates the PJM Interchange Energy Market as described in Tariff, Attachment K-Appendix and provides various other services to market participants. The cost of operating the PJM Interconnection, L.L.C., including principal and/or depreciation expense, interest expense and financing costs, excluding any costs specifically recovered pursuant to other provisions of this Tariff as identified in this Schedule 9, shall be recovered from users of the various PJM services pursuant to the rates set forth in this Schedule 9 and its subsidiary Schedules which correspond to categories of services ("Service Categories") provided by PJM. The charge in any month to any user of PJM's services under this Schedule 9 is the sum of the charges under the following subsidiary Schedules of this Schedule 9 to the extent determined to be applicable by the Transmission Provider to such user in such month:

Tariff, Schedule 9-1:	"Control Area Administration Service"
Tariff, Schedule 9-2:	"Financial Transmission Rights Administration Service"
Tariff, Schedule 9-3:	"Market Support Service"
Tariff, Schedule 9-4:	~~"Regulation and Frequency Response Administration Service"~~
~~Tariff, Schedule 9-5:~~	"Capacity Resource and Obligation Management Service"

b) The rates, terms, conditions, and applicability of these subsidiary services of this Schedule 9 are set forth on the subsidiary Schedules of this Schedule 9. These rates and charges do not include the charges for PJMSettlement services to Transmission Customers and Market Participants. The charges for PJMSettlement services to Transmission Customers and Market Participants are set forth in Tariff, Schedule 9-PJMSettlement.

c) This Schedule 9 also includes a subsidiary Schedule 9-5, "Management Services Cost," which shall govern the determination and allocation of certain overhead and administrative costs among subsidiary Schedules 9-1 through 9-4.

d) Each of the subsidiary Schedules 9-1 through 9-4 of this Schedule 9 contains a formula for determination of the rate or charge thereunder. The rates and charges for Schedules 9-1 through 9-4 shall be determined monthly based on the costs incurred in such month, pursuant to the formulas set forth in such schedule.

e) (1) PJM shall allocate to each subsidiary Schedule PJM's Actual Costs and expenses accounted for in all of PJM's Divisions based on the allocation percentage stated in the rate formula in Schedules 9-1 through 9-4 and Schedule 9-PJMSettlement.

(2) In addition to such costs, each month, PJM shall assign to each such Schedule its appropriate share of certain costs and expenses that are not assigned to any Division ("Non-Divisional Costs"), including, but not limited to, Actual Costs associated with (i) financial costs; (ii) operating projects or portions of operating projects; and (iii) capital projects. The assignment of financial costs shall be based on PJM's assignment of its assets among such Schedules. PJM shall assign to each

Schedule each month a proportion of the total amounts for such financial costs equal to the proportion of (iii) the projected gross value of the assets assigned to such Schedule to (iv) the projected gross value of all assets of PJM that are assigned to any subsidiary schedule of this Schedule 9, as of the final day of the month for which the rates are applicable. The assignment of operating projects and expenses related to capital projects shall be on the basis of the service for which such projects are instituted.

(3) PJM shall not recover through this Schedule 9 or its subsidiary Schedules any costs for services provided by PJM in response to specific requests, pursuant to this Tariff, of specific identified entities, including, but not limited to, System Impact Studies and Facilities Studies, to the extent such costs are specifically recovered pursuant to other provisions of this Tariff.

f~~e~~) In addition to subsidiary Tariff, Schedules 9-1 through 9-5, this Schedule 9 also includes the following separate subsidiary schedules: (i) Tariff, Schedule 9-FERC, which is designed to recover Transmission Provider's costs for the annual charges assessed on Transmission Provider by FERC; (ii) Tariff, Schedule 9-OPSI, which is designed to recover Transmission Provider's payments to the Organization of PJM States, Inc.; (iii) Tariff, Schedule 9-CAPS, which is designed to recover Consumer Advocates of PJM States, Inc. costs; (iv) Tariff, Schedule 9-MMU which is designed to recover the cost of providing market monitoring functions to the PJM Region; (v) Tariff, Schedule 9-FINCON, which is designed to recover Transmission Provider's costs of outside consultants engaged by the Finance Committee, and (vi) Tariff, Schedule 9-PJMSettlement, which is designed to recover PJM Settlement, Inc.'s costs.

g) Each month PJM shall post on its website the rates charged under this Schedule 9, including Schedules 9-1 through 9-4, and the separate subsidiary schedules listed above in subsection (f). PJM shall also post each month on its website the rates charged under Schedule 10-NERC and Schedule 10-RFC.

h) As used in this Schedule 9 and in the subsidiary Schedules of this Schedule 9, the following terms shall have the following meanings:

(1) "Actual Costs" shall mean costs, expenses, disbursements and other amounts incurred (whether paid or accrued); and

(2) "Divisions" shall mean the various corporate cost centers within PJM.

i~~d~~) All amounts held in reserve pursuant to this Schedule 9 and all subsidiary Schedules as of December 31, 2021, ~~Revenues received under subsidiary Tariff, Schedules 9-1 through 9-5 shall be used in part to fund and maintain a reasonable reserve, and amounts received in excess of that necessary to recover costs and fund such reserve, shall be refunded to customers on a one-quarter lag basis, in accordance with the following:~~

~~(1) PJM shall record on its income statement deferred regulatory expense, and PJM's balance sheet will reflect as a cumulative deferred regulatory liability, any revenues collected under subsidiary Tariff, Schedules 9-1 through 9-5 that are in excess of all expenses (exclusive of expenses recovered under Tariff, Schedule 9-FERC, Tariff, Schedule 9-OPSI, Tariff, Schedule 9-~~

~~CAPS, Tariff, Schedule 9-FINCON, Tariff, Schedule 9-MMU, Tariff, Schedule 9-PJMSettlement and other similar schedules that may be added to the Tariff, and exclusive of expenses of PJM affiliates), and taking account of and including any accrued tax expense effects of this regulatory liability. The deferred regulatory liability will be reduced whenever after-tax PJM revenues collected under subsidiary Tariff, Schedules 9-1 through 9-5 during any calendar quarter are less than PJM's actual expenses, excluding the costs recovered under Tariff, Schedule 9-FERC, Tariff, Schedule 9-OPSI, Tariff, Schedule 9-CAPS, Tariff, Schedule 9-FINCON, Tariff, Schedule 9-MMU, Tariff, Schedule 9-PJM Settlement and other similar schedules that may be added to the Tariff.~~

~~(2) At the end of each calendar quarter, to the extent that the deferred regulatory liability exceeds six percent of PJM's revenues projected to be collected under Tariff, Schedules 9-1 through 9-5 during the current calendar year (exclusive of any credits to Tariff, Schedules 9-1 through 9-5 charges associated with a refund applied during the preceding calendar quarter(s)), such excess amounts in the deferred regulatory liability~~ shall be refunded ~~evenly~~ over the applicable billing determinant volumes in the ~~following~~ first calendar quarter of 2022 through credits to charges to then-current customers under such schedules of Tariff, Schedules 9-1 through 9-5 (as in effect prior to January 1, 2022) for which cumulative revenues for such schedule over the prior 12-month period ending December 31, 2021 ~~at the end of such quarter~~ exceeded (by any amount) the cumulative expenses for such schedule (consistent with those reported or to be reported to the Finance Committee) over such 12-month period, and apportioned among such Schedules with refunds based on the ratio of each such Schedule's excess revenues to the sum of the excess revenues of all Schedules that had excess revenues for such 12-month period; provided, however, the amount to be refunded associated with Schedule 9-3 (as in effect prior to January 1, 2022) shall be adjusted by any regulatory asset or regulatory liability balance recorded pursuant to Schedule 9-PJMSettlement as of December 31, 2021. The ~~deferred regulatory liability~~reserve shall be reduced to zero dollars~~by such refunds~~.

~~(3) Notwithstanding subsection (d)(2) above, PJM shall refund evenly over a three-month period commencing January 1, 2020 and every third year thereafter, the full cumulative regulatory liability as of December 31 of the previous calendar year, provided that refunds shall be limited to amounts that will not reduce any regulatory liability balance below an amount equal to two percent of the revenues projected to be collected under Tariff, Schedules 9-1 through 9-5 during the same calendar year. Such amounts that are not refunded shall continue to be recorded as a regulatory liability. All such refunds under this paragraph shall be made through credits to the charges to then-current Tariff, Schedules 9-1 through 9-5 customers in the proportions set forth in subsection (d)(2) above.~~

~~(4) If at any time the cumulative deferred regulatory liability on PJM's year-end balance sheet is projected to be less than two percent of the revenues projected to be collected under Tariff, Schedules 9-1 through 9-5 in the same calendar year, PJM will consult with the Finance Committee, in a manner consistent with the Finance Committee Protocol, to develop plans to restore the reserve.~~

SCHEDULE 9-1
Control Area Administration Service

a) Control Area Administration Service comprises all of the activities of PJM associated with preserving the reliability of the PJM Region and administering Point-to-Point Transmission Service and Network Integration Transmission Service. PJM provides Control Area Administration Service to customers using Point-to-Point or Network Integration Transmission Service under this Tariff.

b) PJM will charge each user of Control Area Administration Service each month a charge equal to the Monthly Control Area Administration Service Rate defined below times the total quantity in MWhs of energy delivered (including losses, but excluding Direct Charging Energy) during such month by such user as a transmission customer under this Tariff for Point-to-Point Transmission Service or Network Integration Transmission Service.

c) The Monthly Control Area Administration Service Rate ("MCAASR") shall be calculated each month in accordance with the formula:

$$MCAASR = \frac{[CAASME]}{PJMTHTU}$$

where:

MCAASR is the Monthly Control Area Administration Service Rate

CAASME, Control Area Administration Service monthly expenses, is the Actual Costs assigned to the Control Area Administration Service, calculated as the sum of A.1 plus A.2 plus A.3 for the month for which MCAASR is being calculated, where:

"A.1" equals the product of 33.5% times the Actual Costs for all Divisions in the month for which MCAASR is being calculated.

"A.2" equals an allocation to the Control Area Administration Service of PJM's Actual Costs for Management Service Cost during the month for which MCAASR is being calculated, based on the formula in Schedule 9-5.

"A.3" equals PJM's Actual Costs for Non-Divisional Costs that are assigned to Control Area Administration Service for the month for which MCAASR is being calculated.

PJMTHTU, PJM total hourly transmission usage, is the actual total quantity in MWhs of energy delivered under Point-to-Point and Network Integration Transmission Service by all customers during the month for which MCAASR is being calculated.~~shall be as follows:~~

~~Commencing January 1, 2017: $0.2100 per MWh~~

~~Commencing January 1, 2019:~~	~~$0.2153 per MWh~~
~~Commencing January 1, 2020:~~	~~$0.2207 per MWh~~
~~Commencing January 1, 2021:~~	~~$0.2262 per MWh~~
~~Commencing January 1, 2022:~~	~~$0.2319 per MWh~~
~~Commencing January 1, 2023:~~	~~$0.2377 per MWh~~
~~Commencing January 1, 2024:~~	~~$0.2393 per MWh~~

SCHEDULE 9-2
Financial Transmission Rights Administration Service

a) Financial Transmission Rights Administration Service comprises all of the activities of PJM associated with administering the Financial Transmission Rights ("FTRs") provided for under Tariff, Attachment K including, but not limited to, coordination of FTR bilateral trading, administration of FTR auctions, support of PJM's on-line, internet-based FTR reporting tool, and analyses to determine what total combination of FTRs can be outstanding and accommodated by the PJM system at a given time. PJM provides this service to entities that hold FTRs or that submit offers to sell or bids to buy FTRs.

b) PJM will charge each user of Financial Transmission Rights Administration Service each month a charge equal to: (i) the FTR Service Rate, Component 1, as ~~stated~~ defined below, times the FTR Holder's total FTRs in megawatt-hours during such month; plus (ii) the FTR Service Rate, Component 2, as ~~stated~~ defined below, times the sum of (1) the number of hours in all bids to buy Financial Transmission Rights Obligations submitted by such user during such month, plus (2) five times the number of hours in all bids to buy Financial Transmission Rights Options submitted by such user during such month. Component 1 of this charge applies to all bids submitted into any round of the Long-term, Annual, or monthly FTR Auctions; Component 2 of this charge applies to all bids submitted into any round of the Annual FTR Auction and to all bids submitted into the applicable monthly FTR Auction.

c) The Financial Transmission Rights Administration Service Rate shall be calculated monthly, in accordance with the following formulae:
FTR Service Rate, Component 1 =

$$\frac{\text{Monthly FTR MWh Cost}}{\text{Monthly FTR MWh Determinants}}$$

FTR Service Rate, Component 2 =

$$\frac{\text{Monthly FTR Bid/Offer Hours Cost}}{\text{Monthly FTR Bid/Offer Hours Determinants}}$$

where:

"Monthly FTR MWh Cost" equals 0.6 times the sum of: FTR Cost Component A.1 plus FTR Cost Component A.2 plus FTR Cost Component A.3, as defined below.

"Monthly FTR Bid/Offer Hour Cost" equals 0.4 times the sum of: FTR Cost Component A.1 plus FTR Cost Component A.2 plus FTR Cost Component A.3, as defined below.

"FTR Cost Component A.1" equals the product of: 2.4% times the Actual Costs for all Divisions in the month for which the Financial Transmission Rights Administration Service Rate is being calculated.

"FTR Cost Component A.2" equals the Overhead Allocation to Financial Transmission Rights Administration Service determined pursuant to Schedule 9-5 of PJM's Actual Costs for Management Service Cost during the month for which the Financial Transmission Rights Administration Service Rate is being calculated.

"FTR Cost Component A.3" equals PJM's Actual Costs for the Non-Divisional Costs that are assigned to Financial Transmission Rights Administration Service for the month for which the Financial Transmission Rights Administration Service Rate is being calculated.

and where

"Monthly FTR MWh Determinants" equals the total amount of Financial Transmission Rights, in MWs, in effect each hour for all holders of Financial Transmission Rights during the month for which the Financial Transmission Rights Administration Service Rate is being calculated, summed for each hour of such month.

"Monthly FTR Bid/Offer Hour Determinants" equals the sum of (1) the total number of hours of all Financial Transmission Rights Obligation bids, plus (2) five times the total number of hours of all Financial Transmission Rights Option bids, for all bidders for all FTR auctions conducted during the month for which the Financial Transmission Rights Administration Service Rate is being calculated.

~~The FTR Service Rate, Component 1 shall be as follows~~

~~Commencing January 1, 2017: $0.0028 per MWh~~

~~Commencing January 1, 2019: $0.0029 per MWh~~

~~Commencing January 1, 2020: $0.0029 per MWh~~

~~Commencing January 1, 2021: $0.0030 per MWh~~

~~Commencing January 1, 2022: $0.0031 per MWh~~

~~Commencing January 1, 2023: $0.0032 per MWh~~

~~Commencing January 1, 2024: $0.0032 per MWh~~

~~d) The FTR Service Rate, Component 2 shall be as follows:~~

~~Commencing January 1, 2017: $0.0019 per hour~~

~~Commencing January 1, 2019: $0.0019 per hour~~

~~Commencing January 1, 2020: $0.0020 per hour~~

~~Commencing January 1, 2021: $0.0020 per hour~~

~~Commencing January 1, 2022: $0.0021 per hour~~

~~Commencing January 1, 2023: $0.0021 per hour~~

~~Commencing January 1, 2024: $0.0022 per hour~~

SCHEDULE 9-3
Market Support Service

a) Market Support Service comprises all of the activities of PJM associated with supporting the operation of the PJM Interchange Energy Market and related functions, as described in Operating Agreement, Schedule 1 and Tariff, Attachment K-Appendix, including, but not limited to, market modeling and scheduling functions, locational marginal pricing support, and support of PJM's Internet-based customer transaction tools, and the administration of Regulation and Frequency Response Service under Schedule 3 of this Tariff. PJM provides this service to customers using Point-to-Point or Network Integration Transmission Service under this Tariff, to Generation Providers, as defined below, ~~and~~ to entities that submit offers to sell or bids to buy energy in the PJM Interchange Energy Market, and to entities that supply, and entities that rely upon, Regulation and Frequency Response Service.

b) PJM will charge each user of Market Support Service each month a charge equal to the sum of: (i) the MS Service Rate, Component 1, as ~~stated~~ defined below, times (1) the total quantity in MWhs of energy delivered to load (including losses and net of operating Behind The Meter Generation, but not to be less than zero) in the PJM Region or for export from such region during such month by such user as a customer under Point-to-Point Transmission Service (other than Wheeling-Through Service, as defined below) or Network Integration Transmission Service, plus (2) the total quantity in MWhs of energy input into the Transmission System during such month by such user as a Generation Provider, as defined below, plus (3) the total quantity in MWhs of all accepted Increment Offers and accepted Decrement Bids, and all accepted "Up-to" Congestion Transactions submitted pursuant to Tariff, Attachment K-Appendix, section 1.10.1A(c), submitted by such user during such month; plus (ii) the MS Service Rate Component 2, as ~~stated~~ defined below, times the number of Bid/Offer Segments, as defined below, submitted by such user during such month. For purposes of this Schedule 9-3, Wheeling-Through Service is Point-to-Point Transmission Service for which both the Point of Receipt and the Point of Delivery are at interconnections of the PJM Region with other Control Areas.

c) For purposes of this Schedule 9-3, a Generation Provider shall be: (i) a Generation Owner, as such term is defined in the Operating Agreement; provided, however, that if a Generation Owner is not the entity credited on PJM's records for the energy input into the Transmission System from the generation facilities owned or leased (with rights equivalent to ownership) by such Generation Owner, as, for example, in the case of a qualifying facility selling energy to a public utility pursuant to section 210 of the Public Utility Regulatory Policies Act of 1978, then, with respect to such energy, the Generation Provider shall be the entity credited on PJM's records for the energy input into the Transmission System from such generation facilities; (ii) a Network Customer or Point-to-Point Transmission Service customer, with respect to energy arranged by such customer to be delivered for import into the PJM Region; or (iii) a Market Seller with respect to energy arranged by such Market Seller to be delivered for import to the boundaries of the PJM Region and for which there is no separately identifiable Transmission Customer. As the term is used in this Schedule 9-3, energy "credited on PJM's records" does not necessarily mean that a monetary credit resulted on any billing statement provided by PJM.

d) For purposes of this Schedule 9-3, a Bid/Offer Segment shall be each price/quantity pair submitted into the Day-ahead Energy Market, including those submitted in the generation rebidding period pursuant to Tariff, Attachment K-Appendix, section 1.10.9(a). Segments shall be hourly for each bid to purchase energy, each Increment Offer, each Decrement Bid, each "Up-to" Congestion Transaction, and each Day-ahead Pseudo-Tie Transaction. Segments shall be daily for each offer to sell other than an Increment Offer. Each "Up-to" Congestion Transaction also shall be considered a Bid/Offer Segment.

e) ~~The~~ MS Service Rate~~, Component 1~~ shall be calculated monthly, in accordance with the following formulae~~as follows~~:

MS Service Rate, Component 1 =

$$\frac{\text{Monthly MS MWh Cost}}{\text{Monthly MS MWh Determinants}}$$

MS Service Rate, Component 2 =

$$\frac{\text{Monthly MS Bid/Offer Segment Cost}}{\text{Monthly MS Bid/Offer Segment Determinants}}$$

where:

"Annual MS MWh Cost" equals 0.987 times the sum of the MS Cost Component A.1 plus MS Cost Component A.2 plus MS Cost Component A.3, as defined below.

"Annual MS Bid/Offer Segment Cost" equals 0.013 times the sum of MS Cost Component A.1 plus MS Cost Component A.2 plus MS Cost Component A.3, as defined below.

"MS Cost Component A.1" equals the product of: 11.8% times the Actual Costs for all Divisions in the month for which the Market Support Service Rate is being calculated.

"MS Cost Component A.2" equals the Overhead Allocation to Market Support Service as determined pursuant to Schedule 9-5 of PJM's Actual Costs for Management Service Cost during the month for which the Market Support Service Rate is being calculated.

"MS Cost Component A.3" equals PJM's Actual Costs for the Non-Divisional Costs that are assigned to Market Support Service for the month for which the Market Support Service Rate is being calculated.

and where

"Monthly MS MWh Determinants" equals the actual total quantity in MWhs of the energy delivered by all customers under Point-to-Point or Network Integration Transmission Service (less the MWhs of energy delivered as Wheeling-Through Service), plus the total quantity in MWhs of energy input into the Transmission System by all Generation

Providers, plus the actual total quantity in MWhs of all accepted Increment Bids, accepted Decrement Bids, and accepted "up-to" congestion bids, for the month for which the Market Support Service Rate is being calculated.

"Monthly MS Bid/Offer Segment Determinants" equals the actual total amount of all Bid/Offer Segments of all parties submitting Bid/Offer Segments for the month for which the Market Support Service Rate is being calculated.

~~Commencing January 1, 2017: $0.0463 per MWh~~

~~Commencing January 1, 2019: $0.0475 per MWh~~

~~Commencing January 1, 2020: $0.0487 per MWh~~

~~Commencing January 1, 2021: $0.0499 per MWh~~

~~Commencing January 1, 2022: $0.0511 per MWh~~

~~Commencing January 1, 2023: $0.0524 per MWh~~

~~Commencing January 1, 2024: $0.0527 per MWh~~

~~Users charged the MS Service Rate, Component 1, shall receive a credit in the amount the user is charged the PJMSettlement Market Service Rate set forth in Tariff, Schedule 9-PJMSettlement during the same billing period.~~

~~f) The MS Service Rate, Component 2 shall be as follows:~~

~~Commencing January 1, 2017: $0.0693 per Bid/Offer Segment~~

~~Commencing January 1, 2019: $0.0710 per Bid/Offer Segment~~

~~Commencing January 1, 2020: $0.0728 per Bid/Offer Segment~~

~~Commencing January 1, 2021: $0.0746 per Bid/Offer Segment~~

~~Commencing January 1, 2022: $0.0765 per Bid/Offer Segment~~

~~Commencing January 1, 2023: $0.0784 per Bid/Offer Segment~~

~~Commencing January 1, 2024: $0.0789 per Bid/Offer Segment~~

~~SCHEDULE 9-4~~
~~Regulation and Frequency Response Administration Service~~

~~a) Regulation and Frequency Response Administration Service comprises all of the activities of PJM associated with administering the provision of Regulation and Frequency Response Service under Tariff, Schedule 3. PJM provides this service to Load Serving Entities and to generators that provide regulation in accordance with Tariff, Schedule 3.~~

~~b) PJM will charge each user of Regulation and Frequency Response Administration Service each month a charge equal to the Regulation and Frequency Response Administration Service Rate stated below times the MWhs of such user's hourly regulation objective as a Load Serving Entity determined pursuant to Tariff, Schedule 3, plus the MWhs of regulation scheduled (including self-scheduling) from generating units owned by such user, summed for each hour in such month.~~

~~c) The Regulation and Frequency Administration Service Rate shall be as follows:~~

~~Commencing January 1, 2017: $0.2819 per MWh~~

~~Commencing January 1, 2019: $0.2889 per MWh~~

~~Commencing January 1, 2020: $0.2961 per MWh~~

~~Commencing January 1, 2021: $0.3035 per MWh~~

~~Commencing January 1, 2022: $0.3111 per MWh~~

~~Commencing January 1, 2023: $0.3189 per MWh~~

~~Commencing January 1, 2024: $0.3210 per MWh~~

SCHEDULE 9-~~5~~4
Capacity Resource and Obligation Management Service

a) Capacity Resource and Obligation Management Service comprises the activities of PJM associated with (i) assuring that customers have arranged for sufficient generating capacity to meet their unforced capacity obligations under the Reliability Assurance Agreement ("RAA"); (ii) processing Network Integration Transmission Service; (iii) administering the Reliability Pricing Model auctions for the PJM Region; and (iv) administering or providing technical support for the RAA (as delegated to PJM under the RAA), including, but not limited to, long-term load forecasting, studies to establish reserve requirements, and the determination of each Load-Serving Entity's capacity obligations. PJM's Internet-based capacity transaction tool enables many of these functions. PJM provides this service to Load-Serving Entities and to owners of Capacity Resources; as such terms are defined in the RAA.

b) PJM will charge each Load-Serving Entity in the PJM Region each month a charge equal to the Capacity Resource and Obligation Management Service Rate ~~stated~~ defined below times the summation for each day of such month of the Daily Unforced Capacity Obligation of such user, as determined for each such day pursuant to RAA, Schedule 8 or RAA, Schedule 8.1.

c) In addition to any charge under section (b), PJM will charge each month, to each entity that included in an FRR Capacity Plan, self-scheduled, or sold and cleared, in a Reliability Pricing Model Auction, a~~-~~ Capacity Resource committed to serve load for such month, a charge equal to the Capacity Resource and Obligation Management Service Rate ~~stated~~ defined below times such entity's total share, in MWs, of the Unforced Capacity of all Capacity Resources cleared or self-scheduled (including through an FRR Capacity Plan) by such entity, for commitment to serve load during such month.

d) The Capacity Resource and Obligation Management Rate ("CROM") Service shall be calculated monthly, in accordance with the formula~~as follows~~:

~~Commencing January 1, 2017: $0.1073 per MW-day~~

~~Commencing January 1, 2019: $0.1100 per MW-day~~

~~Commencing January 1, 2020: $0.1128 per MW-day~~

~~Commencing January 1, 2021: $0.1156 per MW-day~~

~~Commencing January 1, 2022: $0.1185 per MW-day~~

~~Commencing January 1, 2023: $0.1215 per MW-day~~

~~Commencing January 1, 2024: $0.1223 per MW-day~~

CROM Service Rate =

Monthly CROM Cost

CROM Determinants

where:

"Monthly CROM Cost" equals the sum of the CROM Cost Component A.1 plus CROM Cost Component A.2 plus CROM Cost Component A.3, defined as follows:

"CROM Cost Component A.1" equals the product of: 4.2% times the Actual Costs for all Divisions in the month for which the CROM Service Rate is being calculated.

"CROM Cost Component A.2" equals the Overhead Allocation to Capacity Resource and Obligation Management Service in the month for which the CROM Service Rate is being calculated, as determined pursuant to Schedule 9-5.

"CROM Cost Component A.3 equals the assignment of Non-Divisional Costs to CROM Service based on the Actual Costs in the month for which the CROM Service Rate is being calculated.

and where

"CROM Determinants" equals the actual summation of the Daily Unforced Capacity Obligation (calculated without any deductions for Price Responsive Demand related load credits) of all Load-Serving Entities for all days in the calendar year for which the CROM Service Rate is being determined plus the total quantity in MWs of the Unforced Capacity of all Capacity Resources used to serve load in the PJM Region for all days in the month for which the CROM Service Rate is being calculated.

SCHEDULE 9-~~6~~5

Management Service Cost~~[Reserved for future use]~~

a) Management Service Cost is not a separate service by PJM. Rather, Management Service Cost comprises the cost of overhead and administrative activities performed by PJM which support PJM's provision of the services described in subsidiary Schedules 9-1 through 9-4 and Schedule 9-PJMSettlement of this Schedule 9. Management Service Cost is to be allocated each month among such services in accordance with the following formula:

Overhead Allocation =

Total Overhead Cost * Subsidiary Schedule Division Cost Allocation Percentage

where:

"Total Overhead Cost" equals the sum A.1 + A.2, defined as follows:

"A.1" equals the product of: 44.1% times the Actual Costs for all Divisions in the month for which the Overhead Allocation is being calculated.

"A.2" equals the assignment of Non-Divisional Costs to Management Service based on the Actual Costs for the month for which the Overhead Allocation is being calculated.

and where the applicable "Subsidiary Schedule Division Cost Allocation Percentage" for each subsidiary Schedule is as follows:

Schedule 9-1 – 63.3%

Schedule 9-2 – 4.5%

Schedule 9-3 – 22.3%

Schedule 9-4 – 7.8%

Schedule 9-PJMSettlement – 2.1%

SCHEDULE 9-PJMSettlement
PJM Settlement, Inc. Administrative Services

a) PJM Settlement, Inc. ("PJMSettlement") is the entity that is (i) contracting with customers and conducting financial settlements regarding the use of the transmission capacity of the Transmission System; (ii) the Counterparty with respect to the agreements and "pool" transactions in the centralized markets that PJM Interconnection, L.L.C., as the Transmission Provider, administers under the Tariff and Operating Agreement; and (iii) the Counterparty to Financial Transmission Rights ("FTRs") and Auction Revenue Rights instruments held by a Market Participant. PJMSettlement Services comprise all of the activities of PJMSettlement associated with PJMSettlement performing the services of being the Counterparty and conducting financial settlements.

b) The cost of operating PJMSettlement, including principal and/or depreciation expense, interest expense and financing costs, if any, shall be recovered from users of the PJMSettlement Services pursuant to the PJMSettlement ~~Market Support Service~~ Rate set forth in this Schedule 9-PJMSettlement.

c) **PJMSettlement ~~Market Support Service~~ Rate:** Each customer receiving an invoice from PJMSettlement shall be assessed, on a per-invoice basis, a charge equal to the PJMSettlement Rate, in accordance with the following formula:~~PJMSettlement will charge customers using Point-to-Point or Network Integration Transmission Service under the Tariff, Generation Providers, as defined below, and entities that submit offers to sell or bids to buy energy in the PJM Interchange Energy Market each month a charge equal to: the PJMSettlement Market Support Service Rate, as stated below, times the sum of (1) the total quantity in MWhs of energy delivered to load (including losses and net of operating Behind The Meter Generation, but not to be less than zero) in the PJM Region or for export from such region during such month by such user as a customer under Point-to-Point Transmission Service (other than Wheeling-Through Service, as defined below) or Network Integration Transmission Service, plus (2) the total quantity in MWhs of energy input into the Transmission System during such month by such user as a Generation Provider, as defined below, plus (3) the total quantity in MWhs of all accepted Increment Offers and accepted Decrement Bids, and all accepted Up-to Congestion Transactions submitted pursuant to Tariff, Attachment K-Appendix, section 1.10.1A(c) submitted by such user during such month~~

~~(A) For purposes of this Schedule 9-PJMSettlement, Wheeling-Through Service and Generation Provider shall have the same meanings as set forth in Tariff, Schedule 9-3.~~

~~(B) The PJMSettlement Market Support Service Rate is:~~

~~[CY~~PMSC~~ / VOL] – PQDRLB/ VOLQA] + [PQDRAB/VOLQA]~~
[Invoices]

where

~~CY~~PMSC (~~Current Year~~ PJMSettlement ~~Market Support Service~~ Costs) is the Actual Costs~~budgeted annual costs~~ of PJMSettlement associated with PJMSettlement services, calculated as the sum of PSI A.1 plus PSI A.2 plus PSI A.3 for the month for which the PJMSettlement Rate is being calculated, where ~~recovered pursuant to PJMSettlement's Market Support Service Rate for the current calendar year.~~

"PSI A.1" equals the product of 4.0% times the Actual Costs for all Divisions in the month for which PJMSettlement Rate is being calculated.

"PSI A.2" equals an allocation to the Control Area Administration Service of PJM's Actual Costs for Management Service Cost during the month for which PJMSettlement Rate is being calculated, based on the formula in Schedule 9-5.

"PSI A.3" equals PJM's Actual Costs for Non-Divisional Costs that are assigned to Control Area Administration Service for the month for which PJMSettlement Rate is being calculated.

And,

"Invoices" are the number of invoices PJMSettlement issues to Transmission Customers and Market Participants in the month for which PJMSettlement Rate is being calculated.

~~VOL (Volume) is PJMSettlement's estimate of the sum of (1) the total quantity in MWhs of energy to be delivered to load (including losses and net of operating Behind The Meter Generation, but not to be less than zero) in the PJM Region or to be exported from such region under Point-to-Point Transmission Service (other than Wheeling Through Service) or Network Integration Transmission Service during the year for which the PJMSettlement Market Support Service Rate is being calculated, plus (2) the total quantity in MWhs of energy to be input into the Transmission System by Generation Providers during the year for which the PJMSettlement Market Support Service Rate is being calculated plus (3) the total quantity in MWhs of all accepted Increment Offers and accepted Decrement Bids, and all accepted Up-to Congestion Transactions submitted pursuant to Tariff, Attachment K-Appendix, section 1.10.1A(c), to be submitted during the year for which the PJMSettlement Market Support Service Rate is being calculated.~~

~~PQDRLB (Prior Quarter Deferred Regulatory Liability Balance) is the cumulative deferred regulatory liability balance as of the end of the prior quarter.~~

~~PQDRAB (Prior Quarter Deferred Regulatory Asset Balance) is the cumulative deferred regulatory asset balance as of the end of the prior quarter.~~

~~VOLQA (Volume Quarter Adjustment) is PJMSettlement's estimate of the sum of (1) the total quantity in MWhs of energy to be delivered to load (including losses and net of operating Behind The Meter Generation, but not to be less than zero) in the PJM Region or to be exported from such region under Point-to-Point Transmission Service (other than Wheeling Through Service) or Network Integration Transmission Service during the quarter for which the PJMSettlement Market Support Service Rate is being calculated, plus (2) the total quantity in MWhs of energy to be input into the Transmission System by Generation Providers during the quarter for which the PJMSettlement Market Support Service Rate is being calculated plus (3) the total quantity in MWhs of all accepted~~

~~Increment Offers and accepted Decrement Bids, and all accepted Up-to Congestion Transactions submitted pursuant to Tariff, Attachment K-Appendix, section 1.10.1A(c) to be submitted during the quarter for which the PJMSettlement Market Support Service Rate is being calculated.~~

Attachment B

Revisions to the
PJM Open Access Transmission Tariff

(Clean Format)

SCHEDULE 9
PJM Interconnection, L.L.C. Administrative Services

a) PJM Interconnection, L.L.C. is the Transmission Provider under this Tariff. It also operates the PJM Interchange Energy Market as described in Tariff, Attachment K-Appendix and provides various other services to market participants. The cost of operating the PJM Interconnection, L.L.C., including principal and/or depreciation expense, interest expense and financing costs, excluding any costs specifically recovered pursuant to other provisions of this Tariff as identified in this Schedule 9, shall be recovered from users of the various PJM services pursuant to the rates set forth in this Schedule 9 and its subsidiary Schedules which correspond to categories of services ("Service Categories") provided by PJM. The charge in any month to any user of PJM's services under this Schedule 9 is the sum of the charges under the following subsidiary Schedules of this Schedule 9 to the extent determined to be applicable by the Transmission Provider to such user in such month:

Tariff, Schedule 9-1:	"Control Area Administration Service"
Tariff, Schedule 9-2:	"Financial Transmission Rights Administration Service"
Tariff, Schedule 9-3:	"Market Support Service"
Tariff, Schedule 9-4:	"Capacity Resource and Obligation Management Service"

b) The rates, terms, conditions, and applicability of these subsidiary services of this Schedule 9 are set forth on the subsidiary Schedules of this Schedule 9. These rates and charges do not include the charges for PJMSettlement services to Transmission Customers and Market Participants. The charges for PJMSettlement services to Transmission Customers and Market Participants are set forth in Tariff, Schedule 9-PJMSettlement.

c) This Schedule 9 also includes a subsidiary Schedule 9-5, "Management Services Cost," which shall govern the determination and allocation of certain overhead and administrative costs among subsidiary Schedules 9-1 through 9-4.

d) Each of the subsidiary Schedules 9-1 through 9-4 of this Schedule 9 contains a formula for determination of the rate or charge thereunder. The rates and charges for Schedules 9-1 through 9-4 shall be determined monthly based on the costs incurred in such month, pursuant to the formulas set forth in such schedule.

e) (1) PJM shall allocate to each subsidiary Schedule PJM's Actual Costs and expenses accounted for in all of PJM's Divisions based on the allocation percentage stated in the rate formula in Schedules 9-1 through 9-4 and Schedule 9-PJMSettlement.

(2) In addition to such costs, each month, PJM shall assign to each such Schedule its appropriate share of certain costs and expenses that are not assigned to any Division ("Non-Divisional Costs"), including, but not limited to, Actual Costs associated with (i) financial costs; (ii) operating projects or portions of operating projects; and (iii) capital projects. The assignment of financial costs shall be based on PJM's assignment of its assets among such Schedules. PJM shall assign to each Schedule each month a proportion of the total amounts for such financial costs equal to the proportion of (iii) the projected gross value of the assets assigned to such

Schedule to (iv) the projected gross value of all assets of PJM that are assigned to any subsidiary schedule of this Schedule 9, as of the final day of the month for which the rates are applicable. The assignment of operating projects and expenses related to capital projects shall be on the basis of the service for which such projects are instituted.

(3) PJM shall not recover through this Schedule 9 or its subsidiary Schedules any costs for services provided by PJM in response to specific requests, pursuant to this Tariff, of specific identified entities, including, but not limited to, System Impact Studies and Facilities Studies, to the extent such costs are specifically recovered pursuant to other provisions of this Tariff.

f) In addition to subsidiary Tariff, Schedules 9-1 through 9-5, this Schedule 9 also includes the following separate subsidiary schedules: (i) Tariff, Schedule 9-FERC, which is designed to recover Transmission Provider's costs for the annual charges assessed on Transmission Provider by FERC; (ii) Tariff, Schedule 9-OPSI, which is designed to recover Transmission Provider's payments to the Organization of PJM States, Inc.; (iii) Tariff, Schedule 9-CAPS, which is designed to recover Consumer Advocates of PJM States, Inc. costs; (iv) Tariff, Schedule 9-MMU which is designed to recover the cost of providing market monitoring functions to the PJM Region; (v) Tariff, Schedule 9-FINCON, which is designed to recover Transmission Provider's costs of outside consultants engaged by the Finance Committee, and (vi) Tariff, Schedule 9-PJMSettlement, which is designed to recover PJM Settlement, Inc.'s costs.

g) Each month PJM shall post on its website the rates charged under this Schedule 9, including Schedules 9-1 through 9-4, and the separate subsidiary schedules listed above in subsection (f). PJM shall also post each month on its website the rates charged under Schedule 10-NERC and Schedule 10-RFC.

h) As used in this Schedule 9 and in the subsidiary Schedules of this Schedule 9, the following terms shall have the following meanings:

(1) "Actual Costs" shall mean costs, expenses, disbursements and other amounts incurred (whether paid or accrued); and

(2) "Divisions" shall mean the various corporate cost centers within PJM.

i) All amounts held in reserve pursuant to this Schedule 9 and all subsidiary Schedules as of December 31, 2021, shall be refunded over the applicable billing determinant volumes in the first calendar quarter of 2022 through credits to charges to then-current customers under such schedules of Tariff, Schedules 9-1 through 9-5 (as in effect prior to January 1, 2022) for which cumulative revenues for such schedule over the prior 12-month period ending December 31, 2021 exceeded (by any amount) the cumulative expenses for such schedule (consistent with those reported or to be reported to the Finance Committee) over such 12-month period, and apportioned among such Schedules with refunds based on the ratio of each such Schedule's excess revenues to the sum of the excess revenues of all Schedules that had excess revenues for such 12-month period; provided, however, the amount to be refunded associated with Schedule 9-3 (as in effect prior to January 1, 2022) shall be adjusted by any regulatory asset or regulatory liability balance recorded pursuant to Schedule 9-PJMSettlement as of December 31, 2021. The reserve shall be reduced to zero dollars.

SCHEDULE 9-1
Control Area Administration Service

a) Control Area Administration Service comprises all of the activities of PJM associated with preserving the reliability of the PJM Region and administering Point-to-Point Transmission Service and Network Integration Transmission Service. PJM provides Control Area Administration Service to customers using Point-to-Point or Network Integration Transmission Service under this Tariff.

b) PJM will charge each user of Control Area Administration Service each month a charge equal to the Monthly Control Area Administration Service Rate defined below times the total quantity in MWhs of energy delivered (including losses, but excluding Direct Charging Energy) during such month by such user as a transmission customer under this Tariff for Point-to-Point Transmission Service or Network Integration Transmission Service.

c) The Monthly Control Area Administration Service Rate ("MCAASR") shall be calculated each month in accordance with the formula:

$$MCAASR = \frac{[CAASME]}{PJMTHTU}$$

where:

MCAASR is the Monthly Control Area Administration Service Rate

CAASME, Control Area Administration Service monthly expenses, is the Actual Costs assigned to the Control Area Administration Service, calculated as the sum of A.1 plus A.2 plus A.3 for the month for which MCAASR is being calculated, where:

"A.1" equals the product of 33.5% times the Actual Costs for all Divisions in the month for which MCAASR is being calculated.

"A.2" equals an allocation to the Control Area Administration Service of PJM's Actual Costs for Management Service Cost during the month for which MCAASR is being calculated, based on the formula in Schedule 9-5.

"A.3" equals PJM's Actual Costs for Non-Divisional Costs that are assigned to Control Area Administration Service for the month for which MCAASR is being calculated.

PJMTHTU, PJM total hourly transmission usage, is the actual total quantity in MWhs of energy delivered under Point-to-Point and Network Integration Transmission Service by all customers during the month for which MCAASR is being calculated.

SCHEDULE 9-2
Financial Transmission Rights Administration Service

a) Financial Transmission Rights Administration Service comprises all of the activities of PJM associated with administering the Financial Transmission Rights ("FTRs") provided for under Tariff, Attachment K including, but not limited to, coordination of FTR bilateral trading, administration of FTR auctions, support of PJM's on-line, internet-based FTR reporting tool, and analyses to determine what total combination of FTRs can be outstanding and accommodated by the PJM system at a given time. PJM provides this service to entities that hold FTRs or that submit offers to sell or bids to buy FTRs.

b) PJM will charge each user of Financial Transmission Rights Administration Service each month a charge equal to: (i) the FTR Service Rate, Component 1, as defined below, times the FTR Holder's total FTRs in megawatt-hours during such month; plus (ii) the FTR Service Rate, Component 2, as defined below, times the sum of (1) the number of hours in all bids to buy Financial Transmission Rights Obligations submitted by such user during such month, plus (2) five times the number of hours in all bids to buy Financial Transmission Rights Options submitted by such user during such month. Component 1 of this charge applies to all bids submitted into any round of the Long-term, Annual, or monthly FTR Auctions; Component 2 of this charge applies to all bids submitted into any round of the Annual FTR Auction and to all bids submitted into the applicable monthly FTR Auction.

c) The Financial Transmission Rights Administration Service Rate shall be calculated monthly, in accordance with the following formulae:
FTR Service Rate, Component 1 =

$$\frac{\text{Monthly FTR MWh Cost}}{\text{Monthly FTR MWh Determinants}}$$

FTR Service Rate, Component 2 =

$$\frac{\text{Monthly FTR Bid/Offer Hours Cost}}{\text{Monthly FTR Bid/Offer Hours Determinants}}$$

where:

"Monthly FTR MWh Cost" equals 0.6 times the sum of: FTR Cost Component A.1 plus FTR Cost Component A.2 plus FTR Cost Component A.3, as defined below.

"Monthly FTR Bid/Offer Hour Cost" equals 0.4 times the sum of: FTR Cost Component A.1 plus FTR Cost Component A.2 plus FTR Cost Component A.3, as defined below.

"FTR Cost Component A.1" equals the product of: 2.4% times the Actual Costs for all Divisions in the month for which the Financial Transmission Rights Administration Service Rate is being calculated.

“FTR Cost Component A.2” equals the Overhead Allocation to Financial Transmission Rights Administration Service determined pursuant to Schedule 9-5 of PJM’s Actual Costs for Management Service Cost during the month for which the Financial Transmission Rights Administration Service Rate is being calculated.

“FTR Cost Component A.3” equals PJM’s Actual Costs for the Non-Divisional Costs that are assigned to Financial Transmission Rights Administration Service for the month for which the Financial Transmission Rights Administration Service Rate is being calculated.

and where

“Monthly FTR MWh Determinants” equals the total amount of Financial Transmission Rights, in MWs, in effect each hour for all holders of Financial Transmission Rights during the month for which the Financial Transmission Rights Administration Service Rate is being calculated, summed for each hour of such month.

“Monthly FTR Bid/Offer Hour Determinants” equals the sum of (1) the total number of hours of all Financial Transmission Rights Obligation bids, plus (2) five times the total number of hours of all Financial Transmission Rights Option bids, for all bidders for all FTR auctions conducted during the month for which the Financial Transmission Rights Administration Service Rate is being calculated.

SCHEDULE 9-3
Market Support Service

a) Market Support Service comprises all of the activities of PJM associated with supporting the operation of the PJM Interchange Energy Market and related functions, as described in Operating Agreement, Schedule 1 and Tariff, Attachment K-Appendix, including, but not limited to, market modeling and scheduling functions, locational marginal pricing support, and support of PJM's Internet-based customer transaction tools, and the administration of Regulation and Frequency Response Service under Schedule 3 of this Tariff. PJM provides this service to customers using Point-to-Point or Network Integration Transmission Service under this Tariff, to Generation Providers, as defined below, to entities that submit offers to sell or bids to buy energy in the PJM Interchange Energy Market, and to entities that supply, and entities that rely upon, Regulation and Frequency Response Service.

b) PJM will charge each user of Market Support Service each month a charge equal to the sum of: (i) the MS Service Rate, Component 1, as defined below, times (1) the total quantity in MWhs of energy delivered to load (including losses and net of operating Behind The Meter Generation, but not to be less than zero) in the PJM Region or for export from such region during such month by such user as a customer under Point-to-Point Transmission Service (other than Wheeling-Through Service, as defined below) or Network Integration Transmission Service, plus (2) the total quantity in MWhs of energy input into the Transmission System during such month by such user as a Generation Provider, as defined below, plus (3) the total quantity in MWhs of all accepted Increment Offers and accepted Decrement Bids, and all accepted "Up-to" Congestion Transactions submitted pursuant to Tariff, Attachment K-Appendix, section 1.10.1A(c), submitted by such user during such month; plus (ii) the MS Service Rate Component 2, as defined below, times the number of Bid/Offer Segments, as defined below, submitted by such user during such month. For purposes of this Schedule 9-3, Wheeling-Through Service is Point-to-Point Transmission Service for which both the Point of Receipt and the Point of Delivery are at interconnections of the PJM Region with other Control Areas.

c) For purposes of this Schedule 9-3, a Generation Provider shall be: (i) a Generation Owner, as such term is defined in the Operating Agreement; provided, however, that if a Generation Owner is not the entity credited on PJM's records for the energy input into the Transmission System from the generation facilities owned or leased (with rights equivalent to ownership) by such Generation Owner, as, for example, in the case of a qualifying facility selling energy to a public utility pursuant to section 210 of the Public Utility Regulatory Policies Act of 1978, then, with respect to such energy, the Generation Provider shall be the entity credited on PJM's records for the energy input into the Transmission System from such generation facilities; (ii) a Network Customer or Point-to-Point Transmission Service customer, with respect to energy arranged by such customer to be delivered for import into the PJM Region; or (iii) a Market Seller with respect to energy arranged by such Market Seller to be delivered for import to the boundaries of the PJM Region and for which there is no separately identifiable Transmission Customer. As the term is used in this Schedule 9-3, energy "credited on PJM's records" does not necessarily mean that a monetary credit resulted on any billing statement provided by PJM.

d) For purposes of this Schedule 9-3, a Bid/Offer Segment shall be each price/quantity pair submitted into the Day-ahead Energy Market, including those submitted in the generation rebidding period pursuant to Tariff, Attachment K-Appendix, section 1.10.9(a). Segments shall be hourly for each bid to purchase energy, each Increment Offer, each Decrement Bid, each "Up-to" Congestion Transaction, and each Day-ahead Pseudo-Tie Transaction. Segments shall be daily for each offer to sell other than an Increment Offer. Each "Up-to" Congestion Transaction also shall be considered a Bid/Offer Segment.

e) MS Service Rate shall be calculated monthly, in accordance with the following formulae:

MS Service Rate, Component 1 =

$$\frac{\text{Monthly MS MWh Cost}}{\text{Monthly MS MWh Determinants}}$$

MS Service Rate, Component 2 =

$$\frac{\text{Monthly MS Bid/Offer Segment Cost}}{\text{Monthly MS Bid/Offer Segment Determinants}}$$

where:

"Annual MS MWh Cost" equals 0.987 times the sum of the MS Cost Component A.1 plus MS Cost Component A.2 plus MS Cost Component A.3, as defined below.

"Annual MS Bid/Offer Segment Cost" equals 0.013 times the sum of MS Cost Component A.1 plus MS Cost Component A.2 plus MS Cost Component A.3, as defined below.

"MS Cost Component A.1" equals the product of: 11.8% times the Actual Costs for all Divisions in the month for which the Market Support Service Rate is being calculated.

"MS Cost Component A.2" equals the Overhead Allocation to Market Support Service as determined pursuant to Schedule 9-5 of PJM's Actual Costs for Management Service Cost during the month for which the Market Support Service Rate is being calculated.

"MS Cost Component A.3" equals PJM's Actual Costs for the Non-Divisional Costs that are assigned to Market Support Service for the month for which the Market Support Service Rate is being calculated.

and where

"Monthly MS MWh Determinants" equals the actual total quantity in MWhs of the energy delivered by all customers under Point-to-Point or Network Integration Transmission Service (less the MWhs of energy delivered as Wheeling-Through Service), plus the total quantity in MWhs of energy input into the Transmission System by all Generation Providers, plus the actual total quantity in MWhs of all accepted Increment Bids, accepted Decrement Bids, and accepted “up-to” congestion bids, for the month for which the Market Support Service Rate is being calculated.

“Monthly MS Bid/Offer Segment Determinants” equals the actual total amount of all Bid/Offer Segments of all parties submitting Bid/Offer Segments for the month for which the Market Support Service Rate is being calculated.

SCHEDULE 9-4
Capacity Resource and Obligation Management Service

a) Capacity Resource and Obligation Management Service comprises the activities of PJM associated with (i) assuring that customers have arranged for sufficient generating capacity to meet their unforced capacity obligations under the Reliability Assurance Agreement ("RAA"); (ii) processing Network Integration Transmission Service; (iii) administering the Reliability Pricing Model auctions for the PJM Region; and (iv) administering or providing technical support for the RAA (as delegated to PJM under the RAA), including, but not limited to, long-term load forecasting, studies to establish reserve requirements, and the determination of each Load-Serving Entity's capacity obligations. PJM's Internet-based capacity transaction tool enables many of these functions. PJM provides this service to Load-Serving Entities and to owners of Capacity Resources; as such terms are defined in the RAA.

b) PJM will charge each Load-Serving Entity in the PJM Region each month a charge equal to the Capacity Resource and Obligation Management Service Rate defined below times the summation for each day of such month of the Daily Unforced Capacity Obligation of such user, as determined for each such day pursuant to RAA, Schedule 8 or RAA, Schedule 8.1.

c) In addition to any charge under section (b), PJM will charge each month, to each entity that included in an FRR Capacity Plan, self-scheduled, or sold and cleared, in a Reliability Pricing Model Auction, a Capacity Resource committed to serve load for such month, a charge equal to the Capacity Resource and Obligation Management Service Rate defined below times such entity's total share, in MWs, of the Unforced Capacity of all Capacity Resources cleared or self-scheduled (including through an FRR Capacity Plan) by such entity, for commitment to serve load during such month.

d) The Capacity Resource and Obligation Management Rate ("CROM") Service shall be calculated monthly, in accordance with the formula:

CROM Service Rate =

$$\frac{\text{Monthly CROM Cost}}{\text{CROM Determinants}}$$

where:

"Monthly CROM Cost" equals the sum of the CROM Cost Component A.1 plus CROM Cost Component A.2 plus CROM Cost Component A.3, defined as follows:

"CROM Cost Component A.1" equals the product of: 4.2% times the Actual Costs for all Divisions in the month for which the CROM Service Rate is being calculated.

“CROM Cost Component A.2” equals the Overhead Allocation to Capacity Resource and Obligation Management Service in the month for which the CROM Service Rate is being calculated, as determined pursuant to Schedule 9-5.

“CROM Cost Component A.3 equals the assignment of Non-Divisional Costs to CROM Service based on the Actual Costs in the month for which the CROM Service Rate is being calculated.

and where

“CROM Determinants” equals the actual summation of the Daily Unforced Capacity Obligation (calculated without any deductions for Price Responsive Demand related load credits) of all Load-Serving Entities for all days in the calendar year for which the CROM Service Rate is being determined plus the total quantity in MWs of the Unforced Capacity of all Capacity Resources used to serve load in the PJM Region for all days in the month for which the CROM Service Rate is being calculated.

SCHEDULE 9-5
Management Service Cost

a) Management Service Cost is not a separate service by PJM. Rather, Management Service Cost comprises the cost of overhead and administrative activities performed by PJM which support PJM's provision of the services described in subsidiary Schedules 9-1 through 9-4 and Schedule 9-PJMSettlement of this Schedule 9. Management Service Cost is to be allocated each month among such services in accordance with the following formula:

Overhead Allocation =

Total Overhead Cost * Subsidiary Schedule Division Cost Allocation Percentage

where:

"Total Overhead Cost" equals the sum A.1 + A.2, defined as follows:

"A.1" equals the product of: 44.1% times the Actual Costs for all Divisions in the month for which the Overhead Allocation is being calculated.

"A.2" equals the assignment of Non-Divisional Costs to Management Service based on the Actual Costs for the month for which the Overhead Allocation is being calculated.

and where the applicable "Subsidiary Schedule Division Cost Allocation Percentage" for each subsidiary Schedule is as follows:

Schedule 9-1 – 63.3%

Schedule 9-2 – 4.5%

Schedule 9-3 – 22.3%

Schedule 9-4 – 7.8%

Schedule 9-PJMSettlement – 2.1%

SCHEDULE 9-PJMSettlement
PJM Settlement, Inc. Administrative Services

a) PJM Settlement, Inc. (“PJMSettlement”) is the entity that is (i) contracting with customers and conducting financial settlements regarding the use of the transmission capacity of the Transmission System; (ii) the Counterparty with respect to the agreements and “pool” transactions in the centralized markets that PJM Interconnection, L.L.C., as the Transmission Provider, administers under the Tariff and Operating Agreement; and (iii) the Counterparty to Financial Transmission Rights (“FTRs”) and Auction Revenue Rights instruments held by a Market Participant. PJMSettlement Services comprise all of the activities of PJMSettlement associated with PJMSettlement performing the services of being the Counterparty and conducting financial settlements.

b) The cost of operating PJMSettlement, including principal and/or depreciation expense, interest expense and financing costs, if any, shall be recovered from users of the PJMSettlement Services pursuant to the PJMSettlement Rate set forth in this Schedule 9-PJMSettlement.

c) **PJMSettlement Rate:** Each customer receiving an invoice from PJMSettlement shall be assessed, on a per-invoice basis, a charge equal to the PJMSettlement Rate, in accordance with the following formula:

$$\frac{\text{PMSC}}{[\text{Invoices}]}$$

where

PMSC (PJMSettlement Costs) is the Actual Costs of PJMSettlement associated with PJMSettlement services, calculated as the sum of PSI A.1 plus PSI A.2 plus PSI A.3 for the month for which the PJMSettlement Rate is being calculated, where

> “PSI A.1” equals the product of 4.0% times the Actual Costs for all Divisions in the month for which PJMSettlement Rate is being calculated.
>
> “PSI A.2” equals an allocation to the Control Area Administration Service of PJM’s Actual Costs for Management Service Cost during the month for which PJMSettlement Rate is being calculated, based on the formula in Schedule 9-5.
>
> “PSI A.3” equals PJM’s Actual Costs for Non-Divisional Costs that are assigned to Control Area Administration Service for the month for which PJMSettlement Rate is being calculated.

And,

“Invoices” are the number of invoices PJMSettlement issues to Transmission Customers and Market Participants in the month for which PJMSettlement Rate is being calculated.

Attachment C

Exhibit No. PJM-0001

Prepared Direct Testimony of
Lisa M. Drauschak

and accompanying
Exhibit Nos. PJM-0002 through
PJM-0010

Exhibit No. PJM-0001

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

	)	
PJM Interconnection, L.L.C.	)	Docket No. ER22-___-000
	)	

PREPARED DIRECT TESTIMONY OF
LISA M. DRAUSCHAK
ON BEHALF OF PJM INTERCONNECTION, L.L.C.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

	)	
PJM Interconnection, L.L.C.	)	Docket No. ER22-___-000
	)	

PREPARED DIRECT TESTIMONY OF
LISA M. DRAUSCHAK
ON BEHALF OF PJM INTERCONNECTION, L.L.C.

I. PERSONAL AND PROFESSIONAL QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Lisa M. Drauschak. My business address is PJM Interconnection, L.L.C., 2750 Monroe Blvd., Audubon, PA 19403.

Q. BY WHOM AND IN WHAT CAPACITY ARE YOU EMPLOYED?

A. Since February 2020, I have been Vice President, Chief Financial Officer, and Treasurer of PJM Interconnection, L.L.C. ("PJM"). In this capacity, I am responsible for the following functions within PJM: financial reporting, treasury, tax, procurement, member billing and budgeting/forecasting.

Q. PLEASE DESCRIBE YOUR PROFESSIONAL EXPERIENCE.

A. I joined PJM in July 1999. I was hired as a Sr. Business Analyst performing various financial analysis functions. In March, 2000, I was appointed Assistant Controller and was responsible for accounting, financial reporting and accounts payable. In March 2005, I was appointed Controller of PJM, in which position I was responsible for accounting, financial reporting, tax compliance, payroll, accounts payable, financial software support, and coordination of audits performed by PJM's independent auditors. Before joining PJM, I was a senior auditor with PriceWaterhouse and then Manager of Forecasts and Budgets with Advanta Corporation.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND.

A. I hold a Bachelor of Science in accountancy from Villanova University.

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. My testimony supports PJM's request in this proceeding for changes to the cost recovery for PJM's administrative services as a regional transmission organization ("RTO"). Specifically, I discuss (1) the objectives, developed with PJM Members, of the recent stakeholder and PJM review of PJM's administrative rates, and how the proposal in this filing meets those objectives; (2) the role, rights, and responsibilities of the PJM Finance Committee ("Finance Committee") and its oversight of PJM's budget, capital projects, and cost recovery mechanism; (3) how the proposal supports and ensures inter-Service Category rate equity, PJM revenue adequacy, cost accountability and rate certainty, and moderation of rate variability; (4) how PJM proposes to return to Members the financial reserve needed for the stated rates approach, but no longer needed for the formula rate proposal; and (5) comparison of PJM's estimated monthly charges for 2021 under the stated rate and formula rate approaches.

III. OBJECTIVES OF THE RATES REVIEW THAT LED TO THIS FILING, AND THE FILED PROPOSAL'S SATISFACTION OF THOSE OBJECTIVES

Q. WHAT PROMPTED THE PRESENT FILING?

A. PJM has been engaged with its stakeholders, particularly the PJM Finance Committee, for over a year to discuss and address issues of rate equity, revenue adequacy, and other concerns arising under PJM's current stated-rate method of recovering PJM's administrative costs.

Q. WHAT WERE PJM'S AND PJM MEMBERS' OBJECTIVES FOR POSSIBLE PJM OPEN ACCESS TRANSMISSION TARIFF ("TARIFF") REVISION ALTERNATIVES IN THAT PROCESS?

A. PJM worked with its Members to establish at the outset of this process several objectives for an anticipated 2021 administrative rates filing:

- Ensure rate equity and revenue adequacy;
- Examine cost allocation to PJM member classes;
- Maintain enhanced rate and cost transparency to Members;
- Deploy effective operating and capital cost management; and
- Maintain creditworthiness for cost-effective borrowing purposes.

Q. DOES THE PROPOSAL IN THIS FILING MEET THOSE OBJECTIVES?

A. Yes. The formula rate proposal ensures, and enhances, both rate equity and revenue adequacy, as I show in sections VI.A and VI.B below. I also discuss in section VI.C below how PJM maintains enhanced rate and cost accountability and transparency to Members in connection with this proposal. This filing also embodies the results of an extensive cost of service study by Analysis Group, Inc. ("Analysis Group"), including a detailed review of the assignment and allocation of PJM's administrative costs among the Service Categories and Schedule 9-PJMSettlement. Mr. A. Joseph Cavicchi and Dr. Megan H. Accordino of Analysis Group describe the cost of service study and its results in their testimony.

Q. HOW DOES THIS FILING AFFECT PJM'S EFFECTIVE CAPITAL COST AND OPERATING COST MANAGEMENT?

A. As to capital cost management, the formula rate proposal maintains and provides continued support for PJM's long-term planning of capital projects. Since PJM's capital projects are, for the most part, improvements and additions to PJM's highly inter-related information systems that support PJM's RTO functions, these projects should be thoughtfully planned and sequenced to avoid unnecessary expense. To implement the capital projects on the planned basis, PJM needs reasonable assurance that its future revenues will fund the depreciation and other expenses of those projects when they enter service as planned. The design of the proposed formula rates, which allow PJM to recover its actual costs—including depreciation expense—each month, provides assurance that PJM will have the revenue needed to implement its capital projects on the planned basis.

As to operating cost management, the formula rate allows PJM to collect its actual operating expenses, notwithstanding unexpected billing determinant changes, to help ensure that PJM has the appropriate resources to perform its RTO functions and responsibilities. PJM's actual expenses reflect the implementation of PJM's annual budgets, as reviewed by the Finance Committee and approved by the PJM Board. Allowing PJM to recover its actual operating expenses thus supports the cost management efforts developed through the budget process.

Q. HOW DOES THIS FILING AFFECT PJM'S MAINTENANCE OF CREDITWORTHINESS FOR COST-EFFECTIVE BORROWING PURPOSES?

A. PJM is creditworthy, and historically has been able to secure cost-effective financing. The proposed formula rates will help maintain that posture. Prospective lenders are likely to view favorably the formula rates that will allow PJM to recover its actual costs every month, as it provides reasonable assurance of PJM's ability to timely pay amounts due on its borrowings.

IV. <u>STAKEHOLDER PROCESS ON DEVELOPMENT OF THE FILED PROPOSAL</u>

Q. CAN YOU REVIEW THE STAKEHOLDER PROCESS THAT LED TO THIS FILING?

A. Yes. PJM began the more intensive phase of the process that led to this filing in August 2020, at a meeting of the Finance Committee to discuss PJM's historic and forecast cost drivers for 2017 through 2030; Members' objectives for possible alternative approaches to revising PJM's administrative rates; and a PJM administrative rates review work plan. In parallel, PJM retained Analysis Group in October 2020 to analyze PJM's Service Categories, cost assignments and allocations, billing determinants and rate structure. Mr. Cavicchi presented the results of most aspects of the cost of service study to the Finance Committee in January 2021, and then followed up with discussion of and recommendations on the Service Categories, billing determinants, and rate structure proposal in a February 2021 Finance Committee meeting. PJM presented its proposal on changes to the Schedule 9-1 through 9-5 and 9-PJMSettlement rates to the Finance Committee at meetings in March, May, and June 2021. Throughout the process to this point, PJM also provided informational updates on administrative rate revision progress to the Members Committee and Market Implementation Committee.

Q. WHAT POSITION DID THE RELEVANT STAKEHOLDER GROUPS TAKE ON THIS PROPOSAL?

A. The final proposal reflected in this filing, which was carefully developed with ongoing Member input, has been well received by the Members. The Finance Committee in June 2021 unanimously adopted a letter of recommendation, directed to the Members Committee and PJM Board, of approval of the proposal. That letter is attached to my testimony as Exh. No. PJM-0002. On September 29, 2021, the Members Committee endorsed the proposed revisions with a sector-weighted vote of 3.84 (i.e., 76.8%) in favor.

V. THE PJM FINANCE COMMITTEE AND THE FINANCE COMMITTEE PROTOCOL

Q. PLEASE DESCRIBE THE PJM FINANCE COMMITTEE.

A. The Finance Committee has thirteen members: two from each of the five PJM Member sectors, two PJM Board Members, and one PJM representative. The PJM Board selects its two representatives; the PJM President selects the PJM representative; and each Member sector votes on and elects its two Member representatives. The purpose of the Finance Committee is: (1) to review PJM's and its subsidiaries' financial statements, budgeted and actual costs, operating and capital budgets, and expense management initiatives; and (2) to make recommendations to the PJM Board on matters pertaining to the appropriate level of PJM's rates, proposed major new investments and allocation and disposition of funds consistent with PJM's duties and responsibilities under the PJM Operating Agreement.

Q. ARE THERE RULES CONCERNING HOW THE FINANCE COMMITTEE CONDUCTS ITS REVIEW AND MAKES ITS RECOMMENDATIONS, AND HOW PJM SUPPORTS THAT PROCESS?

A. Yes. The PJM Finance Committee Financial Review, Reporting and Communications Protocol ("Finance Committee Protocol") governs this process. The Finance Committee Protocol arose from the settlement of PJM's 2006 stated rates proceeding, and was almost entirely developed by the Members, not PJM. Importantly, the Finance Committee Protocol can be amended only by a vote of a majority of the total Committee representatives, including at least one PJM Board member. Exh. No. PJM-0003 is a copy of the current Finance Committee Protocol.

Q. PLEASE DESCRIBE THE FINANCE COMMITTEE'S REGULAR REVIEW OF PJM'S COSTS.

A. PJM reviews with the Finance Committee extensive information on both a quarterly and annual basis. Each quarter, the Finance Committee reviews and discusses (among other items):

- PJM's quarterly financial statements;
- Inter-company charges or credits PJM and its unregulated subsidiaries;
- Material variances in budgets and projections of revenues, operating expenses, and capital budget versus actual results;
- Summary of trends from previous quarterly statements;
- Status update on open major projects; and
- Forecast of net operating expenses and capital for the full fiscal year.

Annually, the Finance Committee reviews and discusses (among other items):

- PJM's total annual and five-year projected revenues, operating budgets, and significant expenses, by Service Categories;
- Inter-company charges or credits by PJM and its unregulated subsidiaries;
- Budget variance reports showing major areas of differences in total revenues and operating budget/expenses versus actual results;
- PJM's annual and five-year projected capital spending;
- Actual capital spending;
- PJM's actual financial results; and
- Past and present year financial performance relative to the PJM Board's approved goals and objectives.

Q. WHAT ROLE DOES THE FINANCE COMMITTEE PLAY IN PJM'S BUDGET PROCESS?

A. On an annual basis, PJM submits its annual budget to the Finance Committee for review and comment. The Member representatives will share their comments and any concerns with the PJM representative and PJM must respond to those concerns. Following those communications, the Member representatives make their written recommendations (reached by majority vote of the Member representatives) to the PJM Board. If those recommendations differ from PJM's recommendations, the PJM Board representatives must meet with the Member representatives to understand their position and rationale so it can be accurately conveyed to the PJM Board. The PJM Board will consider the Member representative's recommendations in their deliberations on the annual budget, and if it approves an annual budget that is not consistent with the Member representatives' recommendations, it must provide in writing the reasons for so doing, and the PJM Board representatives must discuss the matter with the Finance Committee.

Q. DOES THE PJM FINANCE COMMITTEE PLAY A ROLE WITH RESPECT TO PJM'S PROPOSED CHANGES TO SCHEDULE 9?

A. Yes. The process is the same as described above for the annual budget, i.e., PJM submits to the Finance Committee PJM's proposed changes to Schedule 9 for review and comment and responds to their comments and concerns. If there are differences, the Board representatives will meet with the Member representatives to understand their concerns and convey those concerns to the Board. The Board will consider those concerns in its deliberations on the proposed Tariff changes, and provide an explanation in writing if the Board approves Tariff revisions that are inconsistent with the Member representatives' recommendations. As noted above and reflected in the letter shown in Exh. No. PJM-0002, the Member representatives on the Finance Committee unanimously recommended adoption of the formula rate proposal reflected in this filing.

Q. ARE ANY CHANGES TO THE PROTOCOL UNDER CONSIDERATION IN CONNECTION WITH PJM'S FORMULA RATE PROPOSAL?

A. Yes. As explained above, only the committee itself, not PJM acting alone, can amend the Finance Committee Protocol. However, PJM (based on input from Member representatives) has proposed to the committee several additions to the Finance Committee Protocol in light of the proposed transition to formula rates. Specifically, PJM proposes that:

- on an annual basis, PJM will provide the Finance Committee for review and discussion projected rates for Schedules 9-1 through 9-4 and Schedule 9-PJMSettlement for the ensuing five years;

- as part of the review of annual and projected five-year capital spending, PJM will identify the cost assignment among Service Categories of budgeted capital expenditures;

- PJM shall give the Finance Committee advance notice of material changes to services provided by PJM to the membership; and

- each five years, beginning in 2027, PJM will conduct a cost of service study to examine the assignment of costs among Schedules 9-1 through 9-5 and Schedule 9-PJMSettlement, and engage the Committee Representatives in a review of the effectiveness of the then-current rate structure.

PJM anticipates that the Finance Committee will consider and act upon these proposed revisions to the Finance Committee Protocol in November, 2021. As can be seen from Exh. No. PJM-0002, the Member representatives of the Finance Committee unanimously recommend these same changes to the Finance Committee Protocol.

VI. BENEFITS OF THE PROPOSED FORMULA RATE APPROACH

Q. WHAT, IN YOUR OPINION, ARE THE BENEFITS OF PJM'S PROPOSED FORMULA RATE APPROACH TO ITS ADMINISTRATIVE COST RECOVERY?

A. In my view, the primary benefits of PJM's proposal are (i) supporting rate equity among Service Categories; (ii) helping ensure ongoing revenue adequacy for PJM; (iii) maintaining and enhancing cost accountability and rate certainty; (iv) moderating rate variability; and (v) enabling the elimination of the current reserve, and thus allowing return of the reserve funds to the Members. I discuss each of these points in turn below.

A. Supporting Rate Equity Among Service Categories

Q. HOW WILL THE FORMULA RATE PROPOSAL AFFECT RATE EQUITY AMONG THE SCHEDULE 9 SERVICE CATEGORIES?

A. The current stated rate approach can lead to inequities for PJM Members served under different Service Categories. The stated rates for each Service Category are based on billing determinant projections made at the time the stated rates were developed. Those projections may turn out to be significantly below, or significantly above, the actual billing determinants experienced in the years when those stated rates are in effect. As a result, the revenues produced by a Service Category stated rate may be well above, or well below, the costs to PJM of providing that service. These Service Category cost over-recoveries and under-recoveries can occur even if PJM in the aggregate, based on all stated rates, is revenue adequate.

Q. DOESN'T THE CURRENT REFUND MECHANISM ENSURE EACH SERVICE CATEGORY ONLY PAYS ITS SHARE OF PJM'S COSTS?

A. No. The stated rate refund mechanism only partially offsets these inequities. The current refund mechanism prioritizes refunds for those Service Categories that have the highest relative degree of excess revenues in the preceding twelve months, but that does not mean that all excess revenues produced by a given Service Category's stated rates will be returned to the Members served under that Service Category. Under the current mechanism, PJM's aggregate revenues for all Service Categories, compared to the aggregate costs for all Service Categories and any required funding of the reserve, determines the available refund pool. That available refund pool, and the degree to which stated rates of any other Service Categories have also produced excess revenues over the prior twelve months, determines the refunds paid to customers of any Service Category that has had over collections. When one Service Category produces substantial excess revenues, while another Service Category results in under collections, the refund mechanism can fall well short of returning all over collections to customers of that Service Category that produced excess revenues.

Q. DOES PJM HAVE ANY EXAMPLES OF RATE INEQUITY UNDER THE STATED RATES APPROACH?

A. Yes. The stated rates for Financial Transmission Rights ("FTR") Administration Service have produced Service Category revenues far in excess of Service Category costs due to a dramatic increase in both the volume of FTRs held and the FTR bidding activity over the time-period stated rates have been in effect. Illustrating this, Exh. No. PJM-0004 to my testimony shows, for 2011 through 2019, percentage comparisons for each of current Schedules 9-1 through 9-5 between the net revenues produced by that Service Category's rates compared to PJM's costs associated with each Service Category. The graph uses 0% to mark the point where net revenues equal costs; positive percentages show the level by which net revenues exceed costs, and negative percentages show the level by which net revenues fall short of costs. As can be seen, the comparison for FTR Administration Service (i.e., Schedule 9-2) reached 100% in 2017, meaning net revenues were double the costs, and grew to 140% by 2019. Exh. No. PJM-0005 to my testimony shows further details of this cost-revenue mismatch for Schedule 9-2, and also charts the rise in FTR Administration Service billing determinants since 2011. The percentage of net revenue over collection for Schedule 9-2 in both of these exhibits has receded slightly since 2019, but remains at very elevated levels. By contrast, as shown on Exh. No. PJM-0004, PJM's Frequency Response and Regulation Control Administration Service (i.e., Schedule 9-4), has yielded since 2014 revenues that are about 60% below its costs.

Q. HOW DID PJM DETERMINE THE COSTS OF EACH SERVICE SCHEDULE FOR THIS COMPARISON?

A. Before PJM submitted a filing to the Commission in 1999 to unbundle PJM's single monthly charge into separate Service Category charges, PJM conducted extensive analysis of the degree to which each of PJM's internal cost centers supported each of the administrative services. PJM included the resulting cost assignment percentages in Schedule 9, as part of the unbundled formula rates that were in effect until PJM implemented stated rates in 2006. Those percentage assignments and allocations did not disappear, however, when PJM moved to stated rates. They were reflected through 2020 in the Tariff's stated percentages for allocating refunds among the Service Categories. PJM also continued to rely on those assignment and allocation percentages (updated periodically to reflect PJM organizational changes and other factors) for PJM's internal purposes when PJM needed to estimate the costs associated with each Service Category. PJM used the current version of those assignment and allocation percentages to estimate individual Service Category costs for purposes of my Exh. Nos. PJM-0004 and PJM-0005. I should note that Analysis Group conducted a comprehensive analysis in 2020 and 2021 of how each of PJM's internal divisions and cost centers supported each of the administrative services (as described in detail in the accompanying testimony of Mr. Cavicchi and Dr. Accordino). Their results differ somewhat from the percentages PJM has been using (as also described in their testimony), but those differences do not substantially change the inter-Service Category cost inequities I describe here.

Q. HAS PJM ATTEMPTED TO ADDRESS THIS INEQUITY THROUGH A PRIOR COMMISSION FILING?

A. Yes. In 2020, PJM filed, and the Commission accepted,[1] an interim solution to this mismatch. Specifically, PJM eliminated the fixed percentages that had been stated in Schedule 9 to allocate PJM's aggregate revenue over collections (relative to aggregate costs and reserve contributions) among the Service Categories. In their place, PJM added the refund method now in effect, which targets refunds to the Service Categories that experienced excess revenues in the preceding 12 months.

Q. DID THAT PREVIOUS TARIFF CHANGE RESOLVE THE INEQUITY?

A. That change helped mitigate, but did not resolve, the inequity. The revised refund method is limited by the need to ensure PJM is revenue adequate overall and maintains a sufficient reserve, and is not designed to return to any Service Category that category's specific level of excess revenues. The refund allocation percentages resulting from that methodology are applied only to the difference between PJM's aggregate costs and aggregate revenues for a calendar quarter; they do not attempt to redistribute all PJM revenues to track PJM's underlying estimates of the costs associated with each Service Category. Given this inherent limitation, PJM

[1] *See PJM Interconnection, L.L.C.*, Docket No. ER21-274-000 (Dec. 16, 2020).

expressly described that refund methodology change to stakeholders in 2020 as an interim measure until new rates or a new rate structure could be developed by 2021.

Q. HOW DOES THIS FILING ELIMINATE THAT INEQUITY?

A. This filing eliminates that source of inequity. Service Category charges will now be based on the actual billing determinants each month, as well as the actual costs each month. If, for example, FTR bid quantities are high in a given month, but Schedule 9-2 costs are stable, the Schedule 9-2 rate formula will reduce the unit rate for that month to reflect the higher billing determinants. Moreover, this filing reflects the results of Analysis Group's new extensive analysis of PJM's administrative cost of service to ensure that the new formula rates assign reasonable percentages of PJM's costs among the Service Categories.

B. Ensuring Revenue Adequacy

Q. HOW WILL THE PROPOSED FORMULA RATES AID PJM'S REVENUE ADEQUACY?

A. The proposed formula rates will help ensure revenue adequacy for PJM. PJM will collect its actual costs each month for each Service Category, no more and no less. The proposed rate form protects PJM not only against the risk of under-recovery from unexpected cost changes, but also the risk of under-recovery from unexpected billing determinant changes. PJM's experience following its 2016 stated rate reset provides a good example of this risk. As can be seen in Exh. No. PJM-0006 to my testimony, PJM projected in its 2016 stated-rates filing that annual load (i.e., energy) would range from 838 Terawatts ("TW") in 2019 to 869 TW in 2026. Post-pandemic, and with other ongoing industry changes, future loads look quite different. PJM's 2020 energy forecast now projects (after a marked dip in 2020 to 800 TW) annual energy of 811 TW in 2021, increasing to 829 TW in 2026. Energy input into and withdrawn from the system is by far the main billing determinant for Schedule 9. As the industry evolves, with expected major long-term trends towards both distributed generation (tending to reduce PJM loads) and greater electrification in both the transportation and building sectors (tending to increase PJM loads), it is reasonable to have a rate form that protects PJM from the impacts of load changes that are greater than initially projected and that are beyond PJM's control.

C. Maintaining and Enhancing Cost Accountability and Rate Certainty

Q. WHAT ASSURANCE DO MEMBERS HAVE THAT ELIMINATION OF THE STATED RATES WILL NOT PERMIT PJM TO ALLOW ITS COSTS TO INCREASE UNDULY?

A. That is an important question. One potential concern with a formula rate, compared to the stated rate approach, is that it could reduce the service provider's incentive to control its costs. In PJM's case, however, the Finance Committee's ongoing review of PJM's budgets, expenses and major projects helps ensure PJM is accountable to its Members and has a strong incentive to keep costs contained. As I explained above, the Finance Committee is composed of representatives from all Member sectors, and has oversight over PJM's actual and budgeted capital expenditures and operating expenses, as well as the budget process and long-range planning, giving it both the incentive and ability to monitor any proposed increases in expenditures.

Q. HOW DO THE PROPOSED CHANGES TO THE FINANCE COMMITTEE PROTOCOL RELATE TO THIS QUESTION?

A. As I explained above, PJM, working with Finance Committee representatives, has proposed several changes to the Finance Committee Protocol to increase transparency and predictability around PJM's Schedule 9 charges, provide more information to Members, and require a periodic evaluation of the Schedule 9 rate structure. Specifically, as I noted above, the protocol revisions would require PJM to provide the Finance Committee with five-year projections of the tariff rates for Schedules 9-1 through 9-4 and 9-PJMSettlement as well as information on the assignments of projected capital spending among the five Service Categories; provide the Finance Committee advance notice of material changes in PJM services, and require to update the cost of service study every five years beginning in 2027, to inform PJM stakeholders on the possible need for changes to the cost assignment and allocation percentages.

Q. IS THE HISTORY OF PJM'S ADMINISTRATIVE CHARGES RELEVANT TO THIS TOPIC?

A. Yes. PJM has an established track record of carefully monitoring and controlling its costs. The best evidence of that effort is PJM's long-term maintenance of the lowest unit cost (i.e., $/Mwh of load served) for administrative services among all RTOs and ISOs, as can be seen in Exh. No. PJM-0007 to my testimony. While the unit cost reflects economies of scale from PJM's size and loads, it also reflects the effects of PJM's cost control measures. Some examples include, but are not limited to, virtualization software which reduced software and hardware costs; renegotiation of telecommunication contracts; streamlining telecommunication connections; renegotiating software and license agreements; reducing employee related expenses; and, moving member meetings on PJM's premise as compared to external locations. As can also be seen from that chart, PJM's unit cost for administrative services has been quite stable over time, which speaks to PJM's consistent approach to cost control.

D. Moderating Rate Variability

Q. WILL THE PROPOSED FORMULA RATE PRODUCE LARGE SWINGS IN THE RATES MEMBERS PAY?

A. No. If anything, the formula rate proposal should moderate the variability in monthly charges that is a characteristic of the current stated-rates approach. One potential downside of a charge that can vary each month to track actual costs and actual billing determinants is that the variation could make the rate level more volatile or unpredictable. Here, however, the proposed formula rate is likely to be *less* volatile than the stated rates it is replacing.

Q. PLEASE EXPLAIN.

A. Members' final rate under the current method is not the stated rate. Rather, the rate customers ultimately pay is the stated rate less the refund paid in one quarter for any cumulative revenue over-recoveries as of the end of the prior quarter. For the entire time PJM has had stated-rates, stated-rate revenues (aided by the Member-funded reserve of up to six percent of PJM's annual revenues) have always been high enough to cover PJM's costs, so customers' final charges for most quarters (i.e., whenever there are excess revenues) have been set by the refund formula, as a deduction from what they pay initially via the stated rates. This current approach is prone to rate volatility because the primary billing determinant, load, changes significantly due to seasonal variations from quarter to quarter. By avoiding the impacts of those lagging quarterly refund adjustments coupled with billing determinant volume seasonality, the proposed approach will likely reduce intra-year variability in PJM's administrative service billings.

Q. DO YOU HAVE AN EXAMPLE OF THIS RATE VARIABILITY?

A. Yes. Exh. No. PJM-0008 to my testimony shows two estimates of 2021 monthly billings for administrative services: one under the current effective stated rate approach, and another under the proposed formula rate approach. The bar chart displays the dollar difference between the highest and lowest monthly charges under the stated-rate approach, and the dollar difference between the highest and lowest monthly charges under the formula-rate approach. As can be seen, for stated rates, the highest charge, in July, is $33.4 million and the lowest charge, in October, is $19.5 million. The difference between these two monthly charges is $13.9 million, or about a 71% increase above the lowest charge. By contrast, with the proposed formula rate, the highest charge, in March, is $28.7 million and the lowest charge, in February, is $22.8 million. The difference between these two monthly charges is $5.9 million, or about a 26% increase above the lowest charge. Note also the consistency of lower highs, and higher lows, for the formula rate billings versus the stated rate billings. Three months of stated rate billings are each higher than the highest month of formula rate billings. Yet, three months of stated rate billings are also each lower than the lowest month of formula rate billings. In addition, as I explained above, PJM also will provide forward estimates of expected monthly formula rates, which will aid market participant planning and help mitigate rate uncertainty.

Q. WHAT ARE PJM'S OPTIONS TO LIMIT MONTHLY CHARGE IMPACTS IF PJM FACES A PARTICULARLY LARGE UNEXPECTED EXPENSE?

A. If PJM faces a particularly large unexpected expense, PJM can take steps to ensure that cost is spread over multiple months (as appropriate based on the magnitude of the expense), rather than charging the expense in a single month. For example, PJM, following consultation with the Finance Committee, could seek Commission approval to treat the expense as a regulatory asset, and thus treat the expense as incurred over a longer period than would be used under standard accounting rules. Whatever method PJM would employ in the unusual case of an unexpected very large expense, PJM would place a priority on mitigating rate impacts to Members.

E. Eliminating the Reserve

Q. WHAT DOES PJM PROPOSE AS TO THE RESERVE CURRENTLY ESTABLISHED BY SCHEDULE 9?

A. Because PJM will no longer use the stated rates approach, it no longer needs the reserve that provided a financial cushion in case costs temporarily exceeded the revenues produced by the stated rates. PJM therefore proposes to refund the full amount of the reserve, as of December 31, 2021, to Members over the first three months of 2022. For that purpose, PJM will use Schedule 9's current effective refund mechanism, with minor modifications to focus it on winding down the reserve.

Q. WHY DOES SCHEDULE 9 PROVIDE FOR A RESERVE?

A. Under the current stated-rate approach, PJM cannot charge customers more than the stated rate specified in the Tariff. This poses a risk if PJM encounters unexpectedly high costs or unexpectedly low billing determinants. PJM cannot charge more than the stated rate in such a case, but PJM has no equity it could use to cushion the impact of under-recovering its administrative costs. The reserve, which can range as high as six percent of PJM's annual revenues, provides that cushion.

Q. IS THAT CUSHION STILL NEEDED IF THE FORMULA RATE PROPOSAL IS ADOPTED?

A. No. The formula rate allows PJM to recover its actual costs each month from its actual billing determinants each month. PJM therefore can eliminate the reserve, and refund all amounts in that reserve to Members. For reference, the reserve has ranged from $16 million to as high as $38 million in the last three years.

Q. HOW WILL PJM CLOSE OUT THE RESERVE?

A. To return the reserve, PJM will employ the same approach it uses now to provide and apportion refunds among the customers under Schedules 9-1 through 9-5 when there are excess amounts in the reserve. Under the current reserve refund rule, PJM evaluates whether, during the prior 12-month period, cumulative revenues for each such schedule exceeded the cumulative expenses for that schedule. Then, under Tariff, Schedule 9, subsection (d)(2), PJM provides refunds to customers "based on the ratio of each such Schedule's excess revenues to the sum of the excess revenues of all Schedules that had excess revenues for such 12-month period." For the refunds needed to close out the reserve, PJM proposes in this filing to use the twelve months ending December 31, 2021, to perform these calculations for the Schedule 9 Service Categories. PJM will then apportion the resulting refund over the first three months of 2022, and will adjust the refund amount in the third month to ensure PJM refunds no less, and no more, than the final amount of the reserve as of December 31, 2021. Since there will be no additions to the reserve after December 31, 2021, this refund will close out the reserve and return it to Members. I should note that the existing refund mechanism will also govern refunds of any excess revenues (aside from the reserve) collected under the stated rates in the fourth quarter of 2021.

Q. DOES PJM PROPOSE ANY REFUND AS TO PJM SETTLEMENT?

A. Yes. PJM proposes that the refund mechanism will also close out any regulatory assets or liabilities booked for PJM Settlement, via an adjustment to the reserve refund amount otherwise calculated for Market Support Service customers. Specifically, PJM proposes that any amount to be refunded under Schedule 9-3 will be adjusted by any regulatory asset or regulatory liability balance recorded pursuant to Schedule 9-PJMSettlement as of December 31, 2021.

Q. WHY IS PJM PROPOSING THIS?

A. This proposal is designed to ensure that PJM Settlement remains revenue neutral (i.e., cumulative revenues match cumulative expenses) in the administrative rate change proposed in this filing. PJM proposes to use Market Support Service (Schedule 9-3) for this adjustment, because current Schedule 9-3 and Schedule 9-PJMSettlement share the same customers. Accordingly, when determining any reserve refunds to Schedule 9-3 customers, PJM shall first determine whether PJM Settlement is over- or under-funded as of December 31, 2021. If PJM Settlement is over-funded, PJM shall include in the refunds to Schedule 9-3 customers an amount equal to the amount (if any) in PJM Settlement's regulatory asset account as of December 31, 2021. Conversely, if PJM Settlement is under-funded, PJM shall reduce the refunds to Schedule 9-3 customers by an amount equal to the amount (if any) in PJM Settlement's regulatory liability account as of December 31.

VII. COST ASSIGNMENT AND ALLOCATION

Q. HOW DO THE PROPOSED FORMULA RATES ASSIGN AND ALLOCATE COSTS AMONG THE SERVICE CATEGORIES?

A. Each Service Category is directly assigned a percentage share of PJM's expenses, and is allocated a percentage share of PJM's overheads that cannot be assigned directly. In addition, PJM assigns capital projects (primarily information system enhancements) to the Service Categories each project benefits.

Q. HOW WERE THE COST ALLOCATION AND ASSIGNMENT PERCENTAGE SHARES DEVELOPED?

A. PJM retained Analysis Group to conduct a comprehensive cost of service study, as explained in more detail in the accompanying testimony of Mr. Cavicchi and Dr. Accordino. From PJM's perspective, we believed it was important to have highly reputable outside independent experts conduct this study, and Analysis Group, satisfied this need. My staff and I ensured that Analysis Group had the information it needed from PJM to conduct the cost of service study, as well as ample opportunity to interview relevant PJM managers to obtain a thorough understanding of how PJM staff activities and other resources support each Service Category.

Q. ARE ANY PJM COST ALLOCATIONS OR ASSIGNMENTS NOT ADDRESSED BY THE ANALYSIS GROUP?

A. Yes, there are two—capital projects and multiple-rate Service Categories. First, PJM will continue to evaluate, as it has since PJM's administrative charges were first unbundled in 2001, which Service Categories each new capital project will benefit. As noted above, PJM's capital projects are mostly additions or enhancements to PJM's extensive suite of information systems that PJM uses to direct operations of the grid, administer the markets, conduct billings and settlements, evaluate credit, plan the system, and manage interconnections to the transmission system. PJM plans and designs these capital projects well in advance of implementation, and (as I noted above, and as provided in the Finance Committee Protocol) reports to the Finance Committee annually (or more often as needed) on PJM's long-term plans for capital projects. As part of this process, PJM identifies the need driving each capital project, and which PJM functions will primarily use and benefit from each project. For example, as part of the 2022 budget process conducted from June through September, projected 2022 capital spending was presented to many standing committees including the Finance, Markets Implementation, Planning and Operating Committees. The presentations, which are posted on the PJM webpages for the referenced committees, identified the service category assignment for the 2022 capital projects. On this basis, PJM identifies which Service Categories will benefit from each capital project and assigns the costs of each project to one or more Service Categories. Where a project is assigned to multiple Service Categories, PJM's analysis identifies the proportion by which each Service Category benefits from that capital project.

Q. HOW DOES PJM TRACK THE EXPENSES ASSOCIATED WITH CAPITAL PROJECTS?

A. Costs for capital projects are not included in PJM's Divisional budgets or cost centers. Instead, each capital project's depreciation expense, as well as its related and pre-in-service costs, are recorded in certain non-Divisional cost centers. PJM reviews and discusses this information with the Finance Committee each quarter.

Q. YOU ALSO REFERENCED ALLOCATIONS FOR MULTIPLE-RATE SERVICE CATEGORIES. WHAT ARE THOSE AND HOW WERE THEY DETERMINED?

A. Market Support Service **(**Schedule 9-3) and FTR Administration Service (Schedule 9-2) both include two rates—one for volumes of service and one for bids and offers submitted by Market Participants. PJM has a long-standing practice of assigning 40% of Schedule 9-2's costs to the bid-based rate in that schedule, and 1.3% of Schedule 9-3's costs to the bid-based rate in that schedule. As part of this administrative rate review, PJM reviewed those percentage assignments, and found that those assignments to the bid-based rates remain reasonable. In this respect, PJM employs automated procedures and systems to receive bids and offers, and the expenses and capital costs associated with those procedures and systems represent the costs incurred by PJM for the benefit of those that submit bids and offers in the energy and FTR/Auction Revenue Rights ("ARR") markets. My staff accordingly reviewed the expenses of hardware, software and operating systems for bidding-support systems for each of the energy and FTR/ARR markets, and the depreciation expense of capital projects supporting and enhancing those bidding support systems, and compared those expenses for each Schedule against the total expenses (including depreciation expense) assigned to each schedule. The resulting percentage shares were very close to the 40% and 1.3% values PJM has long used to identify bid-based costs for those schedules, thus affirming that those values remain reasonable.

VIII. ESTIMATED RATE IMPACT: STATED RATES VS FORMULA RATES

Q. HAS PJM ESTIMATED THE IMPACT OF THE FORMULA RATE PROPOSAL ON PJM'S RATES?

A. Yes. Exh. No. PJM-0009 to my testimony compares PJM's projected monthly 2021 rates (on a bundled-equivalent basis for all Service Categories combined) using the current stated rates method versus the proposed formula method. As can be seen, the monthly unit rates under both methods fall in roughly the same range (i.e., about $0.31 per Mwh to $0.44 per Mwh. The unit rates under the formula rate approach vary during the year based largely on changes in billing determinants. Since load is the primary billing determinant and is highest in the summer, the lowest unit rate under the formula rate approach is in July. By contrast, the stated rate approach produces its highest unit rates during the summer, because there typically are not significant over collections in the second quarter to be refunded in the third quarter, so third quarter rates typically see less reduction. Please note that this exhibit shows monthly variations in the unit rate, unlike Exh. No. PJM-0008, discussed above, which shows greater monthly variation *in the total charges* each month under the stated rate approach.

Focusing on the relative changes for Service Categories, Exh. No. PJM-0010 to my testimony compares for stated rates versus formula rates the annual average rates and the annual revenues for each separate rate under the Service Categories. For purposes of this comparison, the stated rate values reflect the net impact of projected refunds, Schedule 9-4 is assumed to remain in effect to allow comparison for that Service Category, and the values for the first rate component of Market Support Services (indicated on the exhibit as Schedule 9-3a) are net of the projected Schedule 9-PJMSettlement rate. While the differences are not great, the pattern of the changes exemplifies correction of the current (inequitable) condition of over collection by some Service Categories (i.e., Schedule 9-2 and Schedule 9-3) and under collection by other Service Categories (i.e., Schedule 9-1 and Schedule 9-5).

IX. REQUIRED RATE FILING STATEMENTS

Q. ARE YOU SPONSORING THE RATE FILING STATEMENTS REQUIRED BY THE COMMISISON'S REGULATIONS?

A. Yes. PJM includes with this filing the applicable statements required by the Commission's regulations on rate change filings. For this purpose, PJM has adopted calendar year 2022, i.e., the twelve months beginning on the proposed January 1, 2022 effective date, as "Period II" and as the test period. For "Period I," PJM is using calendar year 2019. I should emphasize that while PJM provides this information to comply with the Commission's regulations, PJM is filing formula rate, and not stated rates.

Q. PLEASE DESCRIBE PJM'S PERIOD I DATA.

A. PJM proposes using Period I data from the calendar year 2019, because a Period I based on calendar year 2020 would not reasonably represent PJM's costs and expenses. The COVID-19 pandemic significantly affected PJM's business operations in 2020, as reflected in an anomalous drop in PJM's operating expenses of about five percent in a single year from 2019 to 2020. In addition to that aggregate drop in expenses, PJM experienced large changes in various types of costs, related to cessation of PJM's extensive program of on-campus training for operator certification and other Member training, cessation of PJM's prior practice of hundreds of in-person stakeholder meetings each year, a dramatic reduction of employee travel, unprecedented shifts to widespread remote work for most employees, and sequestration of control center and other critical employees. PJM's cost and expense data for calendar year 2019—which entirely precedes the pandemic—are therefore a better indication of PJM's practices and costs for the post-pandemic period during which the proposed formula rates will be in effect.

Q. WHAT IS THE SOURCE OF PJM'S PERIOD II DATA?

A. Period II, i.e., calendar year 2022, is primarily based on PJM's 2022 expense budget, as recommended by the Finance Committee and approved by the PJM Board. Balance sheets and income statements for Period II are pro forma.

Q. PLEASE DESCRIBE THE COST-OF-SERVICE STATEMENTS THAT YOU ARE SUBMITTING FOR PERIOD I AND PERIOD II.

A. I am attaching Statements AA through BM,[2] as required by the Commission's regulations, for Period I and Period II.[3] These statements consist of the following:

Statement AA consists of balance sheets as of the end of both Period I, i.e., December 31, 2019, and Period II, i.e., December 31, 2022.

Statement AB consists of income statements for both Period I and Period II.

Statement AC consists of retained earnings statements for Period I and Period II.

Statement AD consists of statements of the original cost of PJM plant in service. Because PJM is not seeking a return on its plant in service, monthly balances are not presented.

Statement AE consists of statements of accumulated depreciation and amortization of PJM's plant for Periods I and II. Because PJM is not seeking a return on its plant in service, monthly balances are not presented.

Statement AF consists of statements of PJM's accumulated deferred income taxes and the cash reserve.

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2 Where relevant, these statements include cost data for PJM's affiliate PJM Settlement, Inc. ("PJM Settlement"). PJM's filing in this proceeding proposes changes (from a reconciling rate to a formula rate) to the pass-through rates in Schedule 9-PJMSettlement for recovery of PJM Settlement's costs.

3 The PJM and stakeholder-endorsed method of determining the proposed rates will employ service category allocation percentages and direct assignment, where possible. Accordingly, no division of PJM costs by class of service is shown on the statements.

Statement AG consists of PJM's deferred debits and deferred income taxes, as well as a regulatory asset composed of PJM's deferred recovery of pension and post-retirement costs.

Statement AH consists of statements for Period I and Period II of PJM's operation and maintenance expenses.

Statement AI consists of statements for Periods I and II of total wages and salaries paid.

Statement AJ consists of statements for Periods I and II of PJM's depreciation and amortization expenses.

Statement AK consists of statements for Periods I and II of taxes other than income taxes.

Statement AL is inapplicable, because PJM is not seeking a return on working capital.

Statement AM is inapplicable, because PJM is not seeking a return on construction work in progress.

Statement AN is inapplicable because PJM did not have a notes payable balance at the end of Period I (i.e., December 15, 2019) and is not projected to have a notes payable balance at the end of Period II (i.e., December 31, 2022).

Statement AO consists of statements for Periods I and II of the rate for allowance for funds used during construction, providing the capitalized interest rate for each period.

Statement AP consists of statements for Periods I and II of the interest charges taken as federal income tax deductions.

<u>Statement AQ</u> consists of statements for Periods I and II of federal income tax deductions for items other than interest.

<u>Statement AR</u> is inapplicable because PJM did not have any federal income tax deductions or adjustments for Period I and is not projected to have any federal income tax deductions or adjustments for Period II.

<u>Statement AS</u> consists of statements for Periods I and II of additional state income tax deductions.

<u>Statement AT</u> consists of statements for Periods I and II of state tax adjustments.

<u>Statement AU</u> is inapplicable because PJM did not have any revenue credits at the end of Period I (i.e., December 31, 2019) and will not have any revenue credits at the end of Period II (i.e., December 31, 2022).

<u>Statement AV</u> consists of statements for Period I and Period II addressing rate of return. PJM is not seeking a rate of return. However, PJM has in the past collected revenues to fund the cash reserve associated with PJM's current stated-rates methodology, which PJM proposes to eliminate as part of the proposed transition to formula rates The amount of this reserve is therefore reflected on the Period I statement, but is not shown for Period II. In addition, because PJM is not seeking a return on investment, PJM recovers its interest expense directly. This statement, therefore, also shows PJM's interest expense associated with long-term debt for Periods I and II.

<u>Statement AW</u> shows for Period I the interest expenses associated with short-term debt. Because PJM is not seeking a return on investment, this statement is inapplicable as to Period II. PJM recovers its interest expense directly as set forth on Statement BK.

Statement AX is inapplicable, as there are no other pending matters seeking a rate change for PJM.

Statement AY consists of statements for Periods I and II of income and revenue tax rate data.

Statement BA describes PJM's five Service Categories.

Statements BB through BF are inapplicable to PJM.

Statement BG consists of statements for Periods I and II of revenue data reflecting the proposed formula rates. The Period I statement applies the proposed formula rates to actual volumes for each month in 2019. The Period II statement applies the proposed formula rates to forecasted volumes for each month in 2022.

Statement BH consists of statements for Periods I and II of revenue data reflecting the present stated rates.[4]

Statement BI is inapplicable to PJM.

Statement BJ is inapplicable because the cost of service data for Period I and Period II is summarized in Statement BK.

Statement BK consists of statements for Periods I and II of PJM's cost of service.

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4 Statements BG and BH also provide the revenue comparison required by the Commission's regulations at 18 C.F.R. §35.13(c)(1). PJM has over 1,000 Members and therefore seeks waiver of the requirement to provide this revenue comparison by customer and by delivery point.

Statement BL consists of rate design information for Periods I and II. For Period II, projected volumes are per PJM's 2022 budget.

Statement BM is inapplicable because PJM is not seeking a return on construction work in progress.

X. ATTESTATION

Q. DO YOU ATTEST, IN COMPLIANCE WITH 18 C.F.R. § 35.139(d)(6), TO THE ACCURACY AND CORRECTNESS OF THE SUBMITTED INFORMATION AND SUPPORTING DATA?

A. Yes, in compliance with 18 C.F.R. § 35.13(d)(6), I attest, as PJM's Chief Financial Officer, that the cost of service statements and supporting data that are being submitted in this amended filing are true, accurate, and current representations of PJM's books, budgets, and other corporate documents.

Q. DOES THIS COMPLETE YOUR PREPARED DIRECT TESTIMONY?

A. Yes, it does.

Exhibit No. PJM-0002

July 16, 2021

PJM Board of Managers:
Mr. Mark Takahashi, Chair
Mr. Manu Asthana, President and CEO
Mr. Terry Blackwell
Ms. Paula Conboy
Ms. Jeanine Johnson
Ms. Margaret Loebl
Mr. David Mills
Mr. O.H. Dean Oskvig
Mr. Charles F. Robinson
Ms. Sarah S. Rogers

PJM Interconnection, LLC
2750 Monroe Boulevard
Valley Forge Corporate Center
Audubon, PA 19403

Subject: Finance Committee Recommendations

PJM Interconnection, LLC ("PJM") is seeking to change the administrative cost recovery under its Open Access Transmission Tariff ("Tariff") Schedules 9-1 through 9-5 and Schedule 9-PSI. Additionally, PJM is seeking to revise the Finance Committee Financial Review, Reporting and Communications Protocol (the "Protocol") to increase transparency. This letter reflects the Finance Committee's activities related to these topics and the recommendation from the member-elected sector representatives to the Finance Committee.

Finance Committee Responsibilities

The Protocol specifies the responsibilities of PJM in reviewing proposed administrative rate changes with the Finance Committee to allow the Finance Committee to provide recommendations to the PJM Board of Managers prior to making regulatory filings to revise its administrative rates. The applicable excerpts from the current Protocol are provided below for reference.

> "The purpose of the PJM Finance Committee is … (b) to make recommendations to the PJM Board on matters pertaining to the appropriate level of PJM's rates …"

> "13. PJM shall give the Finance Committee advance notice of proposed regulatory filings to modify PJM's administrative rate structure so as to

permit the Committee to review and provide comment on the proposed modifications. The Finance Committee, in an advisory capacity, shall provide recommendations to the PJM Board regarding such proposed changes to PJM's administrative rates. In emergency situations, PJM shall provide such notice as feasible to the Finance Committee and the Finance Committee shall provide such recommendations as feasible under the circumstances."

Finance Committee Meetings and Conference Calls

The Finance Committee has met with PJM management via conference calls on the following dates during 2020 and 2021 to discuss PJM's administrative rates:

Date	Discussion Topics
March 24, 2020	Proposal to Review Current Stated Rates
May 5, 2020	Update on Schedule 9 Collections Rate Objectives – Past and Prospective
August 19, 2020	Projected Cost Drivers Workplan for Administrative Rate Review
September 9, 2020	Near-term Schedule 9-2 Discussion Only
November 24, 2020	Regular Business of Budget Review
January 28, 2021	Cost of Service Study – Preliminary Results
February 26, 2021	Review of Administrative Rate Schedules Rate Design Options
March 25, 2021	PJM Proposal on Administrative Rates
May 4, 2021	Update on Schedule 9 Rates, PJM Settlement Rates Indicative Rates for 2021
June 3, 2021	Transparency, Additional Financial Information Reporting Financial Reporting and Communications Protocol Poll of Member-elected Sector Representatives
June 28, 2021	Draft Schedule 9 Open Access Transmission Tariff Language Member-Elected Sector Representatives Position and Recommendations

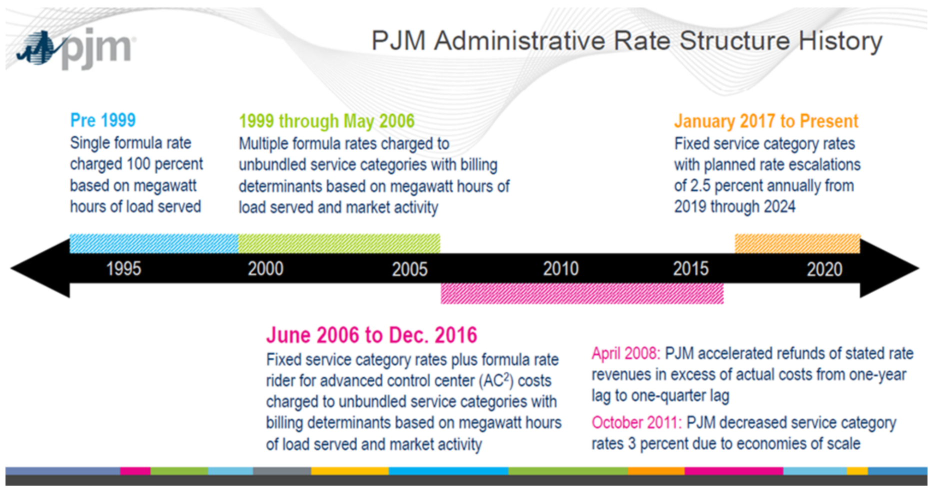
Drivers for Rate Review

In 2016, PJM filed a revised stated-rate schedule that increased the Schedule 9 rates and provided an escalation of 2.5% each year, beginning in 2019, until the composite rate would finally reach $0.41/MWh in 2024. PJM identified to the Finance Committee, in March 2020, a need to review the stated rate sooner than anticipated during the 2016 filing. PJM highlighted the following factors as contributing to the acceleration of the rate review:

- Energy Forecast – energy usage flattened and is significantly below the rate projections.
- Billing Determinants – changes to activity changed the customer revenue mix.
- Risk Mitigation Efforts – additional PJM costs not anticipated in the 2016 rate filing.
- Industry Dynamics – PJM member organization structure changes impact collections.

<u>Administrative Rate History</u>

PJM provided the following history of PJM's administrative rate recovery at the May 2020 meeting of the Finance Committee:



<u>Rate Objectives – Past and Prospective</u>

The Finance Committee discussed, at the May 2020 meeting, the rate objectives of the 2016 PJM rate filing. The Finance Committee also reviewed objectives proposed by PJM for a potential 2021 filing. The objectives were shared with PJM members for comment and were revised based on feedback. The jointly developed objectives for the 2021 PJM rate filing are outlined below with the 2016 objectives provided for comparison.

PJM / Stakeholder Jointly-Developed Objectives

	2016 Stated Rate Filing Objectives		2021 PJM Rate Filing Objectives
1	Maintain low rate volatility and provide multi-year service fee certainty for 5-10 years	1	Ensure Revenue Adequacy and Rate Equity
2	Establish cost recovery for post-AC² Rider ongoing costs of second control center	2	Examine cost allocation to PJM member classes
3	Maintain enhanced rate and cost transparency to members	3	Maintain enhanced rate and cost transparency to members
4	Deploy effective operation and capital cost management	4	Deploy effective operation and capital cost management
5	Maintain creditworthiness for cost-effective borrowing purposes	5	Maintain creditworthiness for cost-effective borrowing purposes

The 2021 PJM Rate Filing prioritized Revenue Adequacy and Rate Equity over the low rate volatility and rate certainty objective while not abandoning the low volatility objective.

Administrative Rate Review – Schedules and Design

PJM engaged Analysis Group to perform both a cost of service study and administrative rate review. The Finance Committee discussed the cost of service results at the January 2021 meeting. The Finance Committee discussed the administrative rate review, both schedules and design, at the February 2021 meeting.

The specific schedules reviewed were:

- Schedule 9-1: Control Area Administration Service
- Schedule 9-2: FTR Administration Service
- Schedule 9-3: Market Support Service
- Schedule 9-4: Regulation and Frequency Response Administration Service
- Schedule 9-5; Capacity Resource & Obligation Management Service
- Schedule 9-PJM Settlement Inc.

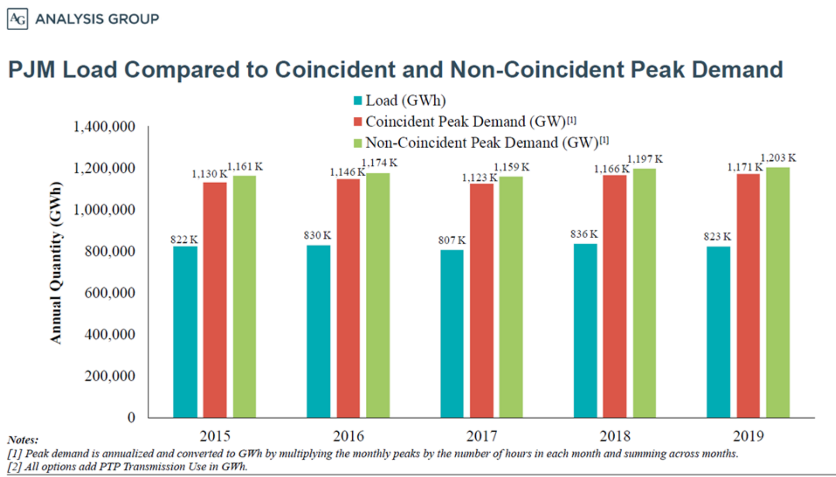
Analysis Group highlighted updated cost assignment changes. Certain costs that were previously assigned to Schedule 9-3 from the reliability function are now aligned with Schedule 9-1 and certain costs that were previously assigned to Schedule 9-1 from the markets function are now aligned with Schedule 9-3. Additionally, certain costs that were previously assigned to overhead are now directly assigned (e.g., long-term planning function). Finally, certain costs that were previously assigned to Schedule 9-3 are now directly assigned to Schedule 9-5 (capacity markets).

Analysis Group recommended that PJM maintain its current membership fees. The Finance Committee reviewed the fees of other ISO/RTOs and noted the comparability to PJM's membership fees. PJM's membership, at the time of the study, and fees are:

- 492 voting members who pay $5,000 per year
- 26 associate members who pay $2,500 per year
- 16 ex-officio and special members who pay $500 per year

Analysis Group recommended incorporating rate Schedule 9-4 into rate Schedule 9-3. However, they also recommended to maintain a separate Schedule 9-5 to isolate capacity market costs. Analysis Group explained that PJM is the only ISO/RTO that charges separately for ancillary services. The Schedule 9-4 costs associated with the provision of regulation and frequency response broadly benefit all of PJM's energy market participants. The directly assigned costs associated with Schedule 9-4 are very small (approximately $5 million, <2 percent of PJM's annual budget) and integral to market operations.

Analysis Group recommended maintaining PJM's current billing determinants. A majority of the cost of service is collected using load (MWh) and generation resource production (MWh) billing determinants. And these are the primary beneficiaries of the services PJM provides. Analysis Group examined the potential use of coincident and non-coincident peak demand for allocating costs to load and saw little difference in the historical growth of those metrics as shown below.



Rate Options

The Finance Committee discussed rate design options beginning at the February 2021 meeting. The options considered were:

Stated	Reconciling	Formula
Fixed rate that may be set years in advance.	Rate based on an approved formula specified in the tariff.	Rate based on an approved formula specified in the tariff.
Typically includes a reserve that is refunded in the event collections exceed a predefined reserve amount.	Typically provides for annual reconciliation against actual costs.	Collects actual monthly costs.

PJM currently uses a multi-year stated rate with a refund mechanism. The rates are specified for several years into the future and re-evaluated on a periodic basis with updates requiring a FERC filing. PJM maintains a reserve of up to 6% of annual revenue. If the stated rates result in over-collections, refunds are made to members on a quarterly basis if the reserve fund is filled.

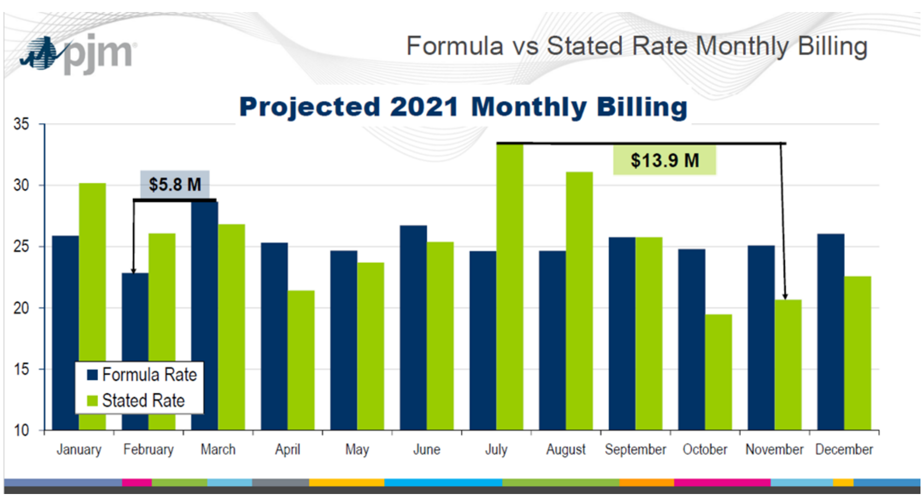
Evaluation of Options

The Finance Committee discussed the revenue adequacy concerns of maintaining a stated rate. The 2016 load forecast used to develop the current stated rate anticipated 869 GWh of consumption in 2026. The current load forecast for 2026 is 829 GWh. The difficulty in accurately forecasting billing determinants can exacerbate concerns for future revenue adequacy for PJM.

The Finance Committee compared projected 2021 monthly billing based on a stated rate versus a formula rate. The formula rate projections varied less on a month-to-month basis than the stated rate. The smaller variation for the formula rate demonstrates the relatively consistent operating costs for PJM on a month-to-month basis. The larger variation of the stated rate highlights the seasonal variation of the underlying MWh billing determinants. The largest variation in monthly charges projected for 2021 were $5.8 million while the largest variation on the stated rate was $13.9 million. This comparison assumed consistent and steady PJM expenses and billing determinates for both the stated and formula rates. It is important to note, that if PJM expenses or billing determinates change significantly, there would be more immediate volatility introduced to members on a unitized basis under a formula rate.

Further, under the proposed formula rate, Members will be subject to administrative rate changes on a month to month and annual basis as a result of variations in PJM expenses or billing determinants. While PJM has agreed to provide rate projections 5 years into the future based on an expected budget and forecast of billing determinants, actual rates could deviate significantly from these projections and members expectations depending on realized PJM expenses and actual billing determinants.

As highlighted during some of the Finance Committee discussions, this evolution could create new risks and costs for load serving entities and customers.



The Finance Committee discussed the consolidation of Schedule 9-4 into Schedule 9-3 and agreed with the recommendations of both Analysis Group and PJM.

The Finance Committee discussed the costs and responsibilities of PJM Settlements, Inc. (PSI) The annual budget for PSI is $13.7 million and is billed to Schedule 9-3 customers on a MWh basis. PSI issues over 170,000 invoices annually and the cost to develop and issue invoices, along with credit/risk monitoring and transfer of funds, is similar on a billing account basis. PJM and PSI recommend aligning cost recovery with the costs to provide service and to recover costs on a per invoice issued basis. The mechanism would be a formula rate billed monthly on an actual cost basis. The projected per invoice charge is $77.61.

PJM initially recommended no changes to the Protocol for the Finance Committee. However, PJM members requested additional transparency and PJM agreed to accept and document some of the additional transparency measures in the Protocol. The changes include:

- PJM adding an annual review and discussion by the Finance Committee of 5 years of projected rates for Schedules 9-1 through 9-5 and 9-PSI.
- PJM annual and 5-year projected capital spending would include identifying cost assignment of budgeted capital expenditures.
- PJM shall give the Finance Committee advance notice of material changes to services provided by PJM to the membership.
- PJM will conduct a cost of service study to examine the assignments of PJM's costs amongst Schedule 9-1 through 9-5 and 9-PSI every 5 years commencing in 2027.

In addition to the revisions to the protocols described above, the Member-elected sector representatives encourage PJM to continue to evaluate opportunities to increase transparency regarding PJM budgeting and operations through the Finance Committee process. Specifically, PJM should make every effort to be responsive to Member requests for information, made by the Member-elected sector representatives, regarding PJM's budget, revenues, expenses and the processes and strategic considerations affecting them, especially when those requests are supported by a cross section of sectors.

Recommendation

The member-elected sector representatives to the Finance Committee recommend the Members Committee endorse and the PJM Board of Managers approve PJM management making a section 205 filing with FERC to move from a stated rate to a formula rate effective January 1, 2022. The recommendation also includes factoring in the 2021 cost of service study assignment results and consolidating Schedule 9-4 into Schedule 9-3. Additionally, the member-elected sector representatives recommend recovering PSI costs on a per invoice issued basis.

The member-elected sector representatives to the Finance Committee also recommend making changes to the Protocol to eliminate the ex-officio participation of a PJM Chief Operating Officer and to correct errata. The member-elected sector representatives also recommend adding the following provisions to the Protocol:

- PJM adding an annual review and discussion by the Finance Committee of 5 years of projected rates for Schedules 9-1 through 9-5 and 9-PSI.
- PJM annual and 5-year projected capital spending would include identifying cost assignment of budgeted capital expenditures.
- PJM shall give the Finance Committee advance notice of material changes to services provided by PJM to the membership.
- PJM will conduct a cost of service study to examine the assignments of PJM's costs amongst Schedule 9-1 through 9-5 and 9-PSI every 5 years commencing in 2027.

The member-elected sector representatives to the Finance Committee recommend continuing the utilization of the current billing determinants for rate Schedules 9-1 through 9-5 and maintaining the annual membership costs at the current levels. The member-elected sector representatives also recommend that the Schedule 9 and 10 pass- through rates remain unchanged.

The member-elected sector representatives to the Finance Committee recommendations achieve the jointly developed objectives of the 2021 administrative rate review. The member-elected sector representatives to the Finance Committee greatly appreciate the efforts of PJM management and staff to support the administrative rate review and answer questions from the membership.

Sincerely,

Member-elected Sector Representatives to the PJM Finance Committee

Member-elected Sector Representative	**Sector**
Adrien Ford, ODEC	Electric Distributor
Chris Norton, AMP	Electric Distributor
Erik Heinle, DC Office of the Peoples' Counsel	End Use Customer
Greg Poulos, CAPS	End Use Customer
Dave Scarpignato, Calpine Energy Services	Generation Owner
Jeff Whitehead, Eastern Generation	Generation Owner
George Kogut, New York Power Authority	Other Supplier
Marguerite Miller, Credit Suisse	Other Supplier
Jim Benchek, ATSI	Transmission Owner
Jim Davis, Virginia Electric & Power Company	Transmission Owner

Exhibit No. PJM-0003

PJM Finance Committee
Financial Review,
Reporting and Communications Protocol

The purpose of the PJM Finance Committee is: (a) to review PJM LLC and its subsidiaries‟ financial statements, budgeted and actual capital costs, operating budgets and expenses, and cost management initiatives; and (b) to make recommendations to the PJM Board on matters pertaining to the appropriate level of PJM‟s rates, proposed major new investments and allocation and disposition of funds consistent with PJM‟s duties and responsibilities as specified in, Section 7.7 of the Operating Agreement. Those duties and responsibilities are to provide for: (i) the safe and reliable operation of the Interconnection; (ii) the creation and operation of a robust, competitive, and non-discriminatory electric power market in the PJM Control Area, and (iii) the principle that a Member or group of Members shall not have undue influence over the operation of the Interconnection.

This protocol outlines and describes the procedures and processes under which the Finance Committee and PJM implement section 7.5 of the PJM Operating Agreement.

1. This Committee shall serve in an advisory capacity to the PJM Board and shall not be responsible for the financial decisions of PJM.
2. The PJM Finance Committee is comprised of 13 persons, as follows:
    a. Two Board Members, other than the President, selected by the PJM Board (“Board Representatives”);
    b. One representative of the Office of the Interconnection selected by the President (“PJM Representative”);
    c. Two representatives shall be elected from each sector of the Members Committee as defined in section 8.1 (“Member Representatives”).
        i. Member Representatives are expected to serve 3 year terms, attend meetings regularly and effectively represent their sectors‟ interest.
        ii. In order to provide effective and continuous member representation and to leverage Finance Committee experience, each sector‟s Member Representatives are expected to serve staggered terms on the Finance Committee.
3. The PJM Representative shall be the Chair of the PJM Finance Committee. Neither the PJM Representative nor the Board representatives shall vote on the Member Representatives‟ recommendations to the PJM Board and Members Committee. Recommendations shall be based upon a vote of a majority of the

Member Representatives. Member Representatives that do not support the majority vote may provide a written minority report to the PJM Board in conjunction with the majority recommendation.

4. The Member Representatives represent the interests of their respective sectors and shall provide through a Member Representative selected by the Member Representatives periodic status reports to the Members Committee (at least once every six months) on Finance Committee activities.

5. The Member Representatives shall in accordance with sections 7.7 and 11.1 of the Operating Agreement avoid (1) undue influence by any Member or group of Members on the operation of PJM and (2) Member management of the business of PJM.

6. The Finance Committee shall meet at least quarterly. An agenda and conference call information for Finance Committee meetings shall be posted on the PJM web site and the Finance Committee meetings shall be open to participation by all members. Such postings shall occur at least one week prior to such Finance Committee meetings, unless a meeting is scheduled with less than one week notice, in which case such notice shall be provided as is reasonably practicable, Additional meetings may be called by either the PJM Representative or any four Member Representatives. A quorum will consist of one PJM Board member and representation from four of five sectors. Committee members are expected to participate in meetings in person. Committee minutes will be prepared and posted to the PJM web site.

7. Amendments to this Financial Review, Reporting and Communications Protocol shall be determined by vote of a majority of the total Committee representatives, which majority shall include at least one PJM Board Representative.

8. The Chief Operating Officer of PJM or her or his designee shall participate as an *ex officio* non-voting participant.

9. Quarterly meetings will have as an agenda at a minimum, to review and discuss the following:

   a. PJM‟s unaudited quarterly financial statements and management‟s discussion and analysis thereof, including a comparison of allocated costs and actual revenues collected from stated rates for each service included in Schedules 9-1 through 9-5 of the PJM Tariff; and

   b. Any intercompany charges or credits between PJM‟s non-FERC regulated subsidiaries and the FERC-regulated RTO shall be identified in these reviews and discussions.

   For the following items c. through h., PJM will review the indicated information for the FERC-regulated company:

c. Material variances in revenues, net operating expense and capital budget vs. actual results;

d. Material variances in revenues, net operating expense and capital forecast vs. actual results;

e. Summary of trends from the previous quarterly statements;

f. Status update on open major projects;

g. Analysis of any deferred regulatory liability balances; and

h. Forecast of net operating expenses and capital for the full fiscal year.

Material variances in net operating expenses shall be reviewed on a total FERC-regulated company basis (and on a service category basis once stated rates are implemented) in PJM"s major cost element categories, such as compensation, non-employee labor, technology, depreciation and interest, other operating expenses, and income taxes. Material variances in capital shall be reviewed on a total FERC-regulated company basis and shall include discussion of any material variances of the projects included in the annual capital budget. Material variances shall be reviewed in sufficient detail so that the Finance Committee members understand the nature and the cause of the material variance.

10. On an annual basis the Finance Committee will review and discuss the following items relative to PJM"s FERC-regulated activities:

a. PJM"s total annual and 5-year projected revenues and significant expenses (by Tariff schedules and service categories, including integration and all subsidiaries" expenses included therein)

b. PJM"s Annual and 5-year projected operating budget and significant expenses (by Tariff schedules and service categories, including integration and all subsidiaries" expenses included therein), such as

1. Total labor expenses (compensation and benefits)

a. Current FTEs (headcount and associated expenses) and contractor expenses

b. Projected FTEs and contractor expenses for the periods in the projections under review

2. Depreciation expenses and interest expense

3. Technology expense

c. Any intercompany charges or credits between PJM"s non-FERC regulated subsidiaries and the FERC-regulated RTO shall be identified in these annual and 5-year projections.

d. Budget variance reports showing major areas of differences in total revenues and operating budget/expenses vs. actual results. Such differences shall be reviewed on a total FERC-regulated company basis (and on a service category basis once stated rates are implemented) in PJM"s major cost element categories, such as compensation, non-employee labor, technology, depreciation and interest, other operating expenses, and income taxes. Material variances shall be reviewed in sufficient detail so that the Finance Committee members understand the nature and the cause of the material variance.

e. PJM annual and 5-year projected capital spending

1. Total Spending
2. Identified Projects: PJM shall review with the Finance Committee the list of active and projected capital projects in the primary project categories, such as reliability services, risk management, new products, technology upgrades.
3. Major Projects: Unless the PJM Board directs otherwise, before making capital expenditures with regard to major projects, and in conjunction with the annual budget process thereafter, PJM shall review with the Finance Committee each major new investment with anticipated total capital expenditures of $25 million or more. Such review shall include the project description, business purpose, development and post-development cost projections, and risk analysis, including alternatives considered and dismissed, if applicable. The Member Representatives, in an advisory capacity, may provide recommendations to the PJM Board regarding these projects. In the case of an emergency requiring immediate action, PJM shall not be required to consult with the Finance Committee in advance of making capital expenditures for major projects but shall provide notice as promptly as is practicable in the circumstances.

f. Actual capital spending

g. Analysis of any deferred regulatory liability balances;

h. Financial Results - Annual review and discussion of actual financial results. The goal of this annual review is to provide the Finance Committee a broad and comprehensive review and understanding of the financial position of PJM and its subsidiaries.

i. Annual review of past and present year financial performance relative to PJM"s Board-approved goals and objectives.

j. Review and discussion of actual financial results, including actual capital spending, operating budget and expenses under Stated Rates and the rider recovering the costs of the second control center (AC^2 rider).

k. Review and discussion of the five-year projected revenues and expenses under Stated Rates and the AC^2 rider.

l. Review of projected sources and uses of funds consistent with PJM‟s purposes included in section 7 of the PJM Operating Agreement and Other Activity Protocol.

m. Recommendations to the PJM Board of any changes in budgets or sources and uses of funds based on the Finance Committee review of items (a) through (l).

11. For major projects arising at times that do not coincide with PJM‟s annual budget process, unless the PJM Board directs otherwise, before making capital expenditures with regard to major projects, and in conjunction with the annual budget process thereafter, PJM shall review with the Finance Committee each major new investment with anticipated total capital expenditures of $25 million or more. Such review shall include the project description, business purpose, development and post-development cost projections, and risk analysis, including alternatives considered and dismissed, if applicable. The Member Representatives, in an advisory capacity, may provide recommendations to the PJM Board regarding these projects. In the case of an emergency requiring immediate action, PJM shall not be required to consult with the Finance Committee in advance of making capital expenditures for major projects but shall provide notice as promptly as is practicable in the circumstances.

12. The Finance Committee may request from PJM, and PJM shall provide, additional data as may be reasonable and consistent with this protocol to assist it in its reviews. The Member Representatives may request the PJM Board to direct PJM to address any concerns of the Member Representatives concerning the quality and detail of information provided by PJM to the Finance Committee.

13. PJM shall give the Finance Committee advance notice of proposed regulatory filings to modify PJM‟s administrative rate structure so as to permit the Committee to review and provide comment on the proposed modifications. The Finance Committee, in an advisory capacity, shall provide recommendations to the PJM Board regarding such proposed changes to PJM„s administrative rates. In emergency situations, PJM shall provide such notice as feasible to the Finance Committee and the Finance Committee shall provide such recommendations as feasible under the circumstances.

14. The Finance Committee may engage consultants to assist in the Finance Committee‟s review of PJM‟s proposed annual budget, major projects and any changes proposed by PJM to its administrative rates. Consultants engaged by the Finance Committee shall have access to the same information provided to the Finance Committee under this protocol. The costs of such consultants shall be managed by the

Finance Committee and, if approved by PJM"s members, PJM shall recover such consulting costs from PJM"s members through a separate Tariff schedule other than Schedules 9-1 through 9-5.

15. On an annual basis PJM shall submit its annual budget to the Finance Committee for review and comment. To the extent feasible, PJM shall also submit to the Finance Committee any proposed changes to Tariff Schedules 9-1 through 9-5. The Member Representatives shall share their comments and any concerns relative to the budget or proposed Tariff changes with the PJM representative on the Finance Committee and the Chief Operating Officer, and PJM shall respond to the Member Representatives" comments and concerns. Subsequent to these communications, the Member Representatives shall make their written recommendations to the Board pursuant to sections 10 (k) or 13 hereof. If the Member Representatives" recommendations to the PJM Board differ from those of PJM management, the PJM Board representatives on the Finance Committee shall meet and review with the Member Representatives the reasons for such differences in order to assure that the Member Representatives" concerns and recommendations are accurately communicated to the PJM Board before it acts on the annual budget or proposed Tariff changes. The PJM Board Representatives shall ensure that the Member Representatives" recommendations are provided and explained to the PJM Board. The PJM Board will consider the Member Representatives" recommendations in their deliberations on PJM"s annual budget, major projects, and revisions to Tariff Schedules 9-1 through 9-5, consistent with this protocol. In the event that the PJM Board approves an annual budget or change to Tariff Schedules 9-1 through 9-5 that is not consistent with recommendations provided by the Member Representatives to the PJM Board, the reasons why the PJM Board did not adopt the Member Representatives" recommendations shall be presented in writing and discussed with the Finance Committee by the PJM Board's representatives thereon.

16. Nothing contained in this protocol shall be construed as affecting in any way PJM's rights unilaterally to make application to the FERC for a change in rates under section 205 of the Federal Power Act and pursuant to the Commission"s Rules and Regulations promulgated thereunder, and nothing in this protocol shall be construed as affecting in any way any entity"s rights that they otherwise may have to make filings under sections 205 or 206 of the Federal Power Act.

Exhibit No. PJM-0004

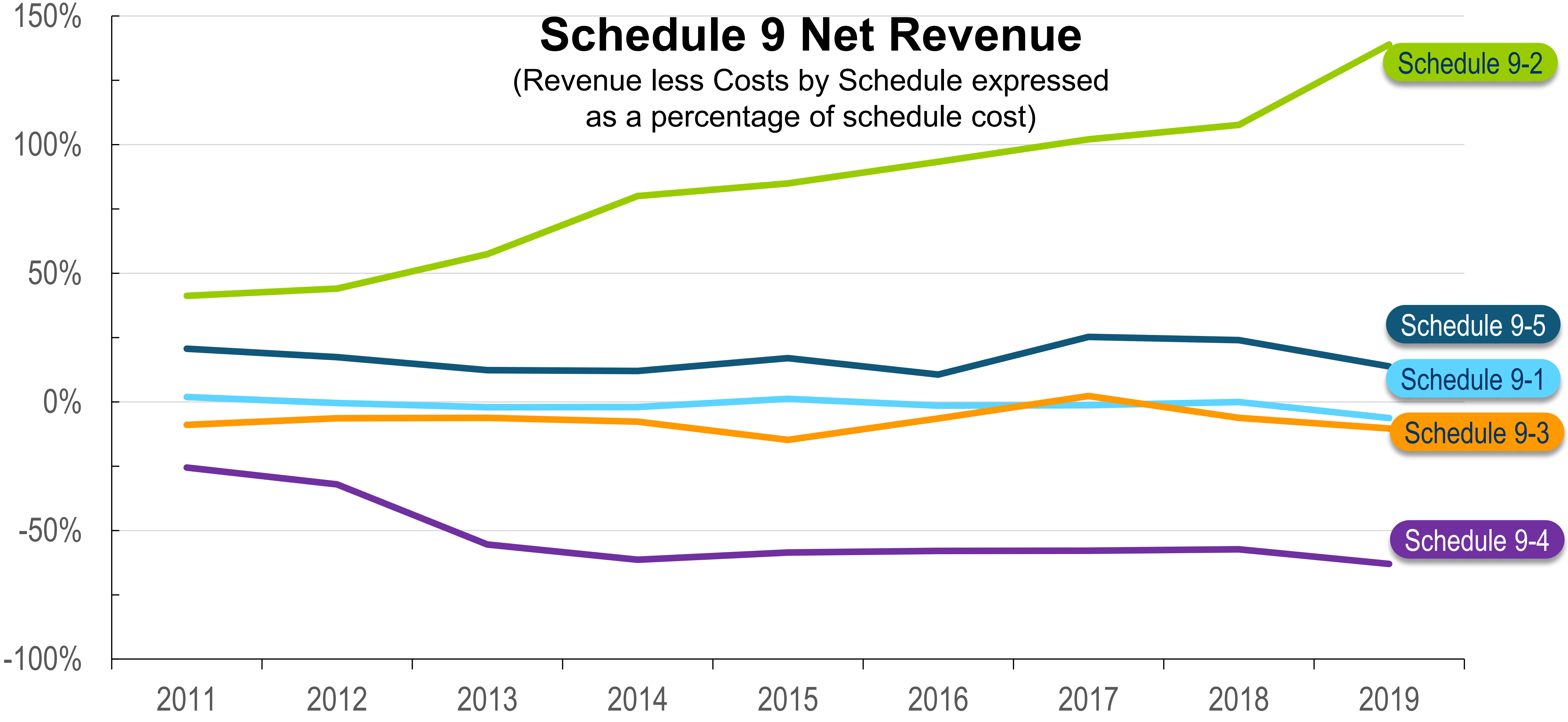

Schedule 9 Net Revenue
(Revenue less Costs by Schedule expressed as a percentage of schedule cost)
150%
100%
50%
0%
-50%
-100%
2011
2012
2013
2014
2015
2016
2017
2018
2019
Schedule 9-2
Schedule 9-5
Schedule 9-1
Schedule 9-3
Schedule 9-4

Exhibit No. PJM-0005

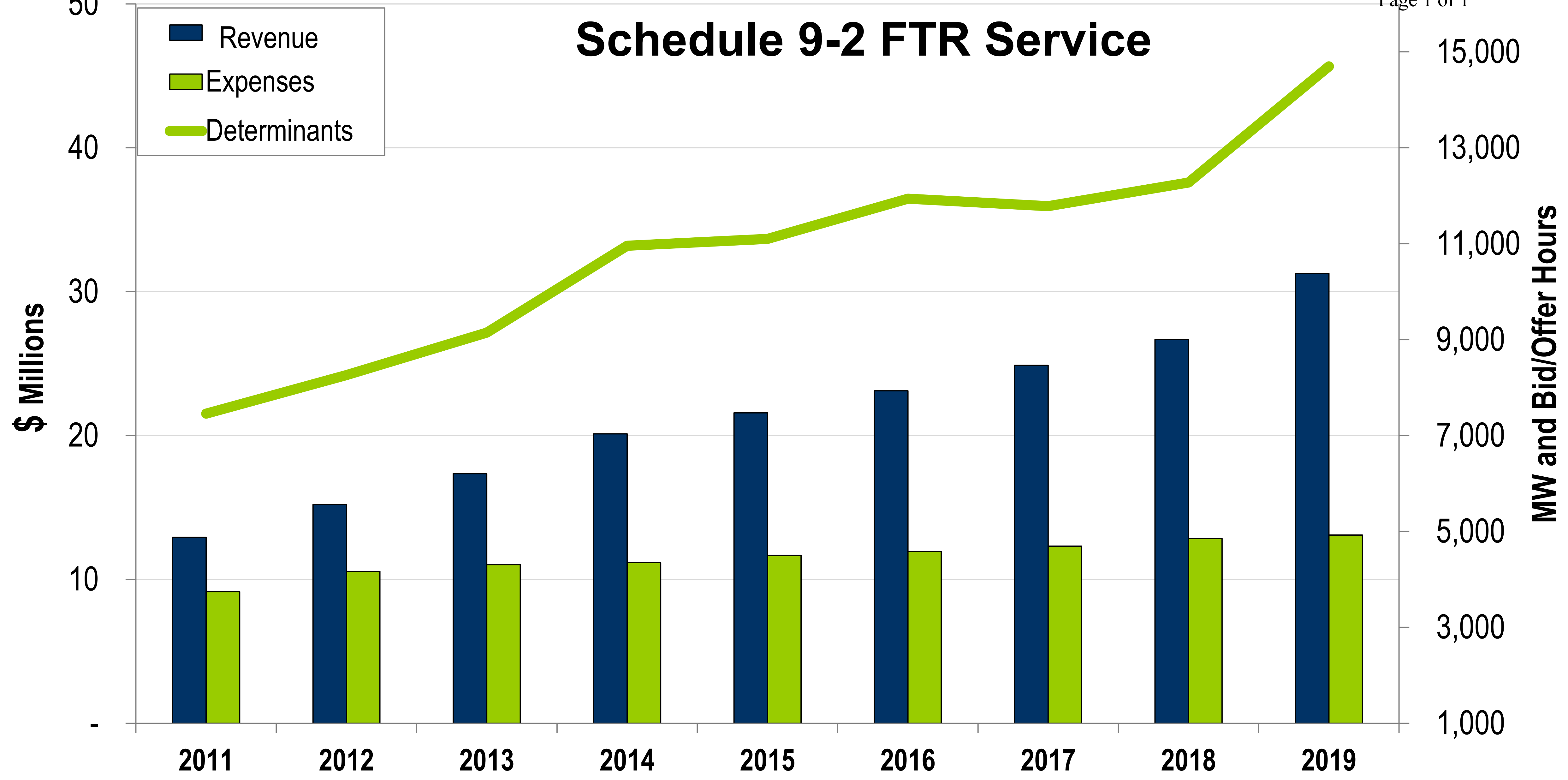

Schedule 9-2 FTR Service
Revenue
Expenses
Determinants
$ Millions
MW and Bid/Offer Hours
50
40
30
20
10
-
15,000
13,000
11,000
9,000
7,000
5,000
3,000
1,000
2011
2012
2013
2014
2015
2016
2017
2018
2019

Exhibit No. PJM-0006

Energy/Load Forecast

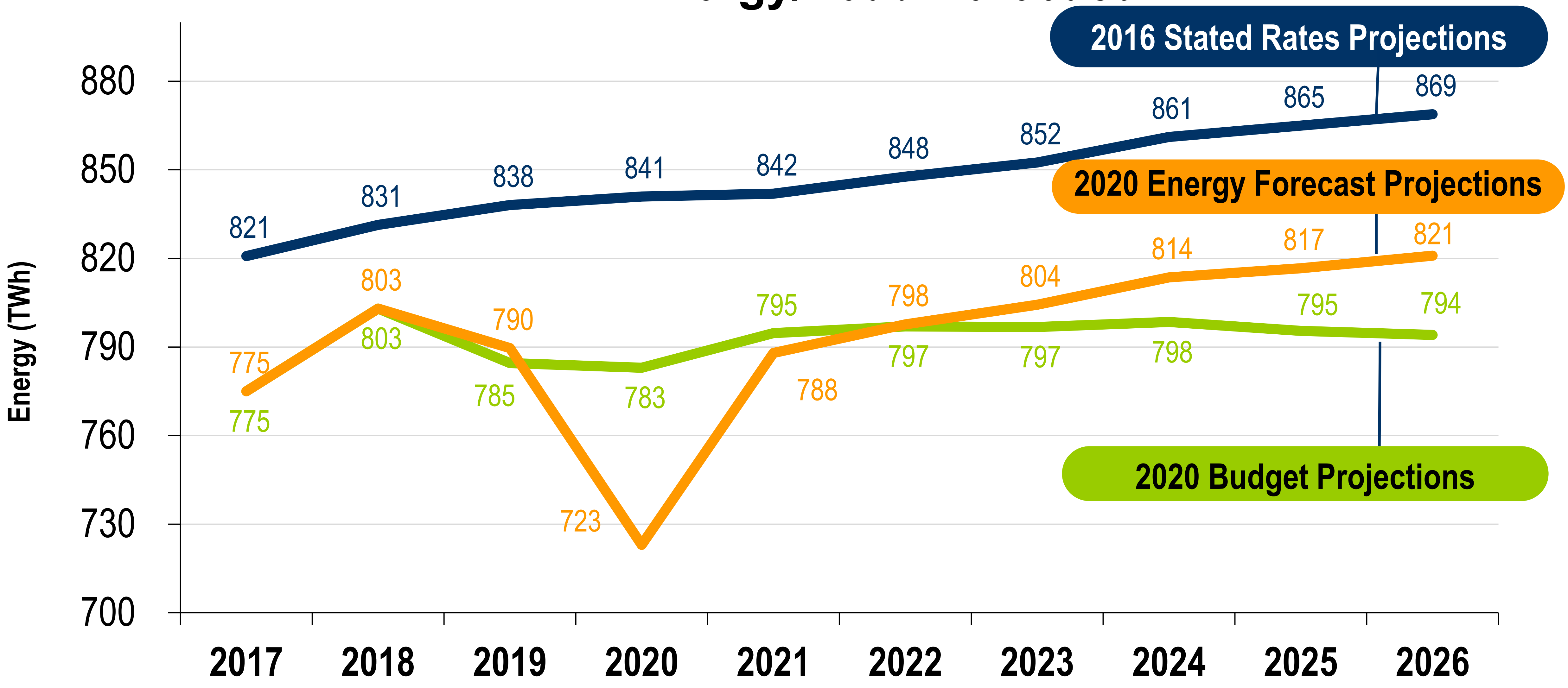


Exhibit No. PJM-0007

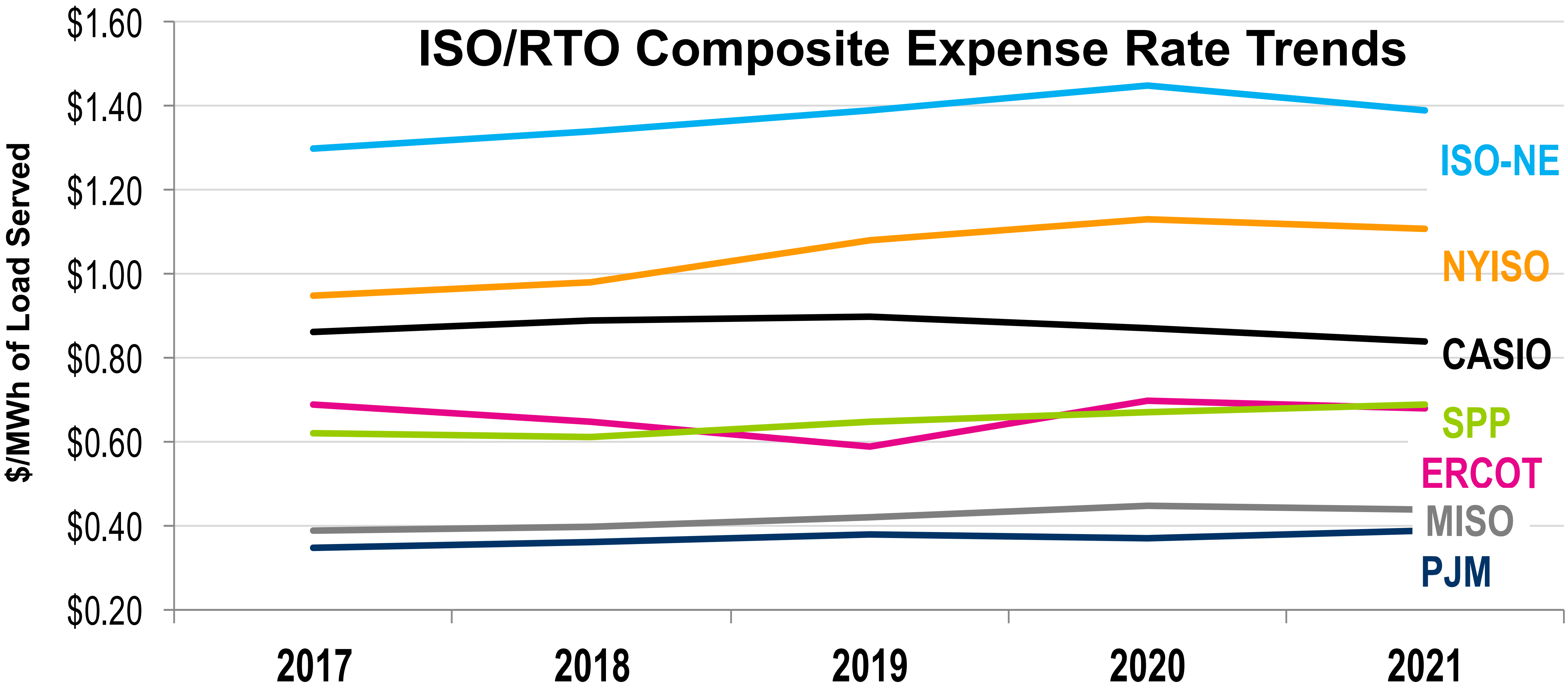

ISO/RTO Composite Expense Rate Trends
$/MWh of Load Served
$1.60
$1.40
$1.20
$1.00
$0.80
$0.60
$0.40
$0.20
2017
2018
2019
2020
2021
ISO-NE
NYISO
CASIO
SPP
ERCOT
MISO
PJM

Exhibit No. PJM-0008

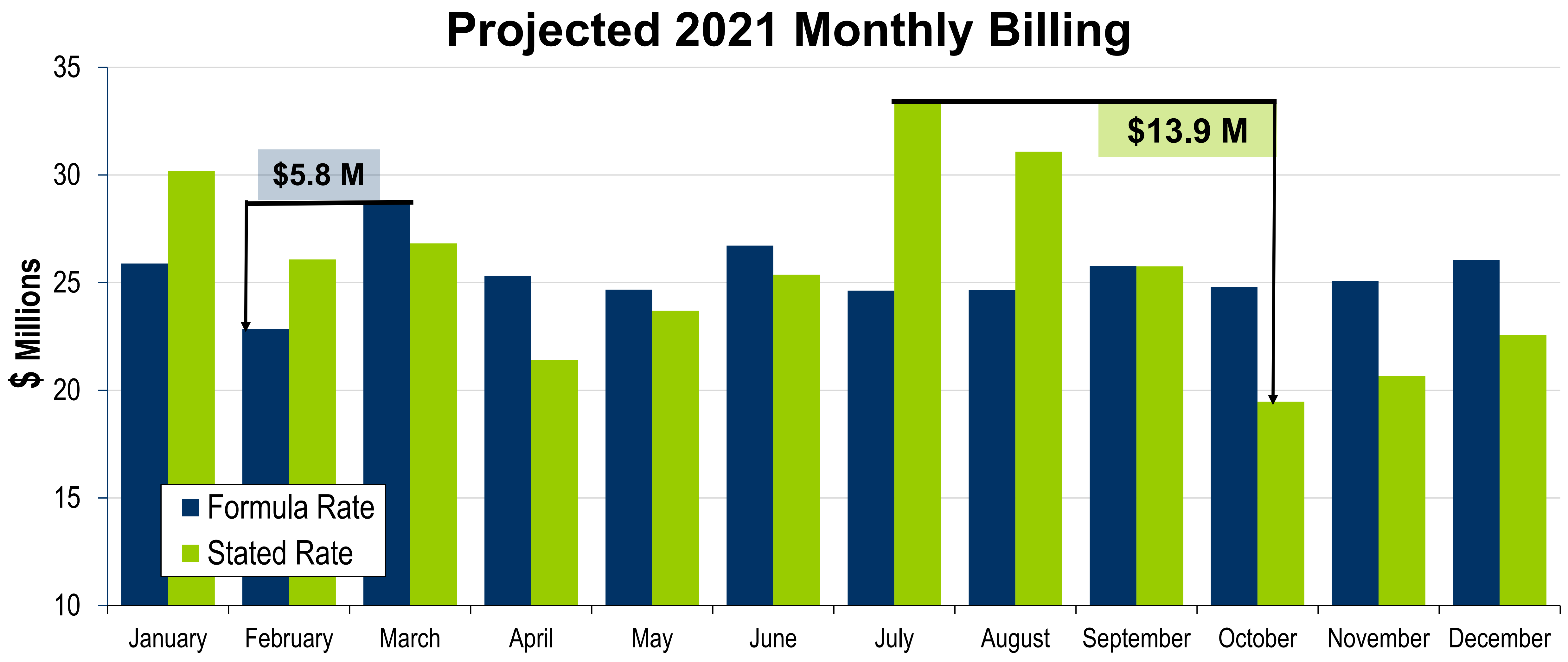

Projected 2021 Monthly Billing
$ Millions
35
30
25
20
15
10
$5.8 M
$13.9 M
Formula Rate
Stated Rate
January
February
March
April
May
June
July
August
September
October
November
December

Exhibit No. PJM-0009

2021 Projected Monthly Billing Rates

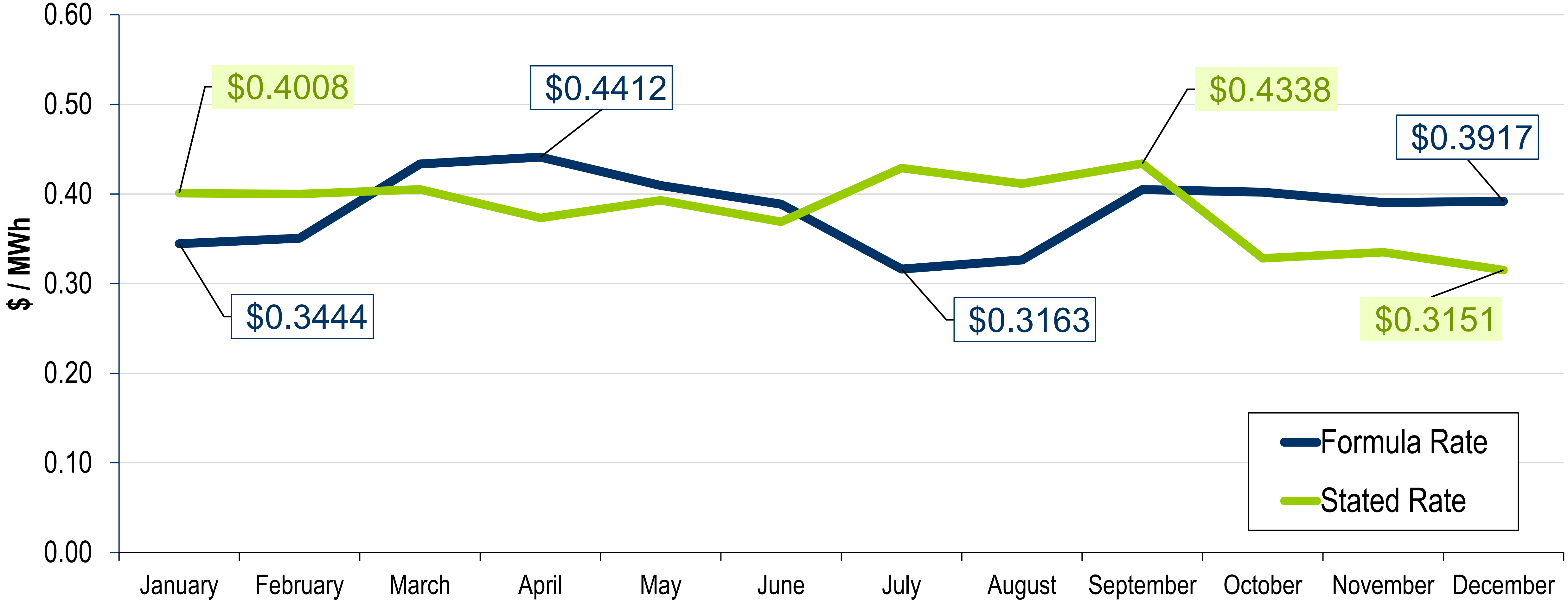


Exhibit No. PJM-0010

	SCH-9-1	SCH-9-2a	SCH-9-2b	SCH-9-3a	SCH-9-3b	SCH-9-4	SCH-9-5	SCH-9-PSI
Formula Rate	$0.2260	$0.0016	$0.0008	$0.0340	$0.0761	$0.5585	$0.1479	$77.61
Formula Rate Revenue	**$183.3M**	**$7.0M**	**$7.0M**	**$66.2M**	**$3.2M**	**$5.1M**	**$19.8M**	**$13.7M**
Stated Rate*	$0.2116	$0.0023	$0.0014	$0.0429**	$0.0519	$0.3035	$0.1010	$0.0070**
Stated Rate Revenue	**$171.7M**	**$10.5M**	**$11.6M**	**$83.5M**	**$2.2M**	**$2.8M**	**$13.5M**	**$13.7M**
Rate Deltas	$0.0144	($0.0007)	($0.0006)	($0.0159)	$0.0242	$0.2550	$0.0469	---
Revenue Deltas	**$11.6M**	**($3.5M)**	**($4.6M)**	**($17.3M)**	**$1.0M**	**$2.3M**	**$6.3M**	**---**

**Stated Rate values reflect net impact of projected refunds*
***Schedule 9-3a State Rate value is net of projected 9-PSI rate*

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.	)))	Docket No. ER22-___-000

VERIFICATION

I, Lisa M. Drauschak, state that I am the Lisa M. Drauschak referred to in the foregoing document entitled “Prepared Direct Testimony of Lisa M. Drauschak on behalf of PJM Interconnection, L.L.C.” that I have read the same and am familiar with the contents thereof, and that the facts set forth therein are true and correct to the best of my knowledge, information, and belief.

In light of the steps that PJM Interconnection, L.L.C. has taken to address the ongoing emergency relating to COVID-19, including making arrangements for employees to work remotely, I respectfully request waiver of the Commission’s regulations with respect to any expectation or requirement that this verification be notarized.[1]

By: /s/ *Lisa M. Drauschak*

Name: Lisa M. Drauschak

Title: Vice President, Chief Financial Officer, and Treasurer
PJM Interconnection, L.L.C.

Dated: September 30, 2021

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[1] *See Extension of Non-Statutory Deadlines*, Supplemental Notice Waiving Regulations, Docket No. AD20-11-000 (July 26, 2021).

Attachment D

Exhibit No. PJM-0011

Prepared Direct Testimony of

A. Joseph Cavicchi and Megan H. Accordino, Ph.D

and accompanying
Exhibit Nos. PJM-0012 through PJM-0020

Exhibit No. PJM-0011

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

	)	
PJM Interconnection, L.L.C.	)	Docket No. ER22-___-000
	)	

PREPARED DIRECT TESTIMONY OF

A. JOSEPH CAVICCHI AND MEGAN H. ACCORDINO, PH.D.

ON BEHALF OF PJM INTERCONNECTION, L.L.C.

OCTOBER 1, 2021

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I. INTRODUCTION

A. Qualifications

Q. Please state your names, titles, and business addresses.

A. Our names are A. Joseph Cavicchi and Megan H. Accordino, Ph.D. We are a Vice President and Manager, respectively, at Analysis Group, Inc. Our business addresses are 111 Huntington Avenue, Boston, MA 02199 and 333 South Hope Street, 27th Floor, Los Angeles, CA 90071.

Q. Please briefly describe the services provided by Analysis Group.

A. Analysis Group's energy and environment practice area is distinguished by expertise in economics, finance, market modeling and analysis, regulatory issues, and public policy, as well as deep experience in environmental economics and energy infrastructure development. Analysis Group has worked for a wide variety of clients, including (among others) energy producers, suppliers and consumers, utilities, regulatory commissions and other federal and state agencies, tribal governments, power-system operators, foundations, financial institutions, and start-up companies.

Q. Mr. Cavicchi, please briefly describe your qualifications.

A. I provide economic analysis and expert testimony in various state and federal regulatory proceedings related to electricity markets. In particular, I work with clients on a variety of state regulatory and Federal Energy Regulatory Commission proceedings, and often file testimony and affidavits supported by economic analyses. Throughout my career I have been directly involved with corporations, private and public institutions, and state and federal regulatory authorities in connection with the economics of the electricity industry.

For the past 24 years I have been working almost exclusively on the regulatory economics of the electricity industry. My CV is included in **Exhibit No. PJM-0012**.

Q. Dr. Accordino, please briefly describe your qualifications.

A. I have 14 years of experience providing economic analysis in litigation and regulatory matters in energy and finance. My experience in regulatory matters in the electric power industry includes working with clients in state regulatory and rate-making proceedings as well as numerous matters in front of the Federal Energy Regulatory Commission. My work has included analyzing utility rate plans and their impact on stakeholders, analyzing investment and unit commitment decisions, and analyzing market power in market-based rate authority applications and electric power mergers. I hold a Ph.D. and M.Phil in economics from the University of California, Los Angeles and a B.A. in economics and international studies from Case Western Reserve University. My CV is included in **Exhibit No. PJM-0013**.

B. Background, Purpose, and Summary of Testimony

Q. Please provide a brief background for your testimony.

A. PJM is a Regional Transmission Organization that coordinates the operation of the electricity system in the Mid-Atlantic U.S. and portions of the Mid-Western U.S. (in all or parts of 13 states and the District of Columbia). PJM employs a staff with specific technical expertise and other relevant skills necessary to administer wholesale electricity markets, oversee electric generator dispatch and transmission system operations, and ensure overall system reliability. PJM is compensated for the costs incurred to administer markets and operate the electricity system by its membership who participate in PJM's wholesale markets. At PJM's request, we conducted a cost of service study to review and analyze the costs that PJM incurs to coordinate power system operations for its membership.

Q. What is the purpose of your testimony?

A. Our testimony describes and presents the results of the cost of service study we conducted for PJM. The cost of service study evaluates PJM's historical cost allocations and service categories. In addition, the cost of service study evaluates the billing determinants PJM uses to recover its costs (*i.e.,* the metrics by which PJM's members are billed for their usage of PJM's services under each service category, typically a per MWh charge) and the tariff design that PJM proposes to use to collect its costs going forward.

Q. Why did PJM want a new cost of service study?

A. PJM initiated a review of its service categories, its historical cost of service allocation, its billing determinants, and its tariff design to ensure that PJM continues to collect its operational costs from its members on a fair and equitable basis. PJM collects the majority of its operational costs through six service categories defined in its tariff schedules. PJM's operational costs are assigned to the six tariff schedules based on an historical cost allocation that PJM wanted to review and update. In particular, the rates set forth in the tariff schedules were set in 2016 based on the forecasted costs of each service category relative to the forecast of each service category's billing determinants.[1] Subsequently, PJM

[1] PJM's current rates are explained and presented in the Prepared Direct Testimony of Suzanne S. Daugherty, PJM Interconnection, L.L.C., Federal Energy Regulatory Commission Docket No. ER17-249-000, Exhibit No. PJM-001, October 31, 2016.

observed that its system usage was not growing as expected in 2016 and that the existing tariff design required refund adjustments to maintain equitable cost recovery from system users.[2] Thus, PJM asked us to complete a new cost of service study.

Q. What are the six tariff schedules that you reviewed for your cost of service study?

A. We reviewed PJM's Open Access Transmission Tariff, Schedule 9, sub-schedules 9-1 through 9-5 and 9-PJMSettlement. A description of these tariff schedules is as follows:

- Schedule 9-1, "Control Area Administration Service," recovers PJM's costs for administering transmission service and ensuring reliable operation of the PJM system;
- Schedule 9-2, "Financial Transmission Rights ("FTR") Administrative Service," recovers PJM's costs for administering FTRs, including auctions and bilateral trading;
- Schedule 9-3, "Market Support Service," recovers PJM's costs of clearing and supporting energy and ancillary services market operations;
- Schedule 9-4, "Regulation and Frequency Response Administration Service," recovers PJM's costs of administering the provision of regulation and frequency response service;
- Schedule 9-5, "Capacity Resource and Obligation Management Service," recovers PJM's costs of operating the PJM capacity market and administering the Reliability Assurance Agreement; and,
- Schedule 9-PJMSettlement, "PJM Settlement, Inc. Administrative Services," recovers administrative costs from market buyers and sellers for billing, cash settlement, and credit management functions that PJM Settlement provides under a services contract with PJM.

Q. Please summarize the elements of your cost of service study for PJM.

A. We collected and evaluated the costs that PJM incurs to provide its services, evaluated the appropriateness of the six service categories, developed updated cost assignments and

[2] Prepared Direct Testimony of Lisa M. Drauschak on Behalf of PJM Interconnection, L.L.C. (included in this filing as Exhibit No. PJM-0001).

allocations for each of the service categories, assessed the results, and reviewed the billing determinants for each of the service categories.

Q. Please summarize your findings.

A. Our major findings are:

- We recommend eliminating Schedule 9-4 by incorporating its costs into Schedule 9-3 as the beneficiaries are the same for both schedules as are the labor and materials used to provide the services.
- The cost of service study shows that there have been no major shifts in the allocation of costs across the various service categories.
- We recommend leaving the billing determinants unchanged except for Schedule 9-PJM Settlement, where we recommend changing from a reconciling volumetric rate to a per invoice charge.
- We find PJM's proposed formula rate to be a preferable alternative to its current stated rate.

II. OVERVIEW OF THE COST OF SERVICE STUDY PROCESS FOR A REGIONAL TRANSMISSION ORGANIZATION ("RTO")/INDEPENDENT SYSTEM OPERATOR ("ISO")

Q. What is a cost of service study for an RTO/ISO?

A. An RTO/ISO cost of service study compiles, assigns, and allocates the RTO/ISO's costs, which consist primarily of general and administrative costs.[3] Unlike a conventional utility where the costs of service are closely aligned with the generation, transmission, and distribution assets that serve utility customers, an RTO/ISO's costs are composed of specialized engineering, technology, information technology, management and legal personnel needed to coordinate and operate a market-based power system. Thus, an RTO/ISO cost of service study seeks to group, or "functionalize," the costs of these specialized staff and technological equipment into service categories that are aligned with the RTO/ISO's key operations (*e.g.*, PJM's service categories).[4] Thereafter, an RTO/ISO cost of service study assigns and allocates costs to the service categories and identifies underlying cost drivers (*e.g.,* system usage or megawatt-hours) to be used as billing determinants.[5]

Q. What principles guide the cost of service study process?

A. A cost of service study follows a common-sense economic principle whereby the objective is to identify the costs of providing the services associated with each of the RTO/ISO's

[3] RTOs and ISOs provide essentially the same services, including operating the electric transmission system and facilitating energy and ancillary services markets where buyers and sellers can bid for and offer generation. PJM is an RTO. *See* "Electric Power Markets," Federal Energy Regulatory Commission, https://www.ferc.gov/electric-power-markets.
[4] *See, e.g.*, "Electric Utility Cost Allocation Manual," National Association of Regulatory Utility Commissioners, January 1992 ("NARUC Manual"), pp. 18-22.
[5] NARUC Manual, pp. 18-22.

service categories and to recover those costs equitably from those system users (beneficiaries) that cause the costs to be incurred.[6]

Q. What are the steps in a cost of service study for an RTO/ISO?

A. A cost of service study for an RTO/ISO proceeds in four steps: (1) defining a test year and collecting cost data from that test year, (2) identifying the service categories, (3) assigning and allocating the RTO/ISO's costs to the service categories, and (4) identifying the billing determinants for each service category that determine the rates paid by the RTO/ISO's users (often referred to as members).

Q. How is the test year selected?

A. The test year selected is a year in which costs and revenue are expected to be representative of those that will be experienced during the time that the rates are likely to remain in effect.[7] The data used may also be updated based on known and measurable future changes in the RTO/ISO's pattern of expenditures.[8]

Q. How are service categories selected for an RTO/ISO?

A. The service categories for an RTO/ISO are selected based on the types of services the RTO/ISO provides to its members, which can generally be grouped into two functions: (1) reliable bulk power system operations and planning and (2) administering the wholesale power markets.[9] Most RTO/ISOs, including PJM, subdivide these broad categories of

[6] NARUC Manual, pp. 12-13.
[7] NARUC Manual, p. 24.
[8] NARUC Manual, p. 25.
[9] With the exception of the New York ISO ("NYISO"), which has a bundled rate, each of the other FERC-regulated RTO/ISOs—California ISO ("CAISO"), ISO New England ("ISO-NE"), Midwest ISO ("MISO"), Southwest Power Pool ("SPP")—charges its members separately for power system operations and planning and for market

service into narrower categories targeted at specific market or reliability-related functions.[10] Subdividing categories allows for more precise assignment of specific service costs to the beneficiaries of those services and allows billing determinants to be more targeted to the beneficiaries of the service.

Q. Please describe the process for assigning and allocating costs to service categories.

A. Test year costs are directly assigned to the different service categories based on the type of services the RTO/ISO provided to its members and the activities that generated the costs. However, RTO/ISO costs are composed almost entirely of administrative activities (labor and overhead expenses) and only a portion of these costs can be directly assigned. Thus, the remaining costs (largely overhead) are allocated proportionally based on those costs (*e.g.*, labor, materials, expenses) that can be directly assigned to the service categories. Directly assigned and proportionally allocated costs by service category are then combined

administration as PJM does. Note that ISO-NE bundles planning services and capacity market administration unlike other RTO/ISOs. *See* CAISO, "2020 Grid Management Charge – Cost of Service Study Update," FERC Docket No. ER21-112-000, October 15, 2020 ("CAISO 2021 Tariff Filing"), p. 1; ISO-NE, "ISO New England Inc., Filing of 2021 Capital Budget and Revised Tariff Sheets for Recovery of 2021 Administrative Costs," FERC Docket No. ER21-106-000, October 15, 2020 ("ISO-NE 2021 Tariff Filing"), pp. 14-15 and Exhibit 1, Tariff Section IV.A, Schedule 3; MISO, FERC Electric Tariff, "Schedule 10 Cost Recovery Adder," January 15, 2015 ("MISO Tariff Schedule 10"), §II.B; MISO, FERC Electric Tariff, "Schedule 17 Energy and Operating Reserve Markets Support Administrative Service Cost Recovery Adder," June 1, 2020 ("MISO Tariff Schedule 17"), §I; NYISO, OATT, "Schedule 1 - ISO Annual Budget Charge and Other Non-Budget Charges and Payments," October 3, 2017, ("NYISO Tariff Schedule 1"), §§6.1.1-6.1.2; SPP, "Amendment to Tariff Filing," FERC Docket No. ER20-3008-001, December 3, 2020 ("SPP 2021 Tariff Filing"), Tariff Schedule 1-A.

[10] Like PJM, each of the other RTO/ISOs has separate charges for FTR administration and for energy and ancillary service market administration. Note that NYISO's rate structure also includes a separate charge to those participating in FTR markets. *See* CAISO 2021 Tariff Filing, p. 1; ISO-NE 2021 Tariff Filing, pp. 17-18; MISO Tariff Schedule 17, §I; MISO, FERC Electric Tariff, "Schedule 16 Financial Transmission Rights Administrative Service Cost Recovery Adder," January 31, 2015 ("MISO Tariff Schedule 16"), §I; NYISO Tariff Schedule 1, §§6.1.2.4.2, 6.1.2.4.4; SPP 2021 Tariff Filing, Tariff Schedule 1-A, §§3-4.

into a tabulation or matrix that sets out the proportion of the RTO/ISO's costs to assign to each service category.

Q. How are costs recovered from RTO/ISO members?

A. RTO/ISO members pay for services based on the rates set out in the RTO/ISO's tariff, which are designed to compensate the RTO/ISO for its costs of providing such services. RTO/ISO tariff rates are set based on service category costs and the degree to which members use the services. With each bill, the amount paid by a member is a function of the member's usage of the service over the billing period and the per unit rate set forth in the tariff.[11] The metrics used by the RTO/ISO to measure each member's usage of its services are known as billing determinants.

Q. What guides the selection of billing determinants for each service category?

A. The selection of billing determinants is guided by the principle of cost causation, which states that the customers that cause costs to be incurred should be the ones that pay the costs.[12] Billing determinants are measures of the usage of RTO/ISO services that influence the magnitude of the costs incurred by the RTO/ISO when providing a service. Cost

[11] Note that ISO-NE's tariff states a precise billing rate for each service category, while the other FERC-regulated RTO/ISOs provide a formula that is used to determine the billing rate, allowing the rate to change over time as the inputs to the formula change. The final rate for each billing period is typically published publicly by the RTO/ISO once the inputs are known. *See* CAISO 2021 Tariff Filing, Attachment A, Tariff Appendix F; CAISO, "Finance Department GMC and Other Rates for 2004-2021," available at http://www.caiso.com/Documents/GMCRatesfor2004-2021_Effective_Jan_01_2021.pdf; ISO-NE 2021 Tariff Filing, Exhibit 1, Tariff Section IV.A; MISO Tariff Schedule 10; MISO Tariff Schedule 16; MISO Tariff Schedule 17; MISO, "Transmission Settlements and Pricing: Sch. 10 16 17 (Cost Recovery)," available at https://www.misoenergy.org/markets-and-operations/settlements/ts-pricing/#nt=%2Ftspricingtype%3ASch.%2010%2016%2017&t=10&p=0&s=Updated&sd=desc; NYISO Tariff Schedule 1; NYISO, "Billing Rates: Rate Schedule 1," available at https://www.nyiso.com/billing-rates; SPP 2021 Tariff Filing, Tariff Schedule 1-A; SPP, "Price Matrix," available at https://opsportal.spp.org/PriceMatrixViewer.

[12] NARUC Manual, pp. 38-39.

causation identifies the billing determinants that are used when calculating the tariff rates customers pay. Together, service category costs and billing determinants are used to calculate RTO/ISO service category tariff rates.

III. PJM'S COST OF SERVICE STUDY

A. Study Process

Q. Please describe the steps followed in performing PJM's cost of service study.

A. First, we defined a test year to determine the data to use in the cost of service study and gathered actual expense data for the test year. For this study, we selected 2019 as the test year, the most recent year with available expense data at the time we began our study. We did not update the test year to use 2020 data to avoid including the impact of the pandemic. However, where there are known and measurable changes to costs when compared to 2019, we used budgeted 2021 costs to capture these changes.[13]

Second, we used PJM's current service categories—Schedule 9-1 Control Area Administration Service, Schedule 9-2 FTR Administration Service, Schedule 9-3 Market Support Service, Schedule 9-4 Regulation and Frequency Response Administration Service, Schedule 9-5 Capacity Resource and Obligation Management Service, and Schedule 9-PJMSettlement PJM Settlement, Inc. Administrative Services—as the starting point in assigning and allocating PJM's costs. We then evaluated the appropriateness of these service categories in light of the information gathered from PJM.

[13] NARUC Manual, p. 16.

Third, we assigned and allocated PJM's costs to its service categories in order to identify the proportions of PJM's costs attributable to each service category.

Fourth, we assessed whether any changes to the billing determinants for each service category should be made in order for PJM to collect its costs from its members on an equitable basis going forward.

Q. Please describe the information on which you relied to perform your analyses.

A. Our analyses of PJM's service categories, cost assignments and allocations, and billing determinants were informed by interviews we conducted with PJM personnel and data we gathered from PJM. Interviews were conducted with PJM managerial staff with direct knowledge of PJM processes across all PJM divisions. The information we gathered included its organizational chart, details regarding the services provided by PJM, the activities performed by PJM staff, the purposes for which PJM's information technology equipment and software applications are used, the factors that influence the magnitude of PJM's costs, expected changes in PJM's costs in the near future, and the beneficiaries of the services PJM provides.

B. Service Category Analysis

Q. Please describe your process for evaluating PJM's service categories.

A. Our service category evaluation process included the following steps: (1) We reviewed PJM's existing tariff schedules and the description of the services provided under each schedule. (2) We reviewed PJM's internal organization and how it classifies activities associated with providing services. (3) We discussed service category definitions with

PJM staff during our interviews with them. In particular, we discussed the types of customers benefiting from each of the services provided and the activities PJM performed to provide each service. (4) We reviewed the service categories used by other RTO/ISOs.

Q. As a result of your evaluation, do you recommend any changes to PJM's service categories?

A. Yes, we recommend combining Schedule 9-4 Regulation and Frequency Response Administration Service with Schedule 9-3 Market Support Service.

Q. What is the basis for your recommendation?

A. Our evaluation of Schedule 9-4 revealed that the beneficiaries of Regulation and Frequency Response Administration Service and of Market Support Service are the same. In particular, load serving entities purchase energy and ancillary services using the services provided under Schedule 9-3 and use regulation and frequency response services (another ancillary service) provided under Schedule 9-4. Similarly, generators both sell energy and ancillary services using the services provided under Schedule 9-3 and provide regulation and frequency response services (under Schedule 9-4). Further, we found that the activities performed by PJM to provide Regulation and Frequency Response Administration Service are performed by the same people and by the same systems that administer other ancillary services provided under Schedule 9-3. Moreover, other RTO/ISOs include the administration of ancillary services as part of their energy market administrative tariffs.[14]

[14] CAISO 2021 Tariff Filing, p. 4; MISO Tariff Schedule 17, §I; SPP 2021 Tariff Filing, Tariff Schedule 1-A, §5; SPP, "Glossary: Ancillary Services," available at https://www.spp.org/glossary/?term=Ancillary%20Services.

Thus, we concluded that there is no incremental benefit to billing PJM customers separately for Regulation and Frequency Response Administration Service and for Market Support Service. PJM can simplify the administration of its tariff schedules by collapsing Schedule 9-4 into Schedule 9-3.

Q. Do you recommend any other changes to PJM's service categories?

A. No.

Q. What is the basis for leaving PJM's other service categories unchanged?

A. Although the specific services provided by PJM have grown in scale and complexity over the years, the types of services provided by PJM are largely unchanged. In particular, PJM continues to provide service in two primary categories: reliably operating and planning the bulk power system (*i.e.*, control area administration) and administering the wholesale power markets. Within its wholesale markets responsibilities, PJM continues to operate markets for the exchange of FTRs, energy and ancillary services, and capacity obligations and to provide billing, settlement, and credit management functions for those markets. These activities correspond to the service categories PJM defines in its tariff.

Next, our analysis of current activities and beneficiaries support maintaining the remaining service categories. In particular, the activities necessary to operate the bulk power system reliably (Schedule 9-1) are generally separated from the activities necessary to administer the wholesale markets, as reflected in PJM's divisional organization where there are separate divisions for Operations and Planning, whose activities are primarily attributable to reliably operating and planning the bulk power system, and Market Services, whose activities are primarily attributable to the remaining market-related service categories.

Additionally, some of PJM's members participate in its wholesale markets as financial participants, and thus do not benefit directly from the reliable operation of the bulk power system.

Similarly, the activities PJM performs to provide each of the market-related services are generally distinct, with particular people and systems administering the FTR markets, the energy and ancillary services markets, the capacity markets, and the billing, settlement, and credit functions associated with PJM Settlement, Inc. Further, not all wholesale market participants participate equally in each of the different types of markets, some participate in only one market, while others participate in multiple markets.

Thus, we concluded that PJM's remaining service categories (after combining Schedules 9-3 and 9-4) are aligned with the services that PJM provides its membership.

Q. Did your recommendation result in any changes to PJM's tariff schedules?

A. Yes, PJM eliminated Schedule 9-4 and combined its activities and costs into Schedule 9-3. PJM also relabeled Schedule 9-5, representing Capacity Resource and Obligation Management Service, as Schedule 9-4. Additionally, PJM added a new tariff schedule, Schedule 9-5 Management Service Cost. However, Schedule 9-5 is not an additional service category, but rather sets out the procedure for allocating overhead and administrative costs to the five service categories, discussed in more detail below.[15]

[15] Proposed Tariff, Schedule 9-5 (included in this filing as Attachment B, Revisions to the PJM Tariff (clean)).

C. Cost Assignment and Allocation

1. The Cost Assignment and Allocation Process

Q. Please summarize the process by which PJM's divisional costs were assigned and allocated to PJM's service categories for the test year.

A. We first directly assigned PJM's divisional costs to the five service categories selected in the previous step, to divisional overhead, or to Schedule 9-5 Management Service Cost.[16] We then allocated divisional overhead expenses to the five service categories. Using the directly assigned costs and proportionally allocated divisional overhead for 2019, we calculated the share of each division's 2019 costs attributable to each of the service categories and to Schedule 9-5 Management Service Cost. These shares provide the basis for the divisional cost assignments to each service category in PJM's updated tariff.

Next, we allocated Management Service Costs to the five service categories. The resulting allocations to the five service schedules are provided in Schedule 9-5 Management Service Cost in PJM's updated tariff.[17]

[16] As defined in Schedule 9-5 of PJM's updated tariff, Schedule 9-5 Management Service Cost "comprises the cost of overhead and administrative activities performed by PJM which support PJM's provision of the services described in subsidiary Schedules 9-1 through 9-4 and Schedule 9-PJMSettlement of this Schedule 9." *See* Proposed Tariff, Schedule 9-5 (included in this filing as Attachment B, Revisions to the PJM Tariff (clean)).

[17] The costs of Schedule 9-PJMSettlement are currently directly assigned based on actual costs incurred by PJM Settlement, Inc. Going forward, PJM will assign and allocate costs to Schedule 9-PJMSettlement based on the percentages developed in this cost of service study.

2. Direct Assignment of Divisional Costs to Service Categories

Q. How did you determine the direct assignments for PJM's divisional costs?

A. PJM's activities are organized under nine divisions: (Presidents, CFO & Treasurer, Corporate Client Services, Law and Compliance, State & Member Services, Market Services, System Operations, System Planning, and Information & Technology Services). Within each division, PJM's activities are further subdivided into a number of cost centers based on the activities performed. Thus, we first evaluated the function of each cost center and the services each provides though our interviews with PJM staff and gathering and analyzing data PJM made available to us.

Based on our interviews with PJM personnel and our analysis of the data we gathered, the activities of certain cost centers are closely aligned with specific service categories, while other cost centers' activities span multiple service categories or are limited to providing support services (*e.g.*, facilities management or administrative services). Where possible, we directly assigned cost centers, or portions thereof, to specific service categories based on the data we gathered from PJM. For example, PJM's Information & Technology Services division tracks the equipment and software applications in service as well as the purpose for which the equipment and software is used, which allows it to be directly assigned to service categories. Similarly, there are many instances where the data we gathered from PJM indicate that particular staff can be directly assigned to PJM service categories or a cost center's expenses can be assigned on a percentage basis to PJM service categories based on its responsibilities.

For cost centers providing support services to other areas of PJM, we classified these costs as divisional overhead or Management Service Costs depending on the specific areas of PJM supported by these cost centers according to the information we gathered from PJM.

3. Divisional Overhead and Management Service Cost Allocation to Service Categories

Q. How did you allocate divisional overhead and Management Service Costs to the service categories?

A. To allocate divisional overhead, we first allocated certain divisional overhead expenses to Schedule 9-PJMSettlement based on information we gathered from PJM, including intercompany billing data. We then proportionally allocated the remaining divisional overhead expenses to Schedules 9-1 to 9-4 based on the 2019 costs that were directly assigned to these four service categories. Using the directly assigned costs and proportionally allocated divisional overhead for 2019, we calculated the share of each division's 2019 costs attributable to each of the service categories and to Schedule 9-5 Management Service Cost.

To allocate Management Service Costs, we first we allocated 2.1 percent of total Management Service Costs to Schedule 9-PJMSettlement based on information received from PJM. The remaining Management Service Costs were then allocated proportionally to Schedules 9-1 to 9-4 based on the shares of Schedules 9-1 to 9-4 costs that were assigned to each of these four service categories either directly or proportionally from divisional overhead.

Q. Please describe the basis for the allocation of divisional overhead and Management Service Costs to Schedule 9-PJMSettlement.

A. The allocations of divisional overhead and Management Service Costs to Schedule 9-PJMSettlement were based on PJM's data on the amount of Management Service Costs, *i.e.*, overhead and administrative costs, attributable to PJM Settlement services. Currently, the costs of PJM Settlement, Inc. Administrative Services are tracked and billed to members separately and thus, data were available on the overhead and administrative costs specifically attributable to Schedule 9-PJMSettlement.

Q. What costs did you use to proportionally allocate the divisional overhead and Management Service Costs to the other four service categories?

A. To allocate divisional overhead, we used the proportion of total divisional costs that were directly assigned to the four service categories within each division. We then added these proportionally allocated divisional overhead costs to the total directly-assigned divisional costs. Next, we calculated the proportion of total directly assigned and proportionally allocated divisional costs for each service category, which we used as the basis for allocating Management Service Costs to the four service categories.[18]

[18] Using total costs is a sensible approach because it captures the contribution of all types of costs that materially contribute to the delivery of the tariff services. However, either choice provides a reasonable basis for allocating overhead expenses (*see, e.g.*, NARUC Manual, pp. 15, 105-106) and the end results for PJM are not sensitive to the choice.

4. Assignment of Non-Divisional Costs to Service Categories

Q. How are PJM's non-divisional costs assigned to service categories?

A. PJM's non-divisional costs consist of project-specific costs for on-going capital projects and depreciation expenses for assets in service. The costs associated with each project and asset are directly assigned by PJM personnel to service categories based on the purpose of each project or asset.

5. Evaluation of Known and Measurable Changes to PJM's Expenses

Q. Please describe the known and measurable changes you account for in your cost of service study.

A. Between 2019 and 2021, certain minor organizational changes within PJM occurred resulting in new cost centers or changes in the functions of existing cost centers within the Presidents, CFO & Treasurer, and Law and Compliance divisions. These changes in responsibilities shifted the allocations of costs across service categories for cost centers in these divisions and also caused material changes in the 2021 budgets for these cost centers relative to 2019 expenditures. Consequently, the resulting cost assignments at the division level for these three divisions were notably different using 2021 budgeted expenses versus 2019 actual expenditures.

In particular, as part of PJM's enhancement of its credit monitoring and risk management services, the budget for credit monitoring and risk management services increased materially in 2021 relative to 2019. In addition, certain activities related to these services were consolidated in the Presidents division, which shifted some activities, and the costs of those activities, from the CFO & Treasurer division to the Presidents division. These organizational changes also facilitated direct assignment of the costs of these activities to the market-related service categories. In the Presidents division, this resulted in an increased budget and increased shares of costs being assigned to the market-related service categories. In the CFO & Treasurer division, this resulted in a decreased budget and a larger share of costs assigned to Schedule 9-PJMSettlement, though the dollar amount budgeted for Schedule 9-PJMSettlement in this division did not change relative to 2019.

In the Law and Compliance division, the activities of certain cost centers were reorganized in order to group together similar activities and responsibilities. For example, compliance activities related to North American Electric Reliability Corporation requirements were consolidated in one cost center and activities related to FERC requirements were consolidated in another, allowing for more direct cost assignments. Additionally, our analysis of attorney assignments and outside counsel budgets indicated changes occurred in the allocation of tasks across service categories between 2019 and 2021 that were expected to continue into the future. For example, PJM's enhancements to its credit monitoring and risk management services increased the share of costs assigned to the market-related service categories and reduced the share of costs attributable to Management Service Costs.

In view of the known and measurable changes in the budgets for the Presidents, CFO & Treasurer, and Law and Compliance divisions, we used 2021 budgeted expenses for all divisions to be consistent when developing the final cost assignments and allocations for PJM's updated tariff.

Q. How did you incorporate known and measurable changes to PJM's divisional expenses in your cost assignment and allocation process?

A. The initial cost assignments and allocations were prepared using expense data by cost center from the test year, 2019.[19] The process was then repeated using data on budgeted expenses for 2021 accounting for the organizational changes discussed above.[20]

Next, as we show in **Exhibit No. PJM-0014**, for the three divisions with material changes—Presidents, CFO & Treasurer, and Law & Compliance—we replaced the 2019 division-level cost assignments to the five service categories and Schedule 9-5 Management Service Cost, with the 2021 versions. Additionally, to reflect the changes in PJM's budget at the division-level for 2021 relative to its 2019 expenditures, we replaced the 2019 actual division-level expenses with 2021 budgeted division-level expenses. We then used the combined 2019/2021 data to compute the final shares of PJM's total costs assigned to the five service categories and to Schedule 9-5 Management Service Cost, which are shown in row B of **Exhibit No. PJM-0014** and in PJM's updated tariff in Schedules 9-1 through 9-5 and 9-PJMSettlement.

The process for allocating Management Service Costs, described in **Section III.C.3**, was then performed using the combined 2019/2021 data, as we show in **Exhibit No. PJM-0014**. The resulting shares of Management Service Costs to assign to each of the five

[19] **Exhibit No. PJM-0016** and **Exhibit No. PJM-0017** provide more detail on the assignments by cost center and the assignment and allocation process and results for 2019.
[20] **Exhibit No. PJM-0018** and **Exhibit No. PJM-0019** provide more detail on the assignments by cost center and the assignment and allocation process and results for 2021.

service categories are shown in row I of **Exhibit No. PJM-0014** and in PJM's updated tariff in Schedule 9-5.

Q. Did you also incorporate known and measurable changes to PJM's non-divisional expenses in your cost assignment and allocation process?

A. Yes, to analyze the proportion of PJM's total costs associated with each service category for purposes of comparison with PJM's existing allocations, we rely on the known and measurable 2021 budgeted non-divisional costs. These costs consist of depreciation and project-specific costs, as assigned by PJM personnel to the five service categories.

6. Results of Cost Assignment and Allocation Process

Q. Please describe the results of the cost assignment and allocation process.

A. As shown in **Exhibit No. PJM-0014**, divisional costs will be assigned as follows under the updated tariff: 33.5 percent to Schedule 9-1 Control Area Administration Service, 2.4 percent to Schedule 9-2 FTR Administration Service, 11.8 percent to Schedule 9-3 Market Support Service, 4.2 percent to Schedule 9-4 Capacity Resource and Obligation Management Service, 4.0 percent to Schedule 9-PJMSettlement PJM Settlement, Inc. Administrative Services, and 44.1 percent to Schedule 9-5 Management Service Cost. The Schedule 9-5 Management Service Cost assignment, representing overhead and administrative costs, will then be allocated across the other schedules as follows: 63.3 percent to Schedule 9-1, 4.5 percent to Schedule 9-2, 22.3 percent to Schedule 9-3, 7.8 percent to Schedule 9-4, and 2.1 percent to Schedule 9-PJMSettlement.

Q. Did the cost of service study result in major changes in the shares of PJM's total costs associated with each service category relative to the shares that prevailed under the existing method?

A. No. As shown in **Exhibit No. PJM-0015**, in 2019, 58.8 percent of PJM's total costs (*i.e.*, divisional and non-divisional costs) were assigned to Schedule 9-1 Control Area Administration Service, while under the updated assignments, 60.8 percent are assigned to Schedule 9-1.[21] Similarly, in 2019, 4.2 percent of PJM's total costs were assigned to Schedule 9-2 FTR Administration Service, while under the updated assignments, 4.5 percent of costs are assigned to Schedule 9-2. In 2019, 29.9 percent of PJM's total costs were assigned to Schedule 9-3 Market Support Service,[22] while under the updated assignments 22.9 percent of PJM's total costs are assigned to Schedule 9-3. In 2019, 3.9 percent of PJM's total costs were assigned to Schedule 9-4 Capacity Resource and Obligation Management Service, while under the updated assignments 7.2 percent of PJM's total costs are assigned to Schedule 9-4. Lastly, in 2019, 3.2 percent of PJM's total costs were assigned to Schedule 9-PJMSettlement PJM Settlement, Inc. Administrative Services, while under the updated assignments, 4.6 percent PJM's total costs are assigned to Schedule 9-PJMSettlement.

[21] The updated assignments of total costs incorporate budgeted 2021 divisional costs, assigned as described above, and budgeted 2021 non-divisional costs, as assigned by PJM staff to the service categories. The process and results are detailed in **Exhibit No. PJM-0020**.

[22] For purposes of comparison, the share of costs assigned to Schedule 9-3 Market Support Service for 2019 includes the costs assigned to Schedule 9-4 Regulation and Frequency Response Administrative Service in 2019 under the current tariff.

Q. Why did the share of costs assigned to Schedule 9-3 Market Support Service fall, while the share of costs assigned to the other schedules increased?

A. In recent years, the costs associated with credit monitoring and risk management that are associated with Schedule 9-PJMSettlement have risen relative to the costs associated with running the energy and ancillary services markets as have the costs associated with running the capacity market (Schedule 9-4). In particular, PJM has enhanced its credit monitoring and risk management services, including hiring a Chief Risk Officer, to better protect its members and the RTO. Additionally, the costs associated with administering the capacity market have risen over time due to the increasing complexity of the market and interactions with stakeholders regarding market design. This has led to larger shares of costs assigned to Schedule 9-4 and Schedule 9-PJMSettlement and a smaller share to Schedule 9-3, changes which are expected to be long-lasting.

D. Billing Determinants and Tariff Rates

Q. Please describe PJM's current billing determinants for each service category.

A. The current billing determinants for Schedule 9-1 Control Area Administration Service are volumetric and based on real-time load (MWh) and point-to-point transmission use (MWh). The current billing determinants for Schedule 9-2 FTR Administration Service include volumetric determinants based on the amount of FTRs in effect each hour of the month (MW) and bid-based determinants based on the number of bids submitted into the FTR markets. The current billing determinants for Schedule 9-3 Market Support Service include volumetric determinants based on real-time load (MWh), generation (MWh), transmission use (MWh), and imports (MWh), as well as cleared decrement bids (MWh), increment offers (MWh), and up-to-congestion energy (MWh) in the day-ahead energy market. The Schedule 9-3 billing determinants also include bid-based determinants based on the number of bids and offers submitted in the day-ahead energy market and generation re-bidding period. The current billing determinants for Schedule 9-4 Capacity Resource and Obligation Management Service include volumetric determinants based on each participant's capacity obligations (MW) and capacity provided to the market (MW). Schedule 9-PJMSettlement PJM Settlement, Inc. Administrative Services currently relies on the same volumetric determinants as are used for Schedule 9-3 Market Support Service.

Q. What is the rationale for using both bid-based and volumetric determinants for Schedules 9-2 and 9-3?

A. In operating the FTR markets as well as the energy and ancillary services markets, PJM employs software to solve for the optimal market clearing prices and quantities given the bids and offers submitted. The larger the number of bids and offers submitted, the more difficult it is for the software to find the optimal solution. Thus, increased numbers of bids and offers, holding the total quantity of power bid or offered to the market (MWh) constant, increases the computational power PJM requires, as well as the amount of data storage required, thus increasing PJM's operating costs. To equitably pass these costs along to its members and ensure members take them into account when choosing how to place bids and offers, PJM utilizes a two-part charge for these services: one based on the number of bids and offers submitted (bid-based determinants) and one based on the quantity of power input (*e.g.*, generation, imports) or withdrawn (*e.g.*, load, exports) from the system (volumetric determinants).[23]

Q. What shares of the costs assigned to Schedules 9-2 and 9-3 are assigned to be collected via volumetric determinants vs. bid-based determinants?

A. For Schedule 9-2, 60.0 percent of divisional costs are assigned to volumetric determinants and 40.0 percent of divisional costs are assigned to bid-based determinants. For Schedule 9-3, 98.7 percent of divisional costs are assigned to volumetric determinants and 1.3 percent of divisional costs are assigned to bid-based determinants. As with other non-divisional costs, PJM assigns non-divisional costs for Schedule 9-2 and 9-3 projects to bid-based or volumetric determinants on a project-by-project basis.

Q. What is the basis for those shares?

A. We understand that these cost assignments are based on information technology requirements and PJM's experience managing its energy and FTR market clearing processes. We have reviewed the data and analysis performed by PJM to derive these shares, as described in greater detail in PJM's testimony,[24] and find the assignments to be reasonable.

[23] CAISO and ISO-NE similarly use both bid-based and volumetric charges to recover the costs of running their markets. *See* CAISO 2021 Tariff Filing, p. 4; ISO-NE 2021 Tariff Filing, pp. 17-18.
[24] Prepared Direct Testimony of Lisa M. Drauschak on Behalf of PJM Interconnection, L.L.C. (included in this filing as Exhibit No. PJM-0001).

Q. Do you recommend any changes to PJM's current billing determinants?

A. Yes, we recommend changes to the Schedule 9-PJMSettlement billing determinants; however, we recommend that the billing determinants for the other tariff schedules remain unchanged.

Q. How do you recommend changing the Schedule 9-PJMSettlement billing determinants?

A. We recommend that the billing determinant of Schedule 9-PJMSettlement be changed to the number of invoices sent to members by PJM Settlement, Inc. each month.

Q. Why do you recommend this change to the billing determinants for Schedule 9-PJMSettlement?

A. The costs associated with Schedule 9-PJMSettlement are currently recovered by a formulaic rate and utilize the same volumetric billing determinants as Schedule 9-3 because any costs collected via Schedule 9-PJMSettlement offset customer's bills under Schedule 9-3. This means that while nearly all of PJM's members use PJM's settlement services, only customers participating in the energy and ancillary services markets pay the costs of PJM Settlement, Inc. This notably excludes those members who participate only in FTR markets, the numbers of which have grown over the years.

Additionally, through our interviews with PJM staff, we identified that the current billing determinants for Schedule 9-PJMSettlement, the volume of energy input into and withdrawn from PJM's system, are not significant determinants of PJM Settlement, Inc.'s costs. Instead, the main driver of the costs of PJM Settlement, Inc.'s services is the number of bills sent out each month. Thus, we recommend using the number of bills issued per month by PJM Settlement, Inc. as the billing determinant for Schedule 9-PJMSettlement.

Q. Why do you recommend leaving the billing determinants for the other schedules unchanged?

A. Through our interviews with PJM staff, we concluded that for the other tariff schedules, the billing determinants are appropriately aligned with the factors that cause costs to change over time. For example, the costs associated with operating PJM's bulk power system (Schedule 9-1) are primarily related to the amount of demand for power (load) and transmission service. Similarly, the costs associated with operating the various markets are attributable to number of bids and offers submitted as well as the quantity of supply (*e.g.*, generation) and demand (*e.g.*, load) cleared in the markets. Thus, we do not recommend any changes to the billing determinants for Schedules 9-1 through 9-4 at this time.

IV. RATE DESIGN

Q. Do you support PJM's proposal to change to a formula rate from its current stated rate?

A. Yes, we find PJM's proposed formula rate to be a preferable alternative to its current stated rate. The proposed formula rate equitably aligns PJM users' costs with the services PJM provides, ensures revenue adequacy by recovering PJM's costs on a timely basis, and does not require the stated rate's large cash reserve fund. Moreover, a formula rate reduces intra-year rate volatility arising from the stated rate's required cost over-collections and refunds. Finally, a formula rate eliminates the need to project and "state" rates for several years into the future. We support PJM's proposal to adopt a formula rate.

Q. What are the key design features of PJM's current stated rate?

A. The key design features of PJM's current stated rate are: (1) Rates set several years in advance based on long-term PJM administrative cost and system usage projections; (2) Maintenance of a built-in cash reserve designed to provide a cushion against unforeseen cost and revenue variations; and (3) Planned overcollection of operational costs with intra-year rate adjustments (refunds) to manage intra-year misalignment of costs and revenues.

Q. How has PJM's stated rate worked in practice?

A. The stated rate meets PJM's revenue adequacy objectives, but the rate design requires regular rate adjustments and introduces potential longer-term cost and revenue misalignments. In particular, stated rates are defined annually and derived using future projections of PJM's historically predictable administrative costs (including a cash reserve that is six percent of projected revenues under the aforementioned service categories)[25] and expected system usage (*i.e.*, projected billing determinants).[26] As such, stated rates are designed to collect revenues that are higher than PJM's costs, particularly during high system usage seasons (*e.g.*, winter and summer). Moreover, because stated rates are designed to collect annual revenues that exceed PJM's annual costs, PJM's cash reserve

[25] The current cash reserve is approximately $18 million. Under the current tariff, the cash reserve is equal to six percent of PJM's revenues projected to be collected under Schedules 9 -1 through 9-5 during the current calendar year (exclusive of any credits to Schedules 9-1 through 9-5 charges associated with a refund applied during the preceding calendar quarter(s)). *See* PJM Tariff, Schedule 9, PJM Interconnection, L.L.C. Administrative Services.
[26] *See* Prepared Direct Testimony of Lisa M. Drauschak on Behalf of PJM Interconnection, L.L.C., PJM Interconnection, L.L.C., Federal Energy Regulatory Commission Docket No. ER17-249-000, Exhibit No. PJM-014, October 31, 2016.

target is regularly exceeded. When the cash reserve target is exceeded PJM must refund to its members the revenue overcollections; in practice, refunds occur via quarterly rate adjustments and system users' actual realized rates vary quarterly.

In addition, because the rates are set for each service category far in advance of when the rates will be in effect, the rate design can result in cost and revenue mis-alignment and create rate collection inequities over time. For example, system usage (measured by billing determinants) projections underlying stated rates will not be the same as realized system usage. As usage changes, stated rate revenue collection varies and over time becomes misaligned with the cost projections used to derive the rates. Restoring equity among ratepayers (*i.e.*, restoring cost and revenue alignment), then requires further adjustments to the rates.[27]

In contrast, a formula rate better maintains ratepayer equity, ensures revenue adequacy, and eliminates the need for a large cash reserve to manage revenue fluctuations.

Q. What are the key features of PJM's proposed formula rate?

A. The key design features of PJM's proposed formula rate are: (1) monthly rates that are derived based on the actual costs PJM incurs during the month and the actual services provided by PJM in that month; (2) no cash reserve; (3) no refunding or reconciliation

[27] For example, under its current tariff, when PJM collects excess revenue from its members, it refunds that revenue to its members. Prior to late 2020, this was done by allocating the revenue to the service categories according to fixed percentages; however given changes in Schedule 9-2 billing determinants relative to the changes in the billing determinants of other schedules, the refund amounts allocated to Schedule 9-2 underrepresented the amount of excess revenue received from Schedule 9-2, necessitating a change in PJM's tariff language. Changes to Administrative Charge Refund Provisions, FERC, Docket No. ER21-274-000, October 30, 2020, pp. 1-6.

mechanism. PJM's formula rate proposal is very straightforward: PJM will collect the actual costs it incurs each month from those users of its services for that same month.

Q. As economists, what are the primary differences you identify between the proposed formula rate and the current stated rate?

A. We observe four key economic differences between a formula rate and a stated rate. First, a formula rate maintains ratepayer equity; the rate aligns costs and revenues on a monthly basis ensuring system users are charged based on actual costs incurred by PJM to provide the services. Second, formula rates ensure PJM's revenue adequacy. Third, formula rates avoid the need to maintain and manage a large cash reserve allowing ratepayers to retain the funds. Fourth, intra-year rate volatility is reduced as large rate refund adjustments are unnecessary.[28]

Q. Do you have any concerns with PJM moving to a formula rate?

A. No. While a stated rate, in some circumstances, may provide an incentive for more disciplined cost control than a formula rate, we do not find this concern to be relevant. We do not believe that the formula rate proposed by PJM would reduce PJM's incentives to control its costs due to the significant oversight role of PJM's Finance Committee. PJM's Finance Committee is composed of representatives for PJM and its members and has oversight over PJM's actual and budgeted capital expenditures and operating expenses, as well as the budget process and long-range planning, giving it both the incentive and ability

[28] Prepared Direct Testimony of Lisa M. Drauschak on Behalf of PJM Interconnection, L.L.C. (included in this filing as Exhibit No. PJM-0001).

to monitor any proposed increases in expenditures.[29] In addition, PJM has proposed updates to the review protocol based on feedback from the PJM Finance Committee to strengthen its oversight of costs and rates going forward, including a commitment to update the cost of service study every five years beginning in 2027.[30] PJM's long history of carefully monitoring and controlling its costs and working closely with the Finance Committee eliminate any concern that may arise when moving from a stated rate to a formula rate.

Q. Please summarize why you support PJM's proposal to adopt a formula rate.

A. Formula rates are aligned with the standard ratemaking principles of equitably ensuring revenue adequacy while minimizing rate volatility.[31] In contrast, stated rates rely on long-term revenue and cost projections that expose PJM and its members to unforeseen changes in underlying costs and usage patterns. In particular, because system usage projections are subject to considerable uncertainty, revenues and costs are likely to become misaligned over time leading to ratepayer inequities. Moreover, the stated rate's response to these uncertainties—a large cash reserve and frequent refunds—unnecessarily introduces further rate design complexity.

Finally, PJM's formula rate proposal is closely aligned with the rate designs used by other RTO/ISOs. For example, MISO uses a formula rate whereby members are charged each

[29] "Finance Committee," PJM, https://www.pjm.com/committees-and-groups/committees/fc.
[30] Other changes include committing to provide the finance committee with five-year projections of the tariff rates for Schedules 9-1 to 9-4 and 9-PJMSettlement as well as information on the assignments of non-divisional costs to the five service categories. *See* Prepared Direct Testimony of Lisa M. Drauschak on Behalf of PJM Interconnection, L.L.C. (included in this filing as Exhibit No. PJM-0001).
[31] Bonbright, J., *Principles of Public Utility Rates,* Columbia University Press, 1961, pp. 49-50, 78.

month based on budged expenses for each service category, calculated based on the formula described in its tariff, and forecasted billing determinants for each month.[32] Members are also billed each month for deviations between forecasted and actual expenses and determinants in the previous month to true up the amount collected with actual costs.[33] SPP also uses a formula rate design (implemented in 2021) where the rates are set once per year based on annual budgets and an excel template, provided as an addendum to its tariff, which assigns and allocates costs to its service categories.[34] Rates are trued up for over/under recovery the next year.[35]

Thus, we find PJM's proposed formula rate to be a reasonable substitute for its current stated rate.

Q. Does this conclude your testimony?

A. Yes, it does.

[32] *See, e.g.*, MISO Tariff Schedule 10, §§ II.A, III-IV.
[33] *See, e.g.*, MISO Tariff Schedule 10, § II.A.
[34] SPP 2021 Tariff Filing, p. 2, Tariff Schedule 1-A, and Addendum 1 ("2021 formula rate template_final.xlsx" and "2021_supporting schedules-final.xlsx").
[35] SPP 2021 Tariff Filing, Tariff Schedule 1-A and Addendum 1 ("2021 formula rate template_final.xlsx").

Exhibit No. PJM-0012

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Mr. Cavicchi is an expert on the economics of wholesale and retail electricity markets. With more than 20 years of consulting experience, he advises a wide range of clients on issues associated with wholesale power market design and market power mitigation frameworks, wholesale and retail contracting practices, and regulatory and contract disputes arising in these marketplaces. In these engagements, Mr. Cavicchi has conducted economic analyses evaluating the impact of regulatory policies on electricity markets, applied rigorous analytical modeling tools to power system operations, evaluated contracting disputes and assessed financial damages, analyzed the effectiveness of market power mitigation frameworks in conjunction with antitrust analyses, and led economic investigations of market participant bidding behavior associated with allegations of market manipulation. He has extensive experience as an expert witness before the Federal Energy Regulatory Commission (FERC) and other federal and state regulatory authorities and has provided testimony in court and arbitration proceedings. Mr. Cavicchi presents and publishes frequently on issues relevant to electricity market design and evolution. He is a registered professional mechanical engineer in the Commonwealth of Massachusetts.

EDUCATION

1997	S.M., technology policy, Massachusetts Institute of Technology
1992	S.M., environmental engineering, Tufts University
1987	B.S., mechanical engineering, University of Connecticut

PROFESSIONAL EXPERIENCE

2019–Present	Analysis Group *Vice President*
1997–2019	Compass Lexecon *Executive Vice President/Senior Vice President (2007–2019)* *Vice President (2001–2006)* *Consultant/Senior Consultant (1997–2001)*
1989–1997	Massachusetts Institute of Technology *Research Assistant/Engineer (1995–1997)* *Project Manager/Staff Mechanical Engineer (1989–1995)*
1987–1988	Carrier Building Systems and Services *Project Engineer*

SELECTED CONSULTING EXPERIENCE

Electric Generation Companies, Trade Associations, and Independent System Operators

Conducts power system economic analyses to investigate the interaction of regulatory policies and rules with wholesale power markets, the results of which from the basis for a wide variety of reports, presentations, and papers. Conducts wholesale market power screening analyses and evaluates the impacts of mergers and acquisitions on wholesale and retail markets. Analyzes power market designs and runs workshops and seminars on power market design features.

Electricity Generation and Transmission Facility Developers

Oversees the development and implementation of security-constrained unit commitment and dispatch modeling for proposed electricity generation units and transmission facilities located in the Northeastern, Mid-Atlantic, and Midwestern US. The analyses typically focus on going-forward generation and transmission resource economic evaluations, and on assessing the impacts of different resource mixtures on local and regional air pollutant emissions and projected wholesale and retail electricity prices. In addition, these analyses often include an estimate of the impact of particular resource investments on social welfare.

SELECTED EXPERT TESTIMONY

- **PPL Electric Utilities Corporation**
  Before the Pennsylvania Public Utility Commission, *Docket No. P-2020-3019356, PPL Electric Utilities Corporation*
  Statement No. 2. Direct Testimony of A. Joseph Cavicchi, March 25, 2020. Written, Public.
  Statement No. 2-R. Rebuttal Testimony of A. Joseph Cavicchi, July 23, 2020. Written, Public.

- **PJM Power Providers Group**
  United States of America, Before the Federal Energy Regulatory Commission, Docket Nos. ER19-1486-000 and EL19-58-000
  Affidavits of A. Joseph Cavicchi on behalf of the PJM Power Providers ("P3") Group, May 15, 2019 and June 20, 2019. Written, Public.

- **NextEra Energy Resources, LLC**
  United States of America, Before the Federal Energy Regulatory Commission, Docket No. ER18-1639-000
  Answering Testimony of A. Joseph Cavicchi on behalf of NextEraEnergy Resources, LLC, August 23, 2018. Written, Public and Confidential. Deposition Testimony of A. Joseph Cavicchi, September 10, 2018. Oral, Public. Testimony of A. Joseph Cavicchi, October 8, 2018, Oral, Public and Confidential.

- **CXA La Paloma, LLC**
  United States of America, Before the Federal Energy Regulatory Commission. RE : CXA La Paloma, LLC v. California Independent System Operator Corporation, Docket No. EL18-177
  Affidavit of Jeffrey Tranen and Joseph Cavicchi, June 20, 2018. Written, Public.

- **Talen Montana, LLC and Talen Energy Marketing, LLC**
  United States of America, Before the Federal Energy Regulatory Commission. RE : Triennial Market-Based Rate Update for the Northwest Region, Talen Montana, L.L.C. et al., Dockets ER 15-2013 et al.
  Affidavit of A. Joseph Cavicchi, April 27, 2018. Written, Public.

- **Talen Montana, LLC and Talen Energy Marketing, LLC**
  United States of America, Before the Federal Energy Regulatory Commission. RE : Triennial Market-Based Rate Update for the Northwest Region, Talen Montana, L.L.C. et al., Dockets ER 10-2016 et al.
  Affidavit of A. Joseph Cavicchi, December 20, 2016. Written, Public.

- **PPL Electric Utilities Corporation and LG&E Energy Marketing Inc.**
  United States of America, Before the Federal Energy Regulatory Commission. RE : Triennial Market-Based Rate Update for the Northeast Region, PPL Electric Utilities Corporation et al., Dockets ER 10-2010 et al.
  Affidavit of A. Joseph Cavicchi, December 20, 2016. Written, Public.

- **NextEra Energy Resources, LLC**
  Before the Commonwealth of Massachusetts, Department of Public Utilities, *Docket D.P.U. 16-05*, *Petition for Approval of Gas Infrastructure Contracts with Algonquin Gas Transmission Co. for the Access Northeast Project*
  Direct Testimony of Joseph P. Kalt and A. Joseph Cavicchi, June 20, 2016 (corrected June 28, 2016), Written, Public and Confidential. Surrebuttal Testimony of Joseph P. Kalt and A. Joseph Cavicchi, July 18, 2016. Written, Public and Confidential.

- **NextEra Energy Resources, LLC**
  Before the Commonwealth of Massachusetts, Department of Public Utilities, *Docket D.P.U. 15-181*, *Petition for Approval of Gas Infrastructure Contracts with Algonquin Gas Transmission Co. for the Access Northeast Project*
  Direct Testimony of Joseph P. Kalt and A. Joseph Cavicchi, June 13, 2016 (corrected June 28, 2016), Written, Public and Confidential. Surrebuttal Testimony of Joseph P. Kalt and A. Joseph Cavicchi, July 12, 2016. Written, Public and Confidential.

- **PPL Electric Utilities Corporation**
  Before the Pennsylvania Public Utility Commission, *Docket No. P-2016-2526627, PPL Electric Utilities Corporation*
  Statement No. 2. Direct Testimony of A. Joseph Cavicchi, January 29, 2016. Written, Public. Statement No. 2-Supp. Supplemental Testimony of A. Joseph Cavicchi, March 9, 2016, Written, Public. Statement No. 2-R Rebuttal Testimony of A. Joseph Cavicchi, May 23, 2016. Written, Public.

- **Calpine Corporation et al.**
  United States of America, Before the Federal Energy Regulatory Commission. Calpine Corporation et al., Complainants v. PJM Interconnection, L.L.C., Respondent. RE: Complaint Requesting Fast Track Processing, PJM Interconnection, L.L.C., Docket No. EL 16-49-000
  Affidavit of A. Joseph Cavicchi, March 21, 2016. Written, Public.

- **PJM Power Providers Group**
  Before the Public Utilities Commission of Ohio, *In the Matter of the Application Seeking Approval of Ohio Power Company's Proposal to Enter into an Affiliate Power Purchase Agreement for Inclusion in the Power Purchase Agreement Rider, Case No. 14-1693-EL-RHR et al.*

Supplemental Testimony of A. Joseph Cavicchi on behalf of the PJM Power Providers Group and The Electric Power Supply Association, December 28, 2015. Written, Public and Confidential. Deposition of A. Joseph Cavicchi on behalf of the PJM Power Providers Group and The Electric Power Supply Association, January 5, 2016. Deposition Testimony of A. Joseph Cavicchi, January 5, 2016. Testimony of A. Joseph Cavicchi, January 7, 2016. Oral, Public.

- **Exelon Generation Company, LLC**
  United States of America, Before the Federal Energy Regulatory Commission, *San Diego Gas & Electric Company v. Sellers of Energy and Ancillary Services, Into Markets Operated by the California, Independent System Operator Corporation, And the California Power Exchange, Docket EL 00-95-280 et al.*
  Affidavit of A. Joseph Cavicchi in Support of the Exelon Generation Company, LLC's Fuel Cost Allowing Filing, December 4, 2015. Written, Public.

- **PJM Power Providers Group**
  Before the Public Utilities Commission of Ohio, *In the Matter of the Application Seeking Approval of Ohio Power Company's Proposal to Enter into an Affiliate Power Purchase Agreement for Inclusion in the Power Purchase Agreement Rider*, *Case No. 14-1693-EL-RHR et al.*
  Direct Testimony of A. Joseph Cavicchi on behalf of the PJM Power Providers Group and The Electric Power Supply Association, September 11, 2015, Written, Public and Confidential. Testimony of A. Joseph Cavicchi on behalf of the PJM Power Providers Group and The Electric Power Supply Association, October 20, 2015. Oral, Public.

- **Iberdrola Renewables, LLC**
  United States of America, Before the Federal Energy Regulatory Commission, Docket Nos. EL02-60-007 and EL02-62-006, consolidated
  Prepared Answering Testimony of A. Joseph Cavicchi on behalf of Iberdrola Renewables, LLC, July 21,2015 Written, Public & Confidential. Deposition of A. Joseph Cavicchi on behalf of the Iberdrola Renewables, LLC, September, 24, 2015. Oral, Confidential. Testimony of A. Joseph Cavicchi, December 3, 2015. Oral, Public.

- **PPL Electric Utilities Corporation**
  Before the Pennsylvania Public Utility Commission, *Docket No. P-2014-2417907, PPL Electric Utilities Corporation*
  Statement No. 2. Direct Testimony of A. Joseph Cavicchi, April 25, 2014, Written, Public. Statement No. 2-R Rebuttal Testimony of A. Joseph Cavicchi, July 28, 2014. Written, Public.

- **San Diego Gas and Electric Company**
  Naturener USA, LLC, et al. v. San Diego Gas & Electric Company, in the Montana Ninth Judicial District Court, Toole County, Declaration, January 22, 2014. Non-Public.

- **PPL EnergyPlus**
  United States of America, Before the Federal Energy Regulatory Commission. RE : Triennial Market-Based Rate Update for the Northeast Region, PPL Electric Utilities Corporation et al., Dockets ER 10-2010 et al.
  Affidavit of A. Joseph Cavicchi, December 31, 2013. Written, Public.

- **PPL EnergyPlus**
  United States of America, Before the Federal Energy Regulatory Commission. RE : Triennial Market-Based Rate Update for the Northwest Region, PPL EnergyPlus LLC et al., Dockets ER 10-2011 et al.
  Affidavit of A. Joseph Cavicchi, December 31, 2013. Written, Public.

- **Transalta Energy Marketing**
  United States of America, Before the Federal Energy Regulatory Commission, *Puget Sound Energy, Inc., Complainant v. All Jurisdictional Sellers of Energy and/or Capacity at Wholesale into Electric Energy and/or Capacity Markets in the Pacific Northwest, Including Parties to the Western System Power Pool Agreement Participants, Docket. No. EL01-085*
  Prepared Answering Testimony of A. Joseph Cavicchi on behalf of Transalta Energy Marketing (U.S.) Inc. and Transalta Energy Marketing (California) Inc., December 17, 2012. Deposition of A. Joseph Cavicchi on behalf of Transalta Energy Marketing (California) Inc., February 8, 2013. Testimony of A. Joseph Cavicchi, October 21 and 22, 2013. Oral, Public.

- **Avista Corporation et al.**
  United States of America, Before the Federal Energy Regulatory Commission, In the Matter of Puget Sound Energy, Inc. v. All Jurisdictional Sellers of Energy and/or Capacity at Wholesale into Electric Energy and/or Capacity Markets in the Pacific Northwest, including Parties to the Western Systems Power Pool Agreement. Docket EL01-10-085
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- **US Department of Justice**
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“Onward Restructuring,” *Hart Energy Markets*, Vol. 9, No. 9, p. 64 (September 2004).

"Competition and Regulation in the North American Electricity Industry: Can These Two Seemingly Opposed Forces Coexist?" with Charlie Augustine and Joseph P. Kalt, 24th Annual North American Conference of the USAEE/IAEE Proceedings, Washington, DC (July 9, 2004).

"Wholesale Electricity Procurement Strategies for Serving Retail Demand," *International Association for Energy Economics Newsletter* (First Quarter 2004).

"Economic and Environmental Benefits of the Kings Park Energy Project: System Production Modeling Report," with Susan F. Tierney (January 25, 2002).

"Economic and Environmental Benefits of the Wawayanda Energy Center: System Production Modeling Report," with Susan F. Tierney (August 24, 2001).

"Air Pollution Reductions Resulting from the Kings Park Energy Project," with Susan F. Tierney (January 24, 2001).

PRESENTATIONS AND SPEAKING ENGAGEMENTS

"Overview of Ancillary Services, Regulation and Reserve Products in Wholesale Markets," EUCI Ancillary Services Fundamentals and Market Dynamics (August 25, 2021).

"Market Power Monitoring and Mitigation in RTO/ISOs," EUCI Electricity Market Power, Manipulation, Regulation and Enforcement (April 20, 2021).

"Critical Elements of Ancillary Services Market Design and Costing," EUCI Ancillary Services Fundamentals and Market Dynamics Workshop (December 1, 2020).

"Achieving Western States Green House Gas (GHG) Reduction Objectives: Effective, Least-Cost Compliance in a Constantly Evolving Policy Environment," presented with Todd Schatzki, Washington CETA Markets Workgroup (August 28, 2020).

"Carbon Pricing for New England," NEPOOL Participants Committee Meeting (August 6, 2020).

"Fundamentals of Capacity Market Design and Performance," EUCI Capacity Markets Workshop, (July 29, 2020).

"Fundamentals of Capacity Market Design and Performance," EUCI Capacity Markets Workshop, Philadelphia, PA (May 1, 2019).

"Critical Elements of Ancillary Services Market Design and Costing," EUCI Ancillary Services Markets Conference, Charleston, SC (March 19, 2019).

"Accommodating the Growing Supply of Zero-Emission Resources in U.S. Wholesale Power Markets, Institute for Energy Law Alternative & Renewable Energy Practice Committee, (January 23, 2019).

"Implementing Order No. 841: What Should We Expect?" K&L Gates, Energy Storage Association, Edison Electric Institute, 2nd Annual Energy Storage Conference, Washington, DC (November 29, 2018).

"Dumping Energy: Renewable Energy, Cost-Effective Curtailment and Remediating Negative Pricing Conditions," EUCI Conference, Minneapolis, MN (July 12, 2018).

"Enhanced Reliability Unit Commitment: Fundamentals Design Elements 9-13," presented with Scott Harvey and Susan Pope, Independent Electricity System Operator of Ontario, Toronto, Ontario (November 27, 2017).

"Enhanced Reliability Unit Commitment: Fundamentals Design Elements 1-8," presented with Scott Harvey and Susan Pope, Independent Electricity System Operator of Ontario, Toronto, Ontario (October 30, 2017).

"The Growing Conflict between FERC Jurisdictional Electric Markets and State Policies," 2017 White & Case Energy Conference (October 18, 2017).

"Enhanced Reliability Unit Commitment: Overview and Design Elements," presented with Scott Harvey and Susan Pope, Independent Electricity System Operator of Ontario, Toronto, Ontario (October 11, 2017).

"Critical Elements of Ancillary Services Market Design and Costing," EUCI Ancillary Services Markets Workshop, Austin Texas (February 17, 2017).

"What Are the Implications for Adequacy and Future Generation Builds?" Infocast, Panelist, RPM and CP BRA Auction Results, PJM Market Summit 2016 (September 8, 2016).

"What Are the Implications for Adequacy, and Future Generation Builds?" Infocast, Panelist, RPM and CP BRA Auction Results, PJM Market Summit 2015 (September 17, 2015).

Panelist, Congressional Staff Briefing regarding the financial repercussions of the EPA's Clean Power Plan to public power plants, electric co-operatives, and merchant power plants, Stranded Assets Panel – Focusing on Financial Impacts to Public Power, Co-Ops, and Merchant Power Plants Under EPA's 111 (d) Clean Power Plan, Washington DC (March 2, 2015).

"Lessons Learned from Existing Scarcity and Shortage Pricing Rules," Price Formation in Energy and Ancillary Services Markets Operated by Regional Transmission Organizations and Independent System Operators, Scarcity and Shortage Pricing, Offer Mitigation, and Offer Caps Workshop, Federal Energy Regulatory Commission, Docket No. AD14-14-000 (October 28, 2014).

"Impacts of Officer Caps and Market Power Mitigation," Price Formation in Energy and Ancillary Services Markets Operated by Regional Transmission Organizations and Independent System Operators, Scarcity and Shortage Pricing, Offer Mitigation, and Offer Caps Workshop, Federal Energy Regulatory Commission, Docket No. AD14-14-000 (October 28, 2014).

Led a Congressional Staff Briefing examining section 111(d) of the Clean Air Act, Stranded Assets Panel – Focusing on the Impacts of EPA's GHG Proposal for Existing Plants Under 111(d), Washington, DC (July 30, 2014).

"Forward Capacity Auctions: Financial, Physical, or Both," EUCI (November 7, 2013).

"Capacity Market Performance Incentives," EUCI (November 7, 2013).

"Fundamentals of Capacity Market Design and Performance," EUCI (November 6, 2013).

"Electricity Industry Fundamentals," EUCI (January 29-30, 2013).

"Market Power Monitoring and Mitigation in Electric Capacity Markets," Capacity Markets: Achieving Market Price Equilibrium?, EUCI (October 4, 2012).

"Market Power Monitoring and Mitigation in Electric Capacity Markets," Capacity Markets: Achieving Market Price Equilibrium?, EUCI (November 7, 2011).

"Economics and Regulation of Large Scale Renewable Resource Electricity System Transmission Additions," Center for Research in Regulated Industries, Eastern Conference, Rutgers University (May 6, 2010).

"PJM's RPM Auctions: Emerging and Unsettled Issues," NECA Power Markets Conference (November 1, 2007).

"Locational Capacity Markets: Understanding the Upside," New York City, July 8, 2006.

"Competition and Regulation in the North American Electricity Industry: Can These Two Seemingly Opposed Forces Coexist?" 24th Annual North American Conference of the USAEE/IAEE, Washington, DC (July 9, 2004).

"Merchant Transmission Investment Regimes: An Outsider's Observations," The East Coast Energy Group (April 16, 2004).

"Wholesale Procurement Strategies for the Restructured Electricity Markets: Experiences from the Field," Platts First Annual Electricity Market Design Imperative, Chicago, IL (November 6, 2003).

"Power Plant Technologies and Characteristics," The Harvard Institute for International Development's Third Annual Program on Climate Change and Development, Cambridge, MA (June 19, 2000).

"Transmission Planning & Investment in the RTO Era," with John Farr and Susan F. Tierney, workshop at Infocast Conference on Transmission Pricing, Chicago, IL (May 1, 2000).

"The US Market for Merchant Plants—Outlooks, Opportunities and Impediments," CBI's 4th Annual Profit from Merchant Plants Conference (January 31, 2000).

"Projecting Electricity Prices for a Restructured Electricity Industry," EXNET Merchant Power Plant Conference, Washington, DC (June 3, 1999).

"Transmission Planning and Competitive Generation Markets: The New England Case," EUCI conference on Transmission Restructuring for Retail Competition, Denver, CO (March 25, 1999).

"Key Issues in Ancillary Service Markets," IBC's conference on Pricing and Selling Ancillary Services in a Competitive Market Conference, San Francisco, CA (March 11, 1999).

"Successfully Forecasting the Price of Energy and Other Products," workshop presented at IBC's conference on Successful Load Profiling, San Francisco, CA (December 2, 1998).

"International Perspective: Lessons from the US Deregulation Experience," Nordic Power '98, Stockholm, Sweden (October 7, 1998).

"Successfully Forecasting the Price of Energy and Other Products in a Restructured Electric Power Industry," workshop presented at IBC's 3rd Strategic Forum on Market Price Forecasting, Baltimore, MD (August 24, 1998).

"Managing Market Share Loss with the Opening of Retail Markets to Competition," Electric Utility Business Environment Conference, Denver, CO (June 24, 1998).

"Multi-Attribute Trade-Off Analysis for Water and Electricity Policy Development," presented in Mendoza, Argentina, (July 1996 and April 1997).

"The Basics of Cogeneration," Tufts University Forum on Energy Conservation (December 1993).

"Implications and History of the MIT Cogeneration Project," presented to the Massachusetts Society of Professional Engineers (November 1993).

CERTIFICATIONS/ACCREDITATIONS

1992–present Registered Professional Engineer, Commonwealth of Massachusetts

PROFESSIONAL ASSOCIATIONS AND MEMBERSHIPS

2002–2012 Board of Directors, Northeast Energy and Commerce Association

Exhibit No. PJM-0013

MEGAN HENDERSON ACCORDINO, PH.D.

Manager

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333 South Hope Street 27th Floor
Los Angeles, CA 90071

Dr. Accordino specializes in applying microeconomic theory, econometrics, and statistical methods to complex litigation, regulatory, and policy matters related to financial and energy markets. Her litigation experience includes analyzing liability, loss causation, and damages in numerous matters involving allegations of market manipulation in natural gas and electric power markets, insider trading in equity markets, misrepresentations to securities investors and insurers, and breaches of fiduciary duty, among others. Her work on these matters has included developing econometric analyses to assess loss causation and building discounted cash flow models to estimate damages. In regulatory proceedings, she has analyzed utility rate plans and their impact on stakeholders, investment and unit commitment decisions, and market power in market-based rate authority applications and electric power mergers. Dr. Accordino has also authored articles on the impact of overlapping greenhouse gas emissions policies (published in *The Energy Journal*), market definition in electric power markets (published in the *ABA Economics Committee Newsletter* and *The Electricity Journal*), and the incentives for and detection of market manipulation. Prior to joining Analysis Group, Dr. Accordino was an analyst at other economics consulting firms.

EDUCATION

2015 Ph.D., economics, University of California, Los Angeles
Dissertation: *Economic Analyses of Three Energy Policy Problems*

2012 M.Phil, economics, University of California, Los Angeles

2007 B.A., economics and international studies (*summa cum laude*), Case Western Reserve University

2006 The General Course, London School of Economics

PROFESSIONAL EXPERIENCE

2015–Present Analysis Group
Manager (2018–Present)
Associate (2015–2017)

2013–2014 20/20 Business Vision
Statistical Consultant

2007–2010 Economists Incorporated
Energy Analyst (2009–2010)
Research Associate (2007–2009)

2008 RBB Economics
Visiting Analyst

SELECTED CONSULTING EXPERIENCE

Energy and Commodities

- **FERC market-based rate analyses**
  Collaborated with expert witnesses in performing FERC market screen and delivered-price test analyses in support of market-based rate authority applications under Section 205 of the Federal Power Act on behalf of several energy companies, including Idaho Power, Integrys, Southern Indiana Gas and Electric Company, and Tampa Electric Company.

- **Energy mergers and acquisitions**
  Conducted various analyses, including delivered-price test analyses under Section 203 of the Federal Power Act, to assess horizontal and vertical market power concerns in conjunction with FERC's and the Department of Justice's reviews of several major electric utility mergers and acquisitions.

- **Alleged Market Manipulation**
  Supported expert witness in examining allegations of manipulation of commodity futures prices, including analyzing the supply and demand fundamentals that influence the commodity futures prices and performing econometric analyses of the alleged impact on prices.

- ***In the Matter of the Application of the Dayton Power and Light Company for Administration of the Significantly Excessive Earnings Test Under R.C. 4928.143(F) and Ohio Adm. Code 4901:1-35-10 for 2018 and 2019***
- Before the Public Utility Commission of Ohio, supported expert witness in preparing written testimony assessing whether Dayton Power and Light's earnings under its rate plan were "significantly excessive" under the test defined by the Commission.

- ***In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Decrease Its Revenues for Electric Service***
  Before the Public Service Commission of the State of Missouri, supported expert witness in preparing written testimony assessing the Ameren Missouri's practices for self-commitment of several coal-fired units, and its offers for incremental energy from these units.

- ***Jessica S. Cook et al. v. South Carolina Public Service Authority et al.***
  State of South Carolina, County of Hampton, Court of Common Pleas, Fourteenth Judicial Circuit
  Supported expert witness in assessing, from a corporate decision-making perspective, the utility defendants' decision in early 2012 to authorize construction of the V.C. Summer nuclear project.

- ***In re: Friends of the Earth and Sierra Club v. South Carolina Electric & Gas Company (SCE&G); In re: Request of the Office of Regulatory Staff for Rate Relief to SCE&G's Rates; In re: Joint Application and Petition of SCE&G and Dominion Energy, Inc.***
  Before the Public Service Commission of South Carolina, supported expert witness in assessing the impact of (i) a proposed merger between SCE&G and Dominion and (ii) a revised rate plan, including the potential disallowance of certain costs related to an abandoned nuclear project, on the utility's cost of capital, ratepayers' costs, and the public interest. Supported expert in preparing written testimony and in preparing to provide testimony in a hearing.

- ***SCE&G v. Swain E. Whitfield et al.***
  U.S. District Court, District of South Carolina, Columbia Division
  Supported expert witness in assessing the impact of a proposed retroactive change in rate-making policy on the utility's cost of capital, ratepayers' costs, and the public interest. Supported expert in preparing written testimony and in preparing to provide testimony in a hearing.

- ***Federal Energy Regulatory Commission v. Barclays Bank PLC et al.***
  U.S. District Court, Eastern District of California
  Supported expert witness in examining allegations of manipulation of electricity markets in the western U.S. Assisted in analyzing allegations of artificial transaction prices, including evaluating Barclays' trading behavior and estimating its impact on prices.

- ***Energy Transfer Partners, L.P., et al.***
  Before FERC, supported expert witness in examining allegations of manipulating natural gas markets in Texas. Assisted in analyzing allegations of artificially low sales prices, hedging strategies, and unjust profits.

- ***Oasis Pipeline, L.P., et al.***
  Before FERC, supported expert witness in examining allegations of undue discrimination, overcharges, and improper update of the company's statement of operating conditions.

- ***Trans-Allegheny Interstate Line Company (TrAILCo)***
  Before FERC, assisted expert witness in analyzing whether the proposed return on equity for the TrAILCo transmission line was reasonable.

Securities and Finance

- **Rule 10b-5 and Section 11 securities fraud litigation**
  Conducted event studies, damages exposure analyses, and analyses of the impact of news and corporate disclosures on securities' prices. Supported damages and subject matter experts on multiple matters in preparing reports and in preparing to provide deposition testimony.
  - ***In Re: Vale S.A. Securities Litigation***
    U.S. District Court, Southern District of New York
    Supported geotechnical expert in assessing tailings dam construction and maintenance practices, in preparing a report, and in preparing to provide deposition testimony.

- ***In Re: RFC and Rescap Liquidating Trust Litigation***
  U.S. District Court, District of Minnesota
  Supported expert witness in multiple proceedings in rebutting Plaintiff's expert's mortgage sampling and extrapolation methodology. Supported expert in preparing reports and in preparing to provide deposition and trial testimony.

- **Residential mortgage-backed securities litigation**
  Supported expert witness in evaluating mortgage origination and securitization practices and in preparing report.

- **Collateralized debt obligation (CDO) litigation**
  Supported expert witness on multiple matters in analyzing loss causation and transaction causation related to losses suffered by CDO investors and guarantors.

- o ***Loreley Financing (Jersey) No. 28, Ltd. v. Merrill Lynch, Pierce, Fenner & Smith Inc. et al.***
  Supreme Court of the State of New York, County of New York
  Supported expert in preparing reports and in preparing to provide deposition testimony.

- **Arbitrations involving alleged breaches of fiduciary duty**
  Supported expert witness in multiple matters in evaluating investment suitability, due diligence processes, and fiduciary duties, in preparing reports, and in preparing to provide hearing testimony.

- ***Ronda A. Pledger, et al. v. Reliance Trust Company et al.***
  U.S. District Court, Northern District of Georgia, Atlanta Division
  Supported expert witness in analyzing the appropriateness of including certain investments as options in an employer-sponsored retirement plan, and in analyzing allegations of underperformance and excessive fees for the investment options in the plan. Supported expert in preparing reports and in preparing to provide deposition testimony.

- ***Syncora Guarantee Inc. v. Alinda Capital Partners LLC, et al.***
  Supreme Court of the State of New York
  Supported monoline due diligence expert, transportation economist, and financial economist in analyzing liability and damages in a matter in which traffic forecasts were allegedly overstated in order to secure insurance for a bond issuance used to finance the purchase of several toll roads. Supported experts in preparing reports and in preparing to provide deposition testimony.

- ***U.S.A. v. William T. Walters***
  U.S. District Court, Southern District of New York
  Analyzed allegations of insider trading, including analyses of trading patterns and strategies.

Other Casework

- ***Pabst Brewing Company, LLC and Blue Ribbon Intermediate Holdings, LLC v. MillerCoors LLC***
  State of Wisconsin, Circuit Court, Milwaukee County
  Supported industry expert in analyzing whether the terms of a beer brewing agreement were breached, in preparing an expert report, and in preparing to provide deposition and trial testimony.

- ***In re: September 11 Litigation***
  U.S. District Court, Southern District of New York
  Supported expert witness in estimating the value of the 99-year master leasehold interests held by Silverstein Properties and calculating damages from the destruction of World Trade Center Towers One, Two, Four, Five, and Seven on September 11, 2001.

- ***CoreLogic, Inc. v. First American Financial Corp.***
  JAMS Arbitration
  Supported expert witness in rebutting plaintiff's damages analysis in this matter, which involved an alleged breach of contract and misappropriation of trade secrets.

ARTICLES AND PUBLICATIONS

"Murky Markets: A Review of FERC's Determination of Submarkets in Wholesale Electric Power Mergers," *ABA Economics Committee Newsletter* (2017)

"When a National Cap-and-Trade Policy with a Carve-out Provision May Be Preferable to a National CO_2 Tax," with Deepak Rajagopal, *The Energy Journal* (2015)

Incentives for and Detection of Manipulation with Spot and Futures Markets, working paper (2015)

"Geographic Market Delineation in LMP Electric Power Markets," with John R. Morris, *The Electricity Journal* (2010)

PRESENTATIONS AND SPEAKING ENGAGEMENTS

"Electricity Market Power, Manipulation Regulation and Enforcement," EUCI (April 20-21, 2021)

"The Impact of Regulatory Uncertainty on Electric Utilities, Rate Payers, and Investors," Rutgers Center for Research in Regulated Industries 32nd Annual Western Conference (June 27, 2019)

"Murky Markets: A Review of FERC's Determination of Submarkets in Wholesale Electric Power Mergers," Rutgers Center for Research in Regulated Industries 30th Annual Western Conference (June 29, 2017)

"Price Impact as a Screen for Manipulation," Rutgers Center for Research in Regulated Industries 29th Annual Western Conference (June 23, 2016)

"Why a National Cap-and-Trade Policy with a Carve-Out Provision May Be Preferable to a National CO_2 Tax," Western Economic Association International Conference (June 30, 2013)

"Comparing Renewable Portfolio Standards, Emissions Intensity Standards and Pollution Taxes in the Electricity Sector," U.S. Association for Energy Economics Conference (November 6, 2012)

SELECTED HONORS AND AWARDS

2011–2013	Clean Energy for Green Industry Integrative Graduate Education and Research Traineeship (funded by the National Science Foundation)
2011	UCE3 Summer School in Environmental and Energy Economics, University of California, Berkeley
2010	Honorable Mention, National Science Foundation Graduate Research Fellowship
2007	H.W. Kneisner Prize for Excellence in Economics, Case Western Reserve University
2006	Phi Beta Kappa

PROFESSIONAL ASSOCIATIONS AND MEMBERSHIPS

2013–Present	American Economic Association
2011–Present	United States Association for Energy Economics

REFEREE WORK

Energy Economics, The Energy Journal, Journal of Public Economics

COMMUNITY INVOLVEMENT

2013–Present	Westwood Presbyterian Church *Children and Family Ministries Committee Member (2016–Present)* *Children's Sunday School Teacher (2013–Present)*
2016–2017	Villa San Cipriano Homeowners' Association *Secretary*
2012	Renewable and Sustainable Energy Technology (ReSET) Workshop *Co-Chair of Planning Committee*

LANGUAGES – Spanish (advanced)

Exhibit No. PJM-0014

Assignment and Allocation of PJM Divisional Costs
2019 Test Year Updated for Known and Measurable Changes Using 2021 Budget Data

Panel 1: Direct Divisional Cost Assignments

Division	Total Expenses	Schedule 9-1 Control Area Administration	Schedule 9-2 FTR Administration	Schedule 9-3 Market Support	Schedule 9-4 Capacity Resource and Obligation Management	Schedule 9-PJMSettlement PJM Settlement Inc. Administration	Schedule 9-5 Management Service Cost
Presidents	$15,329,645	0.0%	7.0%	7.0%	7.0%	11.2%	67.8%
CFO & Treasurer	$11,800,922	0.0%	0.0%	0.0%	0.0%	38.4%	61.6%
Corporate Client Services	$42,150,088	0.0%	0.0%	0.3%	0.0%	0.0%	99.7%
Law and Compliance	$17,799,911	33.5%	11.1%	10.5%	5.5%	8.1%	31.3%
State & Member Services	$15,350,369	32.7%	1.4%	23.1%	8.8%	0.0%	33.9%
Market Services	$23,670,115	9.2%	8.0%	58.6%	21.9%	2.3%	0.0%
System Operations	$38,814,696	97.0%	0.0%	2.5%	0.4%	0.0%	0.0%
System Planning	$13,597,308	92.1%	0.0%	0.0%	7.9%	0.0%	0.0%
Information & Technology Services	$77,547,812	29.0%	1.2%	11.4%	1.0%	2.4%	54.9%
[A] Total Directly Assigned Divisional Costs	$256,060,866	$85,891,868	$6,098,707	$30,328,885	$10,640,833	$10,122,745	$112,977,828
[B] Divisional Cost Assignments		**33.5%**	**2.4%**	**11.8%**	**4.2%**	**4.0%**	**44.1%**

Assignment and Allocation of PJM Divisional Costs
2019 Test Year Updated for Known and Measurable Changes Using 2021 Budget Data

Panel 2: Management Service Cost Allocation

	Total Expenses	Schedule 9-1	Schedule 9-2	Schedule 9-3	Schedule 9-4	Schedule 9-PJM Settlement
[C] Share of Management Service Cost Assigned to Schedule 9-PJMSettlement	$112,977,828					2.1%
[D] Management Service Cost Assigned to Schedule 9-PJMSettlement						$2,372,534
[E] Divisional Costs Directly Assigned to Schedules 9-1 to 9-4 from Row [A]	$132,960,293	$85,891,868	$6,098,707	$30,328,885	$10,640,833	
[F] Share of Divisional Costs Directly Assigned to Schedules 9-1 to 9-4		64.6%	4.6%	22.8%	8.0%	
[G] Allocate Non-PJMSettlement Management Service Cost Using Directly Assigned Divisional Cost Shares from Row [F]	$110,605,293	$71,450,619	$5,073,313	$25,229,602	$8,851,759	
[H] Total Management Service Costs from Rows [D] and [G]	$112,977,828	$71,450,619	$5,073,313	$25,229,602	$8,851,759	$2,372,534
[I] Management Service Cost Allocations		**63.3%**	**4.5%**	**22.3%**	**7.8%**	**2.1%**

Notes:

[1] Direct Divisional Cost Assignments include proportionally allocated divisional overhead.

[2] Unshaded cells in Panel 1 represent cost assignments derived from 2019 Test Year expense data. Grey-shaded cells in Panel 1 represent cost assignments and expenses updated with 2021 budgeted expense data.

[3] Divisional Cost Assignments provide the shares of PJM's "Actual Costs" for all divisions assigned to each schedule under PJM's updated tariff.

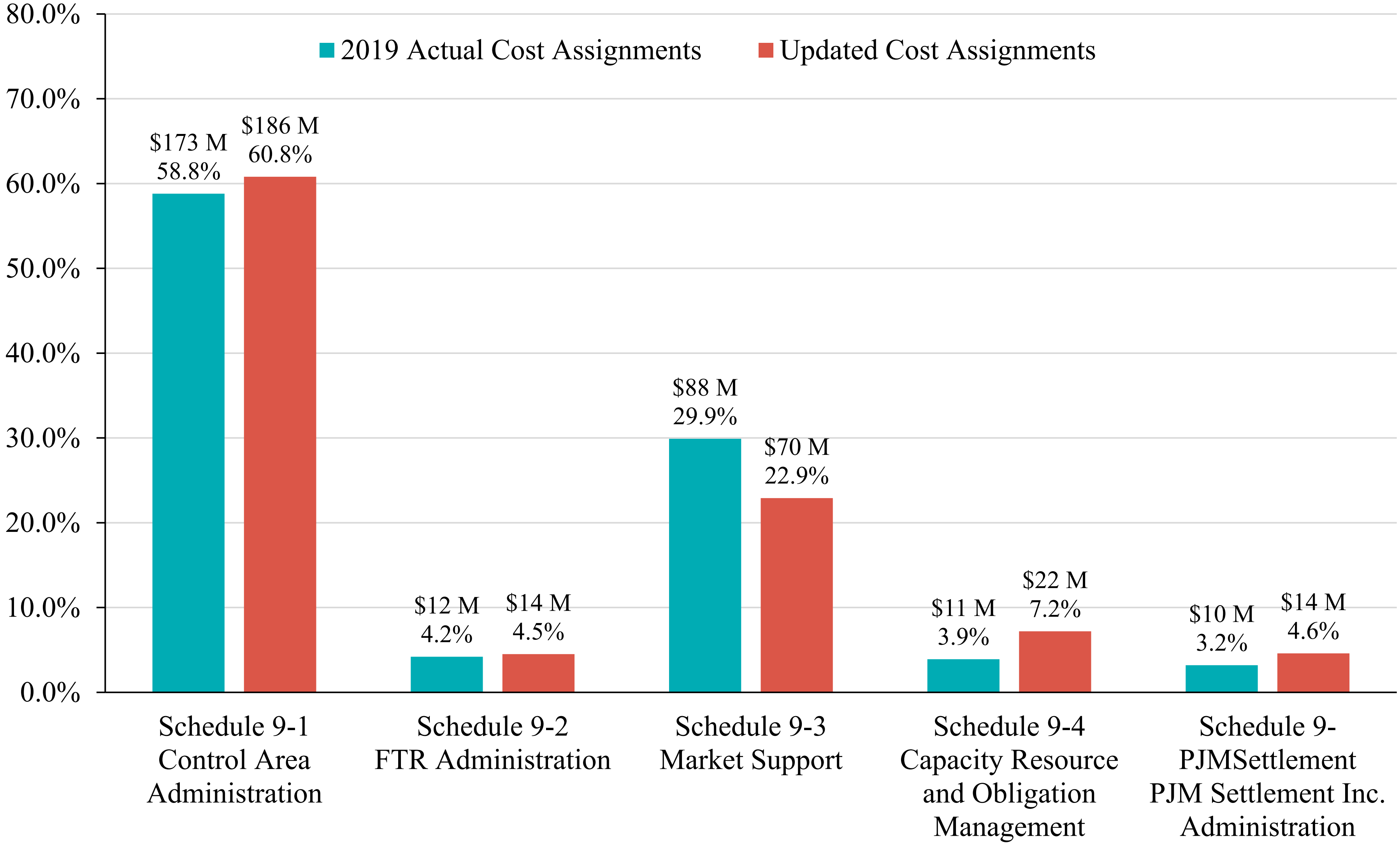
[4] Management Service Cost Allocations provide the shares of PJM’s total Management Services Costs assigned to each schedule under PJM’s updated tariff.

[5] Percentages listed in bold are those that are shown in the updated tariff.

[6] To ensure the rounded percentages sum to 100.0%, the Schedule 9-1 share of PJM overhead (in row [I]) is rounded up from 63.2% to 63.3% in the updated tariff as its unrounded share is the closest to rounding up.

Exhibit No. PJM-0015

Comparison of 2019 Actual Assignments of PJM's Total Costs to the Updated Assignments of PJM's Total Costs from the Cost of Service Study



Note: The updated costs assignments incorporate budgeted 2021 divisional costs, assigned as shown in **Exhibit No. PJM-0014**, and budgeted 2021 non-divisional costs, as assigned by PJM staff. Percentages are rounded to three digits and adjusted to sum to 100.0%.

Exhibit No. PJM-0016

Direct Divisional Cost Assignments by Cost Center
2019 Test Year

Division	Cost Center	Cost Center Name	Division Overhead	Schedule 9-1	Schedule 9-2	Schedule 9-3	Schedule 9-4	Schedule 9-PJM Settlement	Schedule 9-5
Presidents	50	Office of the CEO							100%
Presidents	80	Internal Audit							100%
Presidents	90	Risk Management			9%	9%	9%		74%
Presidents	95	Trade Risk & Analytics			33%	33%	33%		
Presidents	175	Credit Risk & Surveillance						100%	
CFO & Treasurer	100	Finance VP/CFO & Treasurer							100%
CFO & Treasurer	105	Corporate Finance & Risk Management							100%
CFO & Treasurer	120	Controller							100%
CFO & Treasurer	125	Budgets & Analysis							100%
CFO & Treasurer	130	Market Settlements Development						100%	
CFO & Treasurer	135	Market Settlement Operations						100%	
CFO & Treasurer	170	Treasury							100%
CFO & Treasurer	194	Corporate Items - Adjustment							100%
CFO & Treasurer	196	Market Integration Assets							100%
CFO & Treasurer	197	Facilities Agreement Costs							100%
CFO & Treasurer	199	Corporate Items							100%
CFO & Treasurer	630	Procurement/Contracts							100%
Corporate Client Services	57	Conference Services							100%
Corporate Client Services	110	Facilities Services							100%
Corporate Client Services	111	Facilities - Service Center							100%
Corporate Client Services	112	Facilities - Technology Center							100%
Corporate Client Services	113	Facilities - Business Center							100%
Corporate Client Services	114	Facilities - LC, etc							100%
Corporate Client Services	115	Facilities Services - AC2							100%
Corporate Client Services	181	Physical Security							100%
Corporate Client Services	183	Business Continuity							100%
Corporate Client Services	700	VP, Corporate Client Services							100%
Corporate Client Services	702	Rec Mgmt & Bus Plan				4%			96%
Corporate Client Services	706	Identity & Access Management							100%
Corporate Client Services	707	CCS Portfolio & Project Management							100%
Corporate Client Services	708	Corporate Data Management				11%			89%
Corporate Client Services	710	People Services Center							100%
Corporate Client Services	721	Creative, Web & UX							100%
Corporate Client Services	722	Strat & Stkdldr Comm							100%
Corporate Client Services	723	Internal Communications							100%
Corporate Client Services	760	Total Rewards Center							100%
Law and Compliance	70	General Counsel		42%	21%	20%	11%		7%
Law and Compliance	71	Governance and Board Services							100%
Law and Compliance	75	VP Law & Compliance							100%

Direct Divisional Cost Assignments by Cost Center
2019 Test Year

Division	Cost Center	Cost Center Name	Division Overhead	Schedule 9-1	Schedule 9-2	Schedule 9-3	Schedule 9-4	Schedule 9-PJM Settlement	Schedule 9-5
Law and Compliance	800	Reliability Compliance							100%
Law and Compliance	840	CIP Compliance		100%					
State & Member Services	56	State Government Policy		45%	2%	16%	27%		10%
State & Member Services	440	Client Management		7%	3%	3%	3%		84%
State & Member Services	441	Knowledge Management Center							100%
State & Member Services	740	State & Member Training		49%	1%	46%	3%		1%
Market Services	290	Applied Innovation	100%						
Market Services	360	Performance Compliance		44%		56%			
Market Services	500	Market Services	100%						
Market Services	501	Market Design & Economics	100%						
Market Services	504	Advanced Analytics	100%						
Market Services	506	Markets Automation & Quality Assurance	100%						
Market Services	515	Demand Response Operations					100%		
Market Services	530	Day-Ahead Market Operations				100%			
Market Services	535	Real Time Market Operations				100%			
Market Services	540	Market Simulation		22%	57%	22%			
Market Services	545	Cap Mkt & Demand Ops					100%		
Market Services	550	Renewable Services	100%						
Market Services	555	Interregional Market Operations				100%			
Market Services	920	PJM Technologies Support	100%						
System Operations	400	Operations	100%						
System Operations	410	Dispatch		100%					
System Operations	411	Reliability Engineering		100%					
System Operations	425	Markets Coordination		19%		81%			
System Operations	435	System Operator Training		100%					
System Operations	465	Model Management		100%					
System Operations	466	Real Time Data Management		100%					
System Operations	467	EMS Technologies		100%					
System Operations	485	Generation		100%					
System Operations	490	Transmission Operations		100%					
System Operations	495	Outage Analysis Technologies		100%					
System Operations	830	Transmission Services		95%			5%		
System Planning	300	System Planning Vice President	100%						
System Planning	310	Transmission Planning		100%					
System Planning	315	System Planning Modeling & Support		97%			3%		
System Planning	350	Resource Adequacy Planning		46%			54%		
System Planning	365	Infrastructure Coordination		100%					
System Planning	370	Interconnection Analysis		100%					
System Planning	375	Interconnection Projects		100%					

Direct Divisional Cost Assignments by Cost Center
2019 Test Year

Division	Cost Center	Cost Center Name	Division Overhead	Schedule 9-1	Schedule 9-2	Schedule 9-3	Schedule 9-4	Schedule 9-PJM Settlement	Schedule 9-5
Information & Technology Services	201	Information & Technology Services	100%						
Information & Technology Services	205	Enterprise Information Security	100%						
Information & Technology Services	222	Operations Applications		99%		1%			
Information & Technology Services	226	Planning/Legal Applications		37%			3%		60%
Information & Technology Services	227	Markets/Finance Applications		1%	8%	84%	7%		
Information & Technology Services	228	Application Development		37%	3%	23%	3%		34%
Information & Technology Services	229	Development & Data Operations		6%					94%
Information & Technology Services	230	IT Operations Center		35%	2%	9%	1%		53%
Information & Technology Services	231	Sys Engr & Data Mgmt							100%
Information & Technology Services	232	Platforms		9%	1%	21%			69%
Information & Technology Services	233	Enterprise Architecture							100%
Information & Technology Services	234	Application Integration		13%					87%
Information & Technology Services	235	Quality Management		37%	3%	23%	3%		34%
Information & Technology Services	241	Network Infrastructure		52%					48%
Information & Technology Services	242	Telecom Infrastructure		85%		1%			14%
Information & Technology Services	246	IT Systems Support & Control		35%	2%	9%	1%		53%
Information & Technology Services	248	IT Infrastructure Coordination		51%	3%	46%			
Information & Technology Services	250	Corporate Applications (SMS & BI)		2%	3%	3%	2%		90%
Information & Technology Services	255	Business Intelligence							100%
Information & Technology Services	281	IT Compliance Services		19%	1%	13%	1%		66%
Information & Technology Services	704	Business Client Services							100%

Exhibit No. PJM-0017

Assignment and Allocation of PJM Costs
2019 Test Year

Panel 1: Direct Divisional Cost Assignments

Division	Total Expenses	Schedule 9-1 Control Area Administration	Schedule 9-2 FTR Administration	Schedule 9-3 Market Support	Schedule 9-4 Capacity Resource and Obligation Management	Schedule 9-PJMSettlement PJM Settlement Inc. Administration	Schedule 9-5 Management Service Cost
Presidents	$8,622,526	0.0%	2.3%	2.3%	2.3%	13.3%	79.7%
CFO & Treasurer	$15,286,747	0.0%	0.0%	0.0%	0.0%	29.1%	70.9%
Corporate Client Services	$46,778,025	0.0%	0.0%	0.3%	0.0%	0.0%	99.7%
Law and Compliance	$16,784,845	24.8%	9.7%	9.2%	4.9%	4.6%	46.8%
State & Member Services	$13,031,936	32.7%	1.4%	23.1%	8.8%	0.0%	33.9%
Market Services	$22,366,075	9.2%	8.0%	58.6%	21.9%	2.3%	0.0%
System Operations	$37,734,632	97.0%	0.0%	2.5%	0.4%	0.0%	0.0%
System Planning	$12,876,196	92.1%	0.0%	0.0%	7.9%	0.0%	0.0%
Information & Technology Services	$72,799,981	29.0%	1.2%	11.4%	1.0%	2.4%	54.9%
[A] Total Directly Assigned Divisional Costs	$246,280,962	$80,126,484	$4,693,446	$27,281,859	$8,999,170	$8,640,887	$116,539,116
[B] Divisional Cost Assignments		32.5%	1.9%	11.1%	3.7%	3.5%	47.3%

Assignment and Allocation of PJM Costs
2019 Test Year

Panel 2: Management Service Cost Allocation

	Total Expenses	Schedule 9-1	Schedule 9-2	Schedule 9-3	Schedule 9-4	Schedule 9-PJM Settlement
[C] Share of Management Service Cost Assigned to Schedule 9-PJMSettlement	$116,539,116					2.1%
[D] Management Service Cost Assigned to Schedule 9-PJMSettlement						$2,447,321
[E] Divisional Costs Directly Assigned to Schedules 9-1 to 9-4 from Row [A]	$121,100,958	$80,126,484	$4,693,446	$27,281,859	$8,999,170	
[F] Share of Divisional Costs Directly Assigned to Schedules 9-1 to 9-4		66.2%	3.9%	22.5%	7.4%	
[G] Allocate Non-PJMSettlement Management Service Cost Using Directly Assigned Divisional Cost Shares from Row [F]	$114,091,795	$75,488,869	$4,421,795	$25,702,821	$8,478,310	
[H] Total Management Service Costs from Rows [D] and [G]	$116,539,116	$75,488,869	$4,421,795	$25,702,821	$8,478,310	$2,447,321
[I] Management Service Cost Allocations		64.8%	3.8%	22.1%	7.3%	2.1%

Assignment and Allocation of PJM Costs
2019 Test Year

Panel 3: Non-Divisional Cost Assignment

	Total Expenses	Schedule 9-1 Control Area Administration	Schedule 9-2 FTR Administration	Schedule 9-3 Market Support	Schedule 9-4 Capacity Resource and Obligation Management	Schedule 9-PJMSettlement PJM Settlement Inc. Administration	Schedule 9-5 Management Service Cost
Cost Center 195	$2,356,877	77.2%	0.0%	22.8%	0.0%	0.0%	0.0%
Cost Center 198	$34,914,774	28.8%	1.1%	16.7%	2.7%	3.8%	46.8%
Project Costs	$11,662,334	41.8%	0.6%	6.6%	0.2%	1.0%	49.7%
[J] Initial Non-Divisional Costs	$48,933,985	$16,762,325	$463,201	$7,141,020	$980,335	$1,461,393	$22,125,712
[K] Allocate Non-Divisional Management Service Costs Using Management Service Cost Allocations from Row [I]	$22,125,712	$14,332,055	$839,507	$4,879,848	$1,609,662	$464,640	N/A
[L] Total Non-Divisional Costs from Rows [J] and [K]	$48,933,985	$31,094,379	$1,302,708	$12,020,869	$2,589,997	$1,926,033	N/A

Panel 4: Final Assignment

	Total Expenses	Schedule 9-1	Schedule 9-2	Schedule 9-3	Schedule 9-4	Schedule 9-PJM Settlement
[M] Total Costs from Rows [A], [H], and [L]	$295,214,947	$186,709,732	$10,417,949	$65,005,548	$20,067,477	$13,014,241
[N] Final Cost Assignments		63.2%	3.5%	22.0%	6.8%	4.4%

Notes:

[1] Direct Divisional Cost Assignments include proportionally allocated divisional overhead.

[2] Cost assignments are derived from 2019 Test Year expense data.

Exhibit No. PJM-0018

Direct Divisional Cost Assignments by Cost Center
2021

Division	Cost Center	Cost Center Name	Division Overhead	Schedule 9-1	Schedule 9-2	Schedule 9-3	Schedule 9-4	Schedule 9-PJM Settlement	Schedule 9-5
Presidents	50	Office of the CEO							100%
Presidents	80	Internal Audit							100%
Presidents	90	Risk Management			9%	9%	9%		74%
Presidents	95	Trade Risk & Analytics			33%	33%	33%		
Presidents	175	Credit Risk & Surveillance						100%	
CFO & Treasurer	100	Finance VP/CFO & Treasurer							100%
CFO & Treasurer	105	Corporate Finance & Risk Management							100%
CFO & Treasurer	120	Controller							100%
CFO & Treasurer	125	Budgets & Analysis							100%
CFO & Treasurer	130	Market Settlements Development						100%	
CFO & Treasurer	135	Market Settlement Operations						100%	
CFO & Treasurer	170	Treasury							100%
CFO & Treasurer	194	Corporate Items - Adjustment							100%
CFO & Treasurer	196	Market Integration Assets							100%
CFO & Treasurer	197	Facilities Agreement Costs							100%
CFO & Treasurer	199	Corporate Items							100%
CFO & Treasurer	630	Procurement/Contracts							100%
Corporate Client Services	57	Conference Services							100%
Corporate Client Services	110	Facilities Services							100%
Corporate Client Services	111	Facilities - Service Center							100%
Corporate Client Services	112	Facilities - Technology Center							100%
Corporate Client Services	113	Facilities - Business Center							100%
Corporate Client Services	114	Facilities - LC, etc							100%
Corporate Client Services	115	Facilities Services - AC2							100%
Corporate Client Services	181	Physical Security							100%
Corporate Client Services	183	Business Continuity							100%
Corporate Client Services	700	VP, Corporate Client Services							100%
Corporate Client Services	702	Rec Mgmt & Bus Plan				4%			96%
Corporate Client Services	706	Identity & Access Management							100%
Corporate Client Services	707	CCS Portfolio & Project Management							100%
Corporate Client Services	708	Corporate Data Management				11%			89%
Corporate Client Services	710	People Services Center							100%
Corporate Client Services	721	Creative, Web & UX							100%
Corporate Client Services	722	Strat & Stkdldr Comm							100%
Corporate Client Services	723	Internal Communications							100%
Corporate Client Services	760	Total Rewards Center							100%
Law and Compliance	70	General Counsel		42%	21%	20%	11%		7%
Law and Compliance	71	Governance and Board Services							100%
Law and Compliance	75	VP Law & Compliance							100%

Direct Divisional Cost Assignments by Cost Center
2021

Division	Cost Center	Cost Center Name	Division Overhead	Schedule 9-1	Schedule 9-2	Schedule 9-3	Schedule 9-4	Schedule 9-PJM Settlement	Schedule 9-5
Law and Compliance	800	Reliability Compliance		100%					
Law and Compliance	860	Operational Excellence & FERC Compliance							100%
State & Member Services	56	State Government Policy		45%	2%	16%	27%		10%
State & Member Services	440	Client Management		7%	3%	3%	3%		84%
State & Member Services	441	Knowledge Management Center							100%
State & Member Services	740	State & Member Training		49%	1%	46%	3%		1%
Market Services	290	Applied Innovation	100%						
Market Services	360	Performance Compliance		44%		56%			
Market Services	500	Market Services	100%						
Market Services	501	Market Design & Economics	100%						
Market Services	504	Advanced Analytics	100%						
Market Services	506	Markets Automation & Quality Assurance	100%						
Market Services	515	Demand Response Operations					100%		
Market Services	530	Day-Ahead Market Operations				100%			
Market Services	535	Real Time Market Operations				100%			
Market Services	540	Market Simulation		22%	57%	22%			
Market Services	545	Cap Mkt & Demand Ops					100%		
Market Services	550	Renewable Services	100%						
Market Services	555	Interregional Market Operations				100%			
Market Services	920	PJM Technologies Support	100%						
System Operations	400	Operations	100%						
System Operations	410	Dispatch		100%					
System Operations	411	Reliability Engineering		100%					
System Operations	425	Markets Coordination		19%		81%			
System Operations	435	System Operator Training		100%					
System Operations	465	Model Management		100%					
System Operations	466	Real Time Data Management		100%					
System Operations	467	EMS Technologies		100%					
System Operations	485	Generation		100%					
System Operations	490	Transmission Operations		100%					
System Operations	495	Outage Analysis Technologies		100%					
System Operations	830	Transmission Services		95%			5%		
System Planning	300	System Planning Vice President	100%						
System Planning	310	Transmission Planning		100%					
System Planning	315	System Planning Modeling & Support		97%			3%		
System Planning	350	Resource Adequacy Planning		46%			54%		
System Planning	365	Infrastructure Coordination		100%					
System Planning	370	Interconnection Analysis		100%					
System Planning	375	Interconnection Projects		100%					

Direct Divisional Cost Assignments by Cost Center
2021

Division	Cost Center	Cost Center Name	Division Overhead	Schedule 9-1	Schedule 9-2	Schedule 9-3	Schedule 9-4	Schedule 9-PJM Settlement	Schedule 9-5
Information & Technology Services	201	Information & Technology Services	100%						
Information & Technology Services	205	Enterprise Information Security	100%						
Information & Technology Services	222	Operations Applications		99%		1%			
Information & Technology Services	226	Planning/Legal Applications		37%			3%		60%
Information & Technology Services	227	Markets/Finance Applications		1%	8%	84%	7%		
Information & Technology Services	228	Application Development		37%	3%	23%	3%		34%
Information & Technology Services	229	Development & Data Operations		6%					94%
Information & Technology Services	230	IT Operations Center		35%	2%	9%	1%		53%
Information & Technology Services	231	Sys Engr & Data Mgmt							100%
Information & Technology Services	232	Platforms		9%	1%	21%			69%
Information & Technology Services	233	Enterprise Architecture							100%
Information & Technology Services	234	Application Integration		13%					87%
Information & Technology Services	235	Quality Management		37%	3%	23%	3%		34%
Information & Technology Services	241	Network Infrastructure		52%					48%
Information & Technology Services	242	Telecom Infrastructure		85%		1%			14%
Information & Technology Services	246	IT Systems Support & Control		35%	2%	9%	1%		53%
Information & Technology Services	248	IT Infrastructure Coordination		51%	3%	46%			
Information & Technology Services	250	Corporate Applications (SMS & BI)		2%	3%	3%	2%		90%
Information & Technology Services	255	Business Intelligence							100%
Information & Technology Services	281	IT Compliance Services		19%	1%	13%	1%		66%
Information & Technology Services	704	Business Client Services							100%

Exhibit No. PJM-0019

Assignment and Allocation of PJM Costs
2021 Budget

Panel 1: Direct Divisional Cost Assignments

Division	Total Expenses	Schedule 9-1 Control Area Administration	Schedule 9-2 FTR Administration	Schedule 9-3 Market Support	Schedule 9-4 Capacity Resource and Obligation Management	Schedule 9-PJMSettlement PJM Settlement Inc. Administration	Schedule 9-5 Management Service Cost
Presidents	$15,329,645	0.0%	7.0%	7.0%	7.0%	11.2%	67.8%
CFO & Treasurer	$11,800,922	0.0%	0.0%	0.0%	0.0%	38.4%	61.6%
Corporate Client Services	$42,150,088	0.0%	0.0%	0.4%	0.0%	0.0%	99.6%
Law and Compliance	$17,799,911	33.5%	11.1%	10.5%	5.5%	8.1%	31.3%
State & Member Services	$15,350,369	34.7%	1.5%	24.1%	9.8%	0.0%	30.0%
Market Services	$23,670,115	9.6%	8.4%	61.3%	18.9%	1.7%	0.0%
System Operations	$38,814,696	96.7%	0.0%	2.9%	0.5%	0.0%	0.0%
System Planning	$13,597,308	92.1%	0.0%	0.0%	7.9%	0.0%	0.0%
Information & Technology Services	$77,547,812	27.9%	1.2%	11.1%	1.0%	2.4%	56.5%
[A] Total Directly Assigned Divisional Costs	$256,060,866	$85,251,933	$6,145,693	$31,024,535	$10,036,759	$10,011,781	$113,590,165
[B] Divisional Cost Assignments		33.3%	2.4%	12.1%	3.9%	3.9%	44.4%

Assignment and Allocation of PJM Costs
2021 Budget

Panel 2: Management Service Cost Allocation

	Total Expenses	Schedule 9-1	Schedule 9-2	Schedule 9-3	Schedule 9-4	Schedule 9-PJM Settlement
[C] Share of Management Service Cost Assigned to Schedule 9-PJMSettlement	$113,590,165					2.1%
[D] Management Service Cost Assigned to Schedule 9-PJMSettlement						$2,385,393
[E] Divisional Costs Directly Assigned to Schedules 9-1 to 9-4 from Row [A]	$132,458,919	$85,251,933	$6,145,693	$31,024,535	$10,036,759	
[F] Share of Divisional Costs Directly Assigned to Schedules 9-1 to 9-4		64.4%	4.6%	23.4%	7.6%	
[G] Allocate Non-PJMSettlement Management Service Cost Using Directly Assigned Divisional Cost Shares from Row [F]	$111,204,772	$71,572,544	$5,159,565	$26,046,387	$8,426,276	
[H] Total Management Service Costs from Rows [D] and [G]	$113,590,165	$71,572,544	$5,159,565	$26,046,387	$8,426,276	$2,385,393
[I] Management Service Cost Allocations		63.0%	4.5%	22.9%	7.4%	2.1%

Assignment and Allocation of PJM Costs
2021 Budget

Panel 3: Non-Divisional Cost Assignment

	Total Expenses	Schedule 9-1 Control Area Administration	Schedule 9-2 FTR Administration	Schedule 9-3 Market Support	Schedule 9-4 Capacity Resource and Obligation Management	Schedule 9-PJMSettlement PJM Settlement Inc. Administration	Schedule 9-5 Management Service Cost
Cost Center 195	$1,275,107	77.2%	0.0%	22.8%	0.0%	0.0%	0.0%
Cost Center 198	$35,736,884	26.5%	2.3%	19.2%	2.1%	2.8%	47.2%
Project Costs	$12,516,215	40.1%	6.1%	20.2%	0.3%	1.4%	31.9%
[J] Initial Non-Divisional Costs	$49,528,206	$15,460,886	$1,565,351	$9,667,464	$787,401	$1,170,400	$20,876,705
[K] Allocate Non-Divisional Management Service Costs Using Management Service Cost Allocations from Row [I]	$20,876,705	$13,154,298	$948,275	$4,787,058	$1,548,663	$438,411	N/A
[L] Total Non-Divisional Costs from Rows [J] and [K]	$49,528,206	$28,615,184	$2,513,626	$14,454,522	$2,336,064	$1,608,811	N/A

Panel 4: Final Assignment

	Total Expenses	Schedule 9-1	Schedule 9-2	Schedule 9-3	Schedule 9-4	Schedule 9-PJM Settlement
[M] Total Costs from Rows [A], [H], and [L]	$305,589,072	$185,439,660	$13,818,884	$71,525,444	$20,799,099	$14,005,985
[N] Final Cost Assignments		60.7%	4.5%	23.4%	6.8%	4.6%

Notes:
[1] Direct Divisional Cost Assignments include proportionally allocated divisional overhead.
[2] Cost assignments are derived from 2021 budget data.

Exhibit No. PJM-0020

Assignment and Allocation of PJM Costs
2019 Test Year Updated for Known and Measurable Changes Using 2021 Budget Data

Panel 1: Direct Divisional Cost Assignments

Division	Total Expenses	Schedule 9-1 Control Area Administration	Schedule 9-2 FTR Administration	Schedule 9-3 Market Support	Schedule 9-4 Capacity Resource and Obligation Management	Schedule 9-PJMSettlement PJM Settlement Inc. Administration	Schedule 9-5 Management Service Cost
Presidents	$15,329,645	0.0%	7.0%	7.0%	7.0%	11.2%	67.8%
CFO & Treasurer	$11,800,922	0.0%	0.0%	0.0%	0.0%	38.4%	61.6%
Corporate Client Services	$42,150,088	0.0%	0.0%	0.3%	0.0%	0.0%	99.7%
Law and Compliance	$17,799,911	33.5%	11.1%	10.5%	5.5%	8.1%	31.3%
State & Member Services	$15,350,369	32.7%	1.4%	23.1%	8.8%	0.0%	33.9%
Market Services	$23,670,115	9.2%	8.0%	58.6%	21.9%	2.3%	0.0%
System Operations	$38,814,696	97.0%	0.0%	2.5%	0.4%	0.0%	0.0%
System Planning	$13,597,308	92.1%	0.0%	0.0%	7.9%	0.0%	0.0%
Information & Technology Services	$77,547,812	29.0%	1.2%	11.4%	1.0%	2.4%	54.9%
[A] Total Directly Assigned Divisional Costs	$256,060,866	$85,891,868	$6,098,707	$30,328,885	$10,640,833	$10,122,745	$112,977,828
[B] Divisional Cost Assignments		**33.5%**	**2.4%**	**11.8%**	**4.2%**	**4.0%**	**44.1%**

Assignment and Allocation of PJM Costs
2019 Test Year Updated for Known and Measurable Changes Using 2021 Budget Data

Panel 2: Management Service Cost Allocation

	Total Expenses	Schedule 9-1	Schedule 9-2	Schedule 9-3	Schedule 9-4	Schedule 9-PJM Settlement
[C] Share of Management Service Cost Assigned to Schedule 9-PJMSettlement	$112,977,828					2.1%
[D] Management Service Cost Assigned to Schedule 9-PJMSettlement						$2,372,534
[E] Divisional Costs Directly Assigned to Schedules 9-1 to 9-4 from Row [A]	$132,960,293	$85,891,868	$6,098,707	$30,328,885	$10,640,833	
[F] Share of Divisional Costs Directly Assigned to Schedules 9-1 to 9-4		64.6%	4.6%	22.8%	8.0%	
[G] Allocate Non-PJMSettlement Management Service Cost Using Directly Assigned Divisional Cost Shares from Row [F]	$110,605,293	$71,450,619	$5,073,313	$25,229,602	$8,851,759	
[H] Total Management Service Costs from Rows [D] and [G]	$112,977,828	$71,450,619	$5,073,313	$25,229,602	$8,851,759	$2,372,534
[I] Management Service Cost Allocations		**63.2%**	**4.5%**	**22.3%**	**7.8%**	**2.1%**

Assignment and Allocation of PJM Costs
2019 Test Year Updated for Known and Measurable Changes Using 2021 Budget Data

Panel 3: Non-Divisional Cost Assignment

	Total Expenses	Schedule 9-1 Control Area Administration	Schedule 9-2 FTR Administration	Schedule 9-3 Market Support	Schedule 9-4 Capacity Resource and Obligation Management	Schedule 9-PJMSettlement PJM Settlement Inc. Administration	Schedule 9-5 Management Service Cost
Cost Center 195	$1,275,107	77.2%	0.0%	22.8%	0.0%	0.0%	0.0%
Cost Center 198	$35,736,884	26.5%	2.3%	19.2%	2.1%	2.8%	47.2%
Project Costs	$12,516,215	40.1%	6.1%	20.2%	0.3%	1.4%	31.9%
[J] Initial Non-Divisional Costs	$49,528,206	$15,460,886	$1,565,351	$9,667,464	$787,401	$1,170,400	$20,876,705
[K] Allocate Non-Divisional Management Service Costs Using Management Service Cost Allocations from Row [I]	$20,876,705	$13,203,064	$937,477	$4,662,074	$1,635,680	$438,411	N/A
[L] Total Non-Divisional Costs from Rows [J] and [K]	$49,528,206	$28,663,950	$2,502,827	$14,329,538	$2,423,081	$1,608,811	N/A

Panel 4: Final Assignment

	Total Expenses	Schedule 9-1	Schedule 9-2	Schedule 9-3	Schedule 9-4	Schedule 9-PJM Settlement
[M] Total Costs from Rows [A], [H], and [L]	$305,589,072	$186,006,437	$13,674,847	$69,888,024	$21,915,674	$14,104,090
[N] Final Cost Assignments		60.9%	4.5%	22.9%	7.2%	4.6%

Notes:
[1] Direct Divisional Cost Assignments include proportionally allocated divisional overhead.
[2] Unshaded cells in Panel 1 represent cost assignments derived from 2019 Test Year expense data. Grey-shaded cells in Panel 1 represent cost assignments and expenses updated with 2021 budgeted expense data.
[3] Divisional Cost Assignments provide the shares of PJM's "Actual Costs" for all divisions assigned to each schedule under PJM's updated tariff.
[4] Management Service Cost Allocations provide the shares of PJM's total Management Services Costs assigned to each schedule under PJM's updated tariff.
[5] Percentages listed in bold are those that are shown in the updated tariff.
[6] To ensure the rounded percentages sum to 100.0%, the Schedule 9-1 share of PJM overhead (in row [I]) is rounded up from 63.2% to 63.3% in the updated tariff as its unrounded share is the closest to rounding up. For purposes of computing the final assignments of both divisional and non-divisional costs in this exhibit, unrounded percentages are used.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.	)))	Docket No. ER21-___-000

VERIFICATION

I, A. Joseph Cavicchi, state that I am the A. Joseph Cavicchi referred to in the foregoing document entitled "Prepared Direct Testimony of A. Joseph Cavicchi and Megan H. Accordino, Ph.D on behalf of PJM Interconnection, L.L.C." that I have read the same and am familiar with the contents thereof, and that the facts set forth therein are true and correct to the best of my knowledge, information, and belief.

In light of the ongoing emergency relating to COVID-19, I respectfully request waiver of the Commission's regulations with respect to any expectation or requirement that this verification be notarized.[1]

By: a. [signature]

Name: A. Joseph Cavicchi

Title: Vice President
Analysis Group, Inc.

Dated: September 30, 2021

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[1] *See Extension of Non-Statutory Deadlines*, Supplemental Notice Waiving Regulations, Docket No. AD20-11-000 (July 26, 2021).

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.	)))	Docket No. ER21-___-000

VERIFICATION

I, Megan H. Accordino, Ph.D, state that I am the Megan H. Accordino, Ph.D referred to in the foregoing document entitled "Direct Testimony of A. Joseph Cavicchi and Megan H. Accordino, Ph.D on behalf of PJM Interconnection, L.L.C." that I have read the same and am familiar with the contents thereof, and that the facts set forth therein are true and correct to the best of my knowledge, information, and belief.

In light of the ongoing emergency relating to COVID-19, I respectfully request waiver of the Commission's regulations with respect to any expectation or requirement that this verification be notarized.[1]

By: Megan H. Accordino

Name: Megan H. Accordino, Ph.D

Title: Manager
Analysis Group, Inc.

Dated: September 30, 2021

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[1] *See Extension of Non-Statutory Deadlines*, Supplemental Notice Waiving Regulations, Docket No. AD20-11-000 (July 26, 2021).