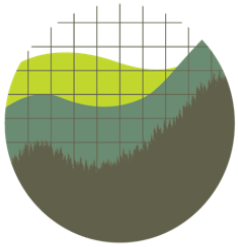

Institute *for*
Policy Integrity
NEW YORK UNIVERSITY SCHOOL OF LAW

October 18, 2024

To: Michelle Greening & Samantha Rozecki, PJM Interconnection LLC

Re: Transmission Expansion Advisory Committee Special Session on Order No. 1920 - Request for Stakeholder Feedback on Policy-Driven Retirements

The Institute for Policy Integrity at New York University School of Law (Policy Integrity)[1] respectfully submits the following comments responding to PJM Interconnection LLC's (PJM) notice regarding policy-driven retirements[2] in the context of the Federal Energy Regulatory Commission's Order No. 1920.[3] Policy Integrity is a non-partisan think tank dedicated to improving the quality of government decisionmaking through advocacy and scholarship in the fields of administrative law, economics, and public policy.

As Policy Integrity explained during its PJM transmission planning modeling presentation, how PJM chooses retirement inputs can significantly shape its identification of long-term transmission needs.[4] During that session, Policy Integrity compared modeled optimal transmission network buildouts resulting from two different sets of retirement inputs.[5] Policy Integrity's work highlighted how varying retirement inputs resulted in different transmission needs, underscoring the potential stakes of PJM selecting reasonable retirement inputs.[6]

Given the importance of these inputs and of using validated, realistic data for scenario development, a robust process for gathering feedback is important. PJM should make clear that it will continue to consider feedback on all Order No. 1920 factors on an ongoing basis as scenario development unfolds. In particular, PJM may be best served by creating and publishing: (1) a schedule for soliciting feedback on each of the seven categories of factors; and (2) specific guidance on the format that such feedback should take (e.g., quantitative vs. qualitative, file types for modeling inputs). Doing so would provide stakeholders (including state air regulators and other agencies that may not be frequent PJM transmission planning participants) better notice of upcoming deadlines and an opportunity to share data, inputs, and methodologies in a manner that PJM can best operationalize them. Additionally, PJM should include in its compliance filing a process for soliciting feedback on how this input will be updated for all successive rounds of long-term scenario development.

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[1] This document does not purport to present the views, if any, of New York University School of Law.
[2] PJM INTERCONNECTION, REQUEST FOR STAKEHOLDER FEEDBACK ON POLICY-DRIVEN DEACTIVATION METHODOLOGIES (2024), https://perma.cc/AE6Z-R65H.
[3] *Building for the Future Through Electric Regional Transmission Planning and Cost Allocation*, Order No. 1920, 187 FERC ¶ 61,068 (2024) [hereinafter Order No. 1920].
[4] CHRISTOPH GRAF, INST. FOR POL'Y INTEGRITY, STAKEHOLDER PRESENTATION ON FERC ORDER 1920: TRANSMISSION MODELING AND THE IMPORTANCE OF SOLID INPUT DATA 9–11 (2024), https://perma.cc/4Y9W-7ZBY.
[5] *Id.*
[6] *Id.* at 11.

Policy Integrity specifically recommends:

- PJM should not solely rely on generation portfolio owners' self-reported retirement plans. Doing so would create opportunities for those owners to behave strategically to benefit other generation resources in their portfolios. These opportunities could lead to incorrect representations of the future generation fleet, and thus cause the inefficient evolution of the transmission system.
- As the first step in PJM's process for developing policy-driven retirement inputs, PJM should use an age-based screening methodology that assumes that certain generators will comply with invest-or-retire[7] policies by retiring instead of investing.
- PJM should require generators not eliminated by the age-based screen to provide persuasive evidence of how they will respond to any applicable invest-or-retire policies. One possibility, if it would not delay the process of long-term transmission planning, would be to require generation owners to submit calculations explaining why their decision to invest or retire would be economically rational. Because strategic reporting opportunities exist for generators to convey an intent to retire *or* an intent to continue operating in response to invest-or-retire policies, this step would apply regardless of whether a generator announces a plan to retire. PJM should review these self-reports for plausibility.
- For all fossil-fuel generators that pass the age-based screen and either plausibly self-report that they will continue operations notwithstanding invest-or-retire policies or are not subject any to invest-or-retire deadlines, PJM itself should independently test (perhaps through dispatch modeling) whether generators would retire due to financially mediated policies. These policies include incentives like tax credits for zero-emissions generation that may ultimately reduce fossil-fuel generators' revenue. Order No. 1920 requires that PJM equally consider these policies when modeling the future state of the electric system, not just invest-or-retire policies.
- In all cases, PJM should account for uncertainty in the policy-driven retirement projections it adopts by not assuming that the same set of generators will retire due to policy in each of its three (or more) Order No. 1920-compliant long-term scenarios. PJM's approach to modeling policy-driven retirements should help mitigate the inherent uncertainty of long-term planning by assuming that distinct sets of generators will retire in each scenario in response to the distinct circumstances of each scenario, while still assuming that the relevant laws will be fully implemented.
- PJM should require that the assumptions that generation owners use to predict policy-driven retirements (e.g., future fuel costs) be consistent with PJM's treatment of those same assumptions in each of its scenarios. Retirement decisions result from policies (Order No. 1920 categories one and two) combined with other Order No. 1920-relevant factors like future technology costs (category four). So, for long-term scenarios to be plausible, once PJM has decided the value of relevant modeling input, generation owners should be required to use that same value when evaluating whether a unit would invest or retire. Otherwise, scenarios would not be internally consistent, because generation owners would be making retirement predictions based on inputs that

[7] As PJM explained at the October 1 meeting of Transmission Expansion Advisory Committee, this request for stakeholder input is primarily focused on policies that "directly impact specific generation resources' ability to continue operation" by requiring them to make certain investments or else retire. MATTHEW BERNSTEIN, PJM INTERCONNECTION, ORDER 1920 SCENARIOS POLICY-DRIVEN DEACTIVATION: METHODOLOGY 2 (2024), https://perma.cc/483N-9U8C [hereinafter POLICY-DRIVEN DEACTIVATION METHODOLOGY]. These comments refer to this category of policies as "invest-or-retire policies," in contrast to other policies that may influence generators' retirements policies but that are financially mediated (e.g., a tax credit for zero-emissions generation).

conflict with PJM's vision of what those same inputs should be for a given scenario. Further, if PJM varies the value of relevant modeling inputs across its long-term scenarios, generation owners should need to make separate scenario-specific self-reports using those same assumptions.

Responses to Request for Stakeholder Feedback

I. Impacted resources complying with policies

a. Should there be a process for generation owners and/or states to demonstrate that a resource impacted by a policy intends to comply and therefore remain in operation beyond the compliance date?

b. If so, what should the criteria be for generation owners and/or states to sufficiently demonstrate that a resource intends to comply with a policy and not otherwise be considered for planned retirement?

I. PJM Should Not Rely Exclusively on Generator Self-Reporting Because Strategic Opportunities Exist.

PJM's Question 1 correctly contemplates the risk of inaccurate self-reports from generation owners about how they anticipate responding to invest-or-retire policies, specifically regarding announced intentions to continue operating. Exclusively relying on generation owner self-reporting of future retirement plans may invite strategic behavior. Owners of generation resources often operate a portfolio of generating units, of different generation types, rather than a single unit. Changes in the transmission network, all else being equal, will affect local energy prices and local sale volumes. To achieve desired changes in local energy prices and sale volumes, generation owners might report anticipated retirements to PJM strategically (especially if there is no consequence of over- or under-reporting) to affect the PJM's identification (and ultimately any selection) of long-term transmission planning solutions.

A generation portfolio owner may report the continued operation of a specific unit to influence transmission planning outcomes that would favor the other units in its portfolio. Conversely, a generation portfolio owner could announce a unit's future retirement—but then not actually retire it—to influence the development of the transmission grid in ways benefitting the owner's other units, including projects in the interconnection queue. For example, given the resource adequacy constraints PJM proposes to include in its long-term transmission planning modeling,[8] an erroneous retirement report for a fossil-fuel resource could signal an apparent resource adequacy problem and thus promote the buildout of a transmission topology that enables the same generation owner to build a new gas plant. But a different combination of generation resources and transmission might have been more efficient given the continued operation of the original fossil-fuel resource.

PJM should recognize that there are both under- and over-reporting incentives. Accordingly, as discussed more in Section II, PJM should establish a validation process for both anticipated retirement reports and for anticipated remain-in-service reports.

[8] EMMANUELE BOBBIO, PJM INTERCONNECTION, LTRTP WORKSHOP POLICY STUDY 17 (2024), https://perma.cc/T7EH-LYEG.

II. PJM Should Establish a Three-Stage Methodology Comprising an Age-Based Screening Process, An Evaluation of Generation Owners' Self-Reports, and Modeling Policy-Driven Retirements That Are Financially Mediated.

Step 1: Age-Based Screen

PJM can use a three-stage methodology to develop its modeling inputs for policy-driven generation retirements. First, to reduce the need to evaluate generation owners' self-reports and minimize strategic misreporting, PJM's process for developing modeling inputs for policy-driven retirements should begin with an age-based screen. PJM can use a generator's age to assume that it will retire in response to invest-or-retire policies, obviating the need for owner self-reports. Such a process, which finds support in the academic literature,[9] the practices of other regional transmission organizations,[10] and the Department of Energy's recent National Transmission Planning Study,[11] makes sense in PJM because, for the first long-term planning cycle, many fossil-fuel resources will hit the historically average retirement age for their technology type within Order No. 1920's 20-year planning horizon.

The following Policy Integrity table, based on Energy Information Administration data,[12] shows that approximately 87% of fossil-fuel generation in PJM would reach the technology-specific historical average retirement age during Order No. 1920's 20-year planning horizon. This table does not represent any prediction by Policy Integrity about fossil-fuel retirements in PJM, only evidence that an age-based screening mechanism could promote accurate predictions of retirements and save PJM the effort of reviewing self-reports of certain old generators—given that much of PJM's fossil-fuel fleet will soon be relatively old and given that older units will be less likely to respond to invest-or-retire policies by investing.

Technology	Avg. retirement age in PJM from 2002–2024 [years]	Current total fossil-fuel generation capacity [GW]	Total capacity of fossil-fuel generation reaching historically average retirement age by 2044 [GW]	Share of total existing fossil-fuel generation capacity reaching historically average retirement age by 2044
Conventional Steam Coal	52.37	39.30	35.16	89.47%
Natural Gas Fired Combined Cycle	25.74	64.33	52.09	80.97%
Natural Gas Fired Combustion Turbine	36.27	30.32	27.80	91.69%
Natural Gas Internal Combustion Engine	22.56	0.49	0.49	98.36%
Natural Gas Steam Turbine	50.45	9.47	9.33	98.56%
Petroleum Liquids	41.86	6.00	5.74	95.76%
Total	-	149.91	130.61	87.13%

[9] Emily Grubert, *Fossil Electricity Retirement Deadlines for a Just Transition*, 370 SCIENCE 1171 (2020).
[10] MIDCONTINENT INDEP. SYS. OPERATOR, MISO FUTURES REPORT SERIES 1A, at 21–23 (2023), https://perma.cc/FUG5-B6WN [hereinafter MISO FUTURES REPORT].
[11] U.S. DEP'T OF ENERGY, NATIONAL TRANSMISSION PLANNING STUDY CHAPTER 2: LONG-TERM U.S. TRANSMISSION PLANNING SCENARIOS 90 (2023).
[12] *Preliminary Monthly Electric Generator Inventory (Based on Form EIA-860M as a Supplement to Form EIA-860)*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/electricity/data/eia860m (select "XLS" next to August 2024 under the menu labelled "EIA 860M"). Note that some technology types (e.g., natural gas fired combined cycle) had relatively few observations, and that the reported numbers are only averages.

Of course, there are multiple ways that PJM could implement an age-based screen as a retirement heuristic, and it need not simply assume that every generator will retire when it exceeds a historical average. PJM could pick a more conservative threshold if that would be more realistic given potential changes in future retirement behavior. Alternatively, PJM might label generators as "retiring" instead of "investing" if they exceed an age percentile compared to similar units in PJM (e.g., Is this coal plant older than 75% of other coal plants in PJM?) for classes of generators during the given time horizon.[13] PJM could also combine age with one or more other variables at this initial screening stage, such as heat rate (which is a measurement of plant efficiency).[14] With two variables, PJM might assume that a generator would retire if it exceeds a given percentile for each variable. Whatever approach PJM takes, it should vary the selection criteria across its different long-term planning scenarios given the uncertainty inherent in picking any age-based threshold, as discussed in Section V.

Step 2: Invest-or-Retire Self-Reports and PJM Vetting

Second, for plants that are not screened out by age, PJM can require generation owners to self-report how they intend to comply[15] with any applicable invest-or-retire policies. Notwithstanding the opportunities for strategic behavior, self-reports could be a valuable step, because generation owners would be well-positioned to know unit-specific upgrade costs, e.g., the costs of installing carbon capture and sequestration at a specific location.[16]

But given the risk of strategic behavior, PJM should review generators' self-reports regarding how they anticipate responding to invest-or-retire policies for persuasiveness. One possibility (but certainly not the only option, if the administrative burdens would create unreasonable delays) would be for PJM to require generators to submit calculations underlying their asserted financial rationale for invest-to-comply or retire-to-comply decisions. PJM could then vet these (e.g., by comparing estimated compliance costs with those of other generation owners and with any governmental estimates accompanying the relevant invest-or-retire policies[17]). This process could draw from PJM's existing process for establishing market seller offer caps in the capacity market, which also depends on years-forward forecasts of costs and revenues.[18]

To minimize strategic reporting, regardless of whether PJM is vetting the self-reports, PJM should standardize and align certain parameters for generation owners to use in their calculations, such as expected fuel costs and expected capacity market prices, to the values that PJM is assuming in that long-term scenario. Otherwise, generation owners might make self-serving assumptions about the future that are

[13] When applying any age-based criterion, PJM should consider whether to separately analyze merchant plants and plants owned by vertically integrated utilities, given their different incentives around capital investments and different cost-recovery mechanisms. *See* Meredith Fowlie, *Emissions Trading, Electricity Restructuring, and Investment in Pollution Abatement*, 100 AM. ECON. REV. 837, 841–45 (2010).

[14] *See What is the efficiency of different types of power plants?*, U.S. ENERGY INFO. ADMIN., https://perma.cc/5XDP-TYCH (last updated May 15, 2024).

[15] Contrary to the wording of PJM's Question 1, a generation owner can "comply" with an invest-or-retire policy either by investing or retiring.

[16] Because of the differences between merchant generators and vertically integrated utilities, PJM should consider whether state regulators should provide input in lieu of, or in addition to, self-reports from vertically integrated utilities. *See supra* note 13. Order No. 1920 requires PJM to use the best available data, and PJM should evaluate submissions based on attendant circumstances like regulatory status.

[17] *E.g.*, Env't Prot. Agency, Greenhouse Gas Mitigation Measures for Steam Generating Units: Technical Support Document 50–52, Docket No. EPA-HQ-OAR-2023-0072 (2024).

[18] PJM INTERCONNECTION, OPEN ACCESS TRANSMISSION TARIFF ATTACHMENTS DD6.4, 6.7, 6.8 (2024).

inconsistent with PJM's chosen inputs to its long-term scenarios, making the long-term scenarios implausible because the assumptions would lack internal consistency. Section V revisits this issue of internal consistency for inputs that PJM varies across its long-term scenarios.

Step 3: Financially Mediated Policies

Third, for all fossil-fuel generators that pass an age-based screen—and either make a persuasive case at step 2 showing they will respond to invest-or-retire policies by investing, or are not subject to any invest-or-retire policies—PJM should implement Order No. 1920 by testing for policy-driven retirements that are financially mediated. Examples of such policies include the Regional Greenhouse Gas Initiative and Inflation Reduction Act tax credits for zero-emissions generation[19] and zero-emissions investment.[20] Although PJM's October 1 presentation stated that "PJM will not consider for identifying retirements those policies that impact market behavior but do not expressly mandate retirement,"[21] this does not comport with Order No. 1920's requirements. Order No. 1920 obligates PJM to model the effects of "incentives (e.g., tax credits)."[22] Incentive policies will indirectly cause retirements by reducing revenue for some existing fossil-fuel generators. One possible way for PJM to account for these additional policies when identifying policy-driven retirements would be to conduct dispatch modeling and evaluate whether, in light of incentive policies, fossil-fuel generators would earn sufficient revenues.[23]

> *2. Corporate retirement commitments - These are publicly announced deactivations made by generation owners but are still "unofficial" (meaning they have not submitted a deactivation notice to PJM)*
>
> *a. How should a process work for obtaining awareness of private retirement commitments made by generation owners without an official deactivation notice submitted to PJM?*
>
> *b. How should PJM verify that the generation owner intends to retire by the publicly announced date?*

III. The Recommendations From Sections I and II Apply Equally to Announced Deactivations and Announced Retirements.

While PJM's Question 1 focuses on a procedure for generation owners to demonstrate that their units will remain operating and Question 2 focuses on a procedure for demonstrating intent to retire, PJM should not bifurcate its implementation of policy-driven retirement forecasts in this way. Rather, as explained in Section I, opportunities for strategic reporting exist in connection with both retirement announcements and remain-in-service announcements. PJM should use the three-step process described in Section II to

[19] 26 U.S.C. § 45Y.
[20] 26 U.S.C. § 48E.
[21] POLICY-DRIVEN DEACTIVATION METHODOLOGY, *supra* note 7, at 8. Policy Integrity understood this statement to refer to PJM's anticipated compliance with Order No. 1920, but it is also possible that PJM was referring only to the old Workshop Policy Study and that PJM does intend to model policy-driven retirements that are financially mediated together with ones that PJM specifically flagged in its notice.
[22] Order No. 1920 at P 433. In other non-retirement aspects of PJM's long-term transmission planning modeling, PJM will also need to account for all other state policies including renewable portfolio standards and decarbonization mandates.
[23] Again, differences may be appropriate for plants owned by vertically integrated utilities given their cost recovery mechanisms. *See supra* note 13.

develop its policy-driven retirement inputs for both situations. Even when a generation owner indicates that a unit will retire earlier than would be necessary to comply with an invest-or-retire policy, PJM should require a showing similar to that described in Section II.

3. Additional policies not currently considered

a. Are there other specific policies that PJM should be accounting for when identifying policy-driven deactivations? If so, please provide the policy and indicate how it would impact a resource from remaining in operation.

IV. PJM Should Consider All Relevant Policies When Developing Policy-Driven Retirement Inputs

Because PJM must consider policy-driven retirements that are financially mediated, there is a much wider universe of relevant policies than the seven identified in PJM's presentation.[24] PJM will need to reexamine all prior policies submitted through the Regional Transmission Expansion Plan state policy workbook process,[25] all additional policies submitted by stakeholders, and any additional policies that PJM itself may identify as relevant, to accurately assess policy-driven retirements. Additionally, PJM should make its translation of those state policies into retirement input assumptions transparent and readily reviewable by all stakeholders so that there is at least one opportunity for iteration on the policy-operationalization methodology between the implementing states, PJM, and other key stakeholders.

4. Other assumptions about policy-driven retirements

a. Is there anything else that PJM should be considering on this topic?

V. To Account for Uncertainty, PJM Should Tailor Its Assumptions About Policy-Driven Retirements to the Distinct Attributes of Each Long-Term Planning Scenario.

Regardless of PJM's ultimate policy-driven retirement input methodology, Order No. 1920 requires PJM to create at least three plausible but diverse long-term planning scenarios.[26] While PJM must assume that impacted entities comply with federal, federally recognized tribal, state, and local laws and regulations,[27] PJM should recognize that full policy compliance could still result in different retirement decisions throughout the region in each scenario.[28] For example, the same generator may react differently to an invest-or-retire policy depending on variables like the future cost of fuel. Similarly, policy-driven

[24] POLICY-DRIVEN DEACTIVATION METHODOLOGY, *supra* note 7, at 5–7, 10–13.
[25] *See* MATTHEW BERNSTEIN, PJM INTERCONNECTION, STATE POLICIES WORKBOOK OVERVIEW (2024), https://perma.cc/94WJ-3G4U.
[26] Order No. 1920 at P 575.
[27] *Id.* at P 507.
[28] *See id.* at P 229 ("[B]y requiring transmission providers to use Long-Term Scenarios in Long-Term Regional Transmission Planning, this final rule provides transmission providers with a critical tool for managing uncertainty, facilitating regional transmission planning that accounts for a range of potential futures, as well as an assessment of the likelihood of each scenario manifesting, when identifying, evaluating, and selecting Long-Term Regional Transmission Facilities.").

retirements that are financially mediated will be exacerbated or blunted depending on other compounding factors.

There are many ways that PJM could create diverse but plausible scenarios reflecting different inputs for policy-driven retirements. If PJM uses age-based screening as a first step, PJM could account for the uncertainty in how policies will affect retirement by choosing distinct age thresholds for each scenario. These distinct thresholds should align with PJM's other scenario-specific assumptions that affect how hospitable the scenario would be for the continued operation of each fossil-fuel technology. For example, if PJM had one scenario that was less hospitable to the continued operation of coal than the base scenario due to lower natural gas prices and lower capacity prices, PJM could use a lower age threshold for coal in that scenario. This approach would parallel how the Midcontinent Independent System Operator used three sets of retirement ages for different generation technologies across its three scenarios in its Long Range Transmission Planning (e.g., 46 years, 36 years, and 30 years for coal plants).[29]

Similarly, when PJM solicits self-reports, instead of asking generation owners how they intend to comply with retire-or-invest policies and leaving it to the generators to come up with their own assumptions about the future, PJM could ask how they would comply in (at least) three different scenarios, each with distinct PJM-supplied assumptions. These PJM-supplied assumptions would accord with the rest of PJM's inputs for that scenario, such as PJM's inputs for factor category four, which includes "trends in fuel costs and in the cost, performance, and availability of generation, electric storage resources, and building and transportation electrification technologies."[30] For example, PJM could give generators three sets of assumptions about fuel costs, carbon capture and sequestration costs, capacity prices, etc., and ask generation owners how they would behave in each case. Because these would be the same assumptions that PJM would use for that scenario generally, there would be internal consistency between PJM's assumptions and the generation owners' assumptions. Without this alignment between PJM's and generation owners' assumptions, long-term scenarios would be less plausible, as generation owners might be basing their self-reports on projections about the future that conflict with the scenarios in which these retirements would occur. Depending on the details of this process, PJM may need to institute confidentiality protections by aggregating generators' anticipated operational status across zones, to protect individual generator information.

For retirements driven by financially mediated policies, PJM could apply the distinct assumptions about future market conditions and technology costs that are characteristic of each scenario when checking whether plants would still be profitable given their anticipated revenues. Again, these different assumptions would line up with PJM's long-term scenarios, such that the assumptions underlying other PJM scenario factor inputs would be the same assumptions applied when evaluating the effects of incentive policies.

[29] *See* MISO FUTURES REPORT, *supra* note 10, at 21.
[30] *See* Order No. 1920 at P 456.

Sincerely,

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