Long-Term Transmission Planning Reform Workshops Feedback

PJM received the following comments in response to its "call for feedback" during the February 8, 2022 Long-Term Transmission Planning workshop session. PJM referred stakeholders to its Feb 8 Presentation that was meant to seed the discussion and raises some questions for your consideration.

Comment 1

The challenge to scenario planning in a multi-state RTO is, who speaks for each state? for each stakeholder group? How do differences of opinion get resolved regarding assumptions? As I recall, voting rights and governance issues took a great deal of time during EISPC, and that round of regional planning was informational only, not for actual transmission buildout. PJM should consider sponsoring planning at a subregional level, where perhaps adjacent states will more easily find interests that align. The second major challenge is that transmission is left chasing its tail because tax credits and corporate green goals are driving the generation market, and transmission is left in a reactive position. I see no resolution to this problem any time soon.

Comment 2

**** fully supports planning for future scenarios and modelling anticipated future generation in the regional planning process. It also supports augmenting existing processes to further such efforts.

Whatever changes PJM seeks to make to foster enhanced long-term transmission planning, it must (1) do so in coordination with transmission owners first while also briefing other impacted PJM members; and (2) maintain reliability as the primary driver, as grid reliability is the essential goal and requirement of regional transmission planning.

To eliminate uncertainty, scenario planning should be based on defined shorter-term planning horizons of 5 to 7 years. However, where appropriate, longer-term planning horizons of 10 years or greater could be employed. Employing longer planning windows would better allow PJM to address future issues and generation project needs.

Potential scenarios should more specifically account for state and federal public policy initiatives on renewable generation and the anticipated resulting resource change. This should also include consideration of the commercial customer goals of increasing their reliance on renewable generation. Scenarios may also consider resource adequacy issues on a probabilistic basis

PJM and TO Planners must also consider state partialities such as preferences for use of existing rights-of-way and brownfield sites versus greenfield sites in the planning process. Consideration of these issues in the planning process will benefit all developers as they need to get projects sited and developed in what can be contentious state planning procedures

PJM should continue its work with OPSI and consider commencing collaboration with the TOs to evaluate zones with high potential for renewable generation development, including offshore wind locations. The planning process could culminate in the identification of potential renewable zones.

PJM needs to also work with the TOs to recognize the cost and cost allocation issues associated with implementing scenario-based planning. The PJM TOs have responsibility for cost allocation in PJM and PJM needs to foster discussions that include both TOs and states to determine how to allocate the costs for transmission projects necessary to accommodate new generation resources in renewable zones.

If PJM wants to pursue these workshop discussions, it must also take steps to mitigate the risk that actual demand and needs do not match the anticipated scenario upon which projects were planned and investments made.

Lastly, we agree with PJM that scenario-based planning, if used properly, could be a useful tool for identifying worthwhile transmission enhancements for increasing the resiliency of the grid to extreme weather.

- o Extreme weather events are becoming more frequent and of greater intensity.
- o Traditional cost-benefit analysis for transmission upgrades that assumes a statistical normal distribution of weather extremes does not capture true risk of such events occurring.
- o PJM and TO planners should work together to explore employing more sophisticated statistical techniques than are currently used in order to create appropriate scenarios for study

Comment 3

My understanding is that for Long-Term Planning studies PJM currently relies on existing generation and generation that has reached the FSA stage, and then if more generation is required the existing + FSA stage generation will be scaled up to perform the Long-Term Studies. Currently PJM's markets (the RPM capacity market in particular) are sending a signal for coal generation to retire. I understand that it is PJM's practice to include deactivation requests that have been received. However, given market conditions there is the potential for a precipitous retirement of coal generation, especially given the impact of new environmental regulations (CCR rule). Further, PJM recently published whitepaper entitled Energy Transition in PJM: Frameworks for Analysis that contemplates high renewable penetration. The "accelerated" scenario requires capacity reserve of 78% above peak load which translates to the need to retain or replace about 85% of the existing thermal generation (about 155 GW) to accommodate 125 GW of new renewable generation. The "accelerated" case also assumes about 13% of annual energy would still be generated by coal, however, in some hours of the year there would be enough renewable generation on line to generate 130% of the PJM load. There is a need to retain or replace balancing generation that is currently receiving a market signal to retire and that market signal will get worse as this balancing generation runs less as it is displaced by new zero marginal cost renewable generation. Further, if the "accelerated" scenario could accommodate the retirement of half of PJM's coal generation, the other half would become even less viable because the coal supply chain may become unviable.

In summary -- the current practice of studying existing gen + FSA gen and scaling up if necessary is likely to totally miss extreme changes in generation reserves and generation mix that are likely in the not to distant future. Long-Term Planning is not about studying today's system, but about studying the system we are likely to have in the future so we can spot reliability problems while we still have time to react.

At a high level, the increasing penetration of renewable generation, and likely accelerated deactivations

of existing balancing generation has big implications for Resource Adequacy and Transmission Security. Yes, RMR contracts can mitigate the impact of Transmission Security but they would even further degrade the market signals to generation. Further, while it may be possible to maintain transmission security with RMR, there is a cost to it, and there is a cost to the transmission that is built to accommodate the deactivation.
At a lower level Resource Adequacy is impacted by fuel security which will be impacted by the change in resource mix as coal and nuclear generation retire and are replaced by gas or not replaced at all.

The PJM transmission system could look very different inside the time horizon of Long-Term Planning. The changing mix and reserve levels and changes in the amount of Essential Reliability Services (being catalogued by the Operating Committee) need to be considered from both a reliability and cost standpoint.

Comment 4

We are concerned about how the process to 'build out' the transmission system for future needs will be established. We have observed that forecasts and expectations of needs have vastly differed from actual needs during prior major shifts in resource mix and locations, including when those forecasts were based on expectations around coal by wire and the unforeseen growth of Marcellus shale gas generation. Implementing transmission build outs based on forecasting what was thought to be needed to meet the needs for long term changes for those prior trends would have been difficult and likely resulted in unnecessary line construction. The difficulties and likelihood of forecast error is even greater with the anticipated growth of intermittents. However, all past generation spurts seemingly have benefited from a strong backbone transmission system. The same is likely to be true for integrating vast numbers of new intermittent resources on to the grid, irrespective of whether or not anyone could realistically predict exactly where the new resources are likely to locate. We think that if speculative transmission building is ordered, strengthening the high volt transmission system to facilitate greater zonal transfers of energy will likely have value whether or not the specific scenarios materialize. Increasing transfer capability between RTOs will also facilitate greater bulk transfers.
Our other concern is cost to customers. Customers can only afford to pay so much for transmission costs. That total transmission cost they pay must include necessary local projects to ensure reliability and economic growth. Excessive speculative transmission building will ultimately reduce projects that absolutely benefit paying customers. This balance must be maintained.

At the end of the day, we believe that system reliability must remain the focus for long term transmission planning.

Comment 5

As PJM reviews its current RTEP Process and gathers stakeholder input on process enhancements, *** offers the following for consideration:
Enhanced modeling assumptions should be added to the RTEP process including:

- A 10 15-year planning horizon,
- Shoulder month inclusion (minimum, peak, and light load conditions) in planning analyses,
- Changes to light load case development to reflect actual light load conditions
- Use of historic trends and forecasted generation dispatch in each loading condition.

Improved model benchmarking, including real-time cases to ensure models are as accurate as possible and use of consistent metrics across short- and long-term time horizons.

- Annual benchmarking of summer/winter peak, light load, shoulder month loading and minimum loading and use of load profiles from these cases rather than generic load curves.
- Incorporate AAR ratings in PROMOD

Enhanced project selection evaluation to ensure selected solutions address the immediate reliability issue and provides options for expansion to address longer term planning needs/solutions including testing loading conditions to ensure adequate headroom to and a projects ability to provide reliable service for the foreseeable future.

Comment 6

Thank you to the PJM staff for timely kicking off stakeholder discussions to consider possible areas for reform within PJM based on the recent FERC Advanced Notice of Proposed Rulemaking (ANOPR) on Building for the Future Through Electric Regional Transmission Planning and Cost Allocation and Generator Interconnection. While the ANOPR focuses considerably on process improvements regarding transmission planning, generation interconnection, and cost allocation within both methods, now is an opportune time to work towards a holistic approach in planning the grid of the future by pursuing the development and adoption of criteria for scenario-based transmission planning.

PJM's initial workshop highlights the key goal to Develop a robust, scenario-based transmission planning criteria that analyzes an array of future generation expansion scenarios based on a documented record of customer needs and a series of regulatory checkins that can prudently establish guard rails that help avoid either overbuilding or underbuilding the future transmission system. With federal, state, and private industries drastically shifting to meet renewable objectives in the near and longer-term horizon, it is incumbent on PJM and its stakeholders to proactively consider how to best incorporate these goals and others into the planning process so that the transmission system can be optimally designed and built to accommodate these multi-driver needs.

In the ANOPR, *** submitted comments supportive of the Commission enhancing the planning processes within the region to incorporate scenario-based planning. *** comments explained that as the Commission suggests, to more efficiently and cost-effectively integrate clean energy resources supported by state, federal and private policy objectives, the industry must adopt a more proactive and actionable approach to regional transmission planning. Such planning should evaluate numerous future scenarios using probabilistic analysis to identify the infrastructure that is the most likely to be needed and ensure that it is built cost-effectively and timely. The Commission therefore should require regions to proactively plan regional transmission based on future scenarios that consider policy drivers and other expected grid-related developments. At the same time, the transmission planners must continue to perform traditional planning studies so as to ensure continued transmission system reliability.

Essentially, PJM and its stakeholders should work towards an actionable approach for scenario-based transmission planning that allows for the development of infrastructure necessary to address specific violations that are determined through the various scenarios PJM would study so as not to overbuild or under-build the system. As an example, if PJM studies certain scenarios that may include generation deactivation based on state legislation, private industry renewable goals from the tech and other sectors, and electrification efforts being pursued by state and local governmental entities, and if PJM's analysis identifies the same overloaded facilities under the these scenarios, then

PJM should view those violations as credible priorities and be able to order for those violations to be addressed through the appropriate planning mechanisms.

Additionally, scenario-based planning should remain separate and distinct from the existing RTEP studies, inclusive of the local planning process as identified in M3. The RTEP studies provide a bright-line approach to addressing NERC criteria and market congestion needs on an annual basis, whereas the M3 process allows for local customer needs to be addressed through projects driven by customer interconnections, asset health and performance, resilience, and operational improvements. Although, these processes should be maintained in order to continue to support reliability for our customers, an evaluation should be considered if in the event a scenario-based violation interacts with other planning needs and violations.

Comment 7

*** fully supports PJM's Long Range Transmission Planning initiative. It is important that PJM is already preparing proactively for future planning needs already being discussed on FERCs ANOPR under RM21-17. This forward-looking approach is necessary to complement the current RTEP process, given the speed and depth at which the PJM generation mix is evolving to de-carbonize the grid.
*** position is that an effective LRTP process should incorporate a number of key principles:

1. The goal of PJM LRTP should be to identify and support the development of transmission infrastructure that is sufficient to meet reliability and resource adequacy needs and support a competitive energy market and policy goals.
2. Solutions identified in the LRTP process should support federal, state, and local energy policy and member goals by planning access to a changing resource mix.
3. LRTP process should be as transparent as possible with all the data available to the stakeholders.
4. The LRTP process will need to include a number of scenarios or futures, as indicated in PJMs February 8th presentation. This type of scenario building has been difficult in other RTO stakeholder processes, so it would be important for PJM to work on those scenarios early on , to get the stakeholder input on parameters like load growth, RE penetration, changing load characteristics, hydrogen scenarios, retirements and changing gen mix, electric vehicles, distributed generation, and demand response.
5. The cost allocation mechanism should ensure that the costs are allocated based on anticipated benefits and not unduly burden interconnection projects.
6. The LRTP process should be coordinated with neighboring RTOs or utilities for efficient studies.

On a more technical note, we think it is important PJM has an education session of the technical studies to be performed as part of the LRTP. It is *** view that studies should include steady-state, short circuit, and stability analysis. Steady-state analysis should include the latest generation deliverability criteria once approved. Also, PJM should analyze particular needs for a future with high penetration of inverter based resources and identify if there are particular needs on inertia, weak short circuit ratio connections or other impacts.

Additional Comments received – posted for March 29th meeting

Comment 8

The idea is that PJM could develop a data model to predict a generator's likelihood to retire in the next (year / planning cycle ?) based on information that PJM has about the unit: first year of commercial operation, recent major equipment upgrades, queue uprates, capacity test data, etc. This would be akin to a queue project's commercial probability, but on the other end of the equipment lifetime. This information could provide PJM a rich dataset for constructing the transmission planning scenarios you mentioned. If a generator's likelihood to retire is above a certain threshold, its owner would have to provide some sort of certification on the anticipated remaining life of the unit.

Comment 9

Consistent with U.S. decarbonization goals and given the energy transition well on its way, **** believes there are other drivers that should be considered in PJM's RTEP processes. PJM and industry stakeholders do highlight tensions between reliability and affordability, but two key drivers missing are operationalizing flexibility within planning and grid operations and robust evaluation of least-regrets solutions. Representing solar, storage, demand response, EV charging, and other clean tech innovators, **** would be pleased to present how robust bi-directionality metrics can provide more meaningful planning analysis scenarios and trigger full stack flexibility market solutions. While prudency, scenario creation, future choice consideration, and including short- and long-lead triggers associated with present and future trends are good principles, we believe there are more foundational principles that better guide planners in addressing tensions between stakeholders under the energy transition. The industry therefore needs to define the principles for acting on innovation and operationalizing bi-directionality market signals, both for interconnection of new generation, storage and increasingly controllable load, and system-wide clean energy infrastructure investments like additional transmission lines or grid enhancing technology. And for those stakeholders who invest in the longest-term assets, the highest capital cost solutions, we need better principles for determining best value, lowest costs and ultimately least-regrets solutions. We therefore need the following principles: (1) Defined customer rights that put customers at the center of grid modernization and that support their ability to make data informed reliability and resiliency investments, leveraging their value for all customers for the most affordable grid. (2) Aligned incentives so that monopoly operators act in the interests of all consumers. Special attention should focus on mitigation and where possible removing data and customer relationship monopolies. (3) Cost reflective charges for monopoly services that reflect incremental costs and benefits of how consumers and other parties use the system. This includes minimizing harmful distortions arising from the recovery of fixed charges for using energy networks. (4) A level playing field so that all technologies and business models can compete equally, without barriers to entry to the market. (5) Efficient allocation of risk so that those best placed to manage the uncertainty inherent in a rapidly changing system shoulder the risks involved. (6) Harnessing markets and competition where it can bring benefits to consumers. (7) Support for vulnerable communities to address energy bill burdens and build resiliency. With cost effective energy storage applications increasingly present everywhere and given the inherent grid modernization uncertainty in prioritizing transmission, distribution or even customer own distributed energy resources investments, **** believes ISO/RTO's should lead these contested bi-directionality investment conversations and they start with more robust guiding principles and better industry processes for full engagement in planning modeling and outcomes. We believe these principles will better structure answering your discussion questions.