



Regional Transmission Expansion Plan (RTEP) Market Efficiency (ME) Process

Problem / Opportunity Statement

PJM's market efficiency planning is an evaluation process that results in facilities planned to achieve economic efficiencies and it is designed to among other things:

1. Determine which reliability upgrades, if any, have an economic benefit if accelerated.
2. Identify new transmission upgrades that may result in economic benefits.

PJM has conducted multiple ME cycles (2014/15 and 2016/17) since implementing our Order 1000 processes. This problem statement captures challenges and opportunities for improvements that have become evident.

Benefit-to-Cost Calculation

PJM performs market simulations and produces benefit/cost analyses of projects specifically targeted for economic efficiency. Annual benefits are based on PROMOD simulations in four years between the current year and 10 years out, interpolated between the simulation years, and extrapolated beyond 10 years out. The net present value (NPV) of annual benefits is calculated for the first 15 years of an upgrade's life. This NPV is compared to the NPV of the upgrade's revenue requirement for the same 15-year period to determine if the upgrade is cost beneficial. Consistent with PJM's Operating Agreement, if the ratio of the NPV of benefits to the NPV of costs exceeds 1.25, then the upgrade may be recommended for inclusion in the PJM Regional Transmission Expansion Plan (RTEP).

In order to realize the objective of identifying new transmission upgrades that will result in economic benefits, it is vital to recognize that the calculation of future benefits is inherently uncertain. Future market conditions cannot be known with certainty and future market models must rely on many assumed variables. Benefits that are extrapolated beyond the last PROMOD study year are particularly speculative. This is in contrast to the relative certainty of project costs and transmission rates in successive years. Thus, the calculated net benefit to PJM (reflected in the benefit-to-cost ratio) is less certain in successive years.

Larger projects which are likely to have a later in-service date are evaluated using more years of benefits in increasingly uncertain years than a simpler project with an earlier in-service date. The evaluation of a project expected to be in-service five years out, for example, would rely on extrapolated benefits for two-thirds of a 15-year evaluation period.

In an attempt to ensure proper benefit of Market Efficiency proposals are captured in the evaluation process, the current methodology in developing Market Efficiency benefit calculation should be reviewed and necessary enhancements to address existing uncertainties in the calculation may be adopted.

Facility Service Agreement (FSA) Modeling

PJM Operating Agreement Schedule 6 section 1.5.7 states: "Addition of Customer Facilities pursuant to an executed Interconnection Service Agreement, Facility Study Agreement or executed Interim Interconnection Service Agreement for which Interconnection Service Agreement is expected to be executed. Facilities with an executed



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Facilities Study Agreement may be excluded by the Office of the Interconnection after review with the Transmission Expansion Advisory Committee". Currently PJM is able to exclude FSA resources from its Market Efficiency basecase upon reviewing these assumptions at TEAC on an as needed basis.

PJM currently includes new generation with an executed FSA and any associated network upgrades in the base case for market efficiency analysis. These units are generally on-line in the simulations. This results in having more generation available in the market efficiency simulations than is likely to exist in future years given that many of the projects with executed FSAs may not ultimately interconnect with the system. With recent relatively slow trend in load growth, PJM believes that it is perhaps appropriate to revisit the existing practice and discuss the merits of this technique or explore new opportunities for improvement while preserving overall data quality of the Market Efficiency base case.

Market Efficiency Window

Currently, both energy and capacity market congestion is addressed via the long-term Market Efficiency window, which occurs from November first to end of February on a biennial basis. However constraints in PJM's capacity market can be identified annually. Given that, under the default project solicitation approach, once a capacity market constraint is identified it could take 2 or 3 years or more before the transmission solution could be implemented in the capacity market. During the most recent cycle, PJM conducted a special short-term RPM window to address known congestion in our most recent base residual capacity auction. PJM believes a structured approach is necessary to address this existing gap.

PJM conducts a FERC mandated stage 1A Auction Revenue Right 10 year analysis in an attempt to preserve minimum ARR transmission rights for its firm transmission customers. If unresolved violations exist, PJM is required to develop transmission solutions to ensure the aforementioned requirement is satisfied. This analysis is conducted on an annual basis and results are discussed at the Transmission Expansion Advisory Committee. While the necessary transmission solutions to mitigate violations from this analysis do not require the need to satisfy Market Efficiency benefit-to-cost metric, the process in which PJM implements the appropriate solution shall be consistent with the spirit of FERC order 1000. Also, given the fact that this is an annual analysis and to the extent there is an immediate need to address a violation stemming from the analysis, the existing Market Efficiency window might not be the best avenue to implement transmission solutions for this requirement. PJM believes a structured approach is also necessary to address this existing gap similar to the previously discussed capacity market challenge.

Interregional Market Efficiency Project Selection Process

PJM's regional project selection criteria require that a project must address targeted regional congestion driver for which the project is being evaluated. PJM also evaluates interregional projects that may provide market efficiency benefits for PJM by relieving an internal PJM flow gate or an interregional market to market flow gate. Market efficiency process documentation should be reviewed and updated as required to recognize the evaluation of both regional and interregional projects.

Market Efficiency Reevaluation Process



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PJM OA Schedule 6 Section 1.5.7 states: "To assure that new Economic-based Enhancements or Expansions included in the Regional Transmission Expansion Plan continue to be cost beneficial, the Office of the Interconnection annually shall review the costs and benefits of constructing such enhancements and expansions. In the event that there are changes in these costs and benefits, the Office of the Interconnection shall review the changes in costs and benefits with the Transmission Expansion Advisory Committee and recommend to the PJM Board whether the new Economic-based Enhancements or Expansions continue to provide measurable benefits, as determined in accordance with subsection (d), and should remain in the Regional Transmission Expansion Plan."

PJM's business practice manuals should be reviewed and updated as required to clarify specifically how the market efficiency project reevaluation process is implemented. This review should include a consideration of the number of market efficiency projects in the RTEP, the order in which the projects are reevaluated, and other assumptions including transmission topology, generation, fuel costs and facility expected in-service dates.

Issue Source

RTEP Market Efficiency process existing challenges identified in the problem statement were observed during 2014/15 and 2016/17 cycles.

Stakeholder Group Assignment

PJM proposes that this issue be addressed at the RTEP Market Efficiency Process Enhancement Task Force (MEPETF).

Key Work Activities

The MEPEFT will focus on following work activities:

1. Education material for the identified challenges
2. Explore alternatives (if any) to address the identified challenges
3. Review and endorse necessary governing document language and manual language to effectuate any alternatives

Expected Deliverables

The MEPETF will be expected to deliver:

1. Recommendations to the PC on any necessary changes and respective governing document and manual revisions to address the challenges discussed in the problem statement

Expected Overall Duration of Work

It is PJM's desire to complete this problem statement through the stakeholder process by July 1, 2018 so that PJM can implement necessary changes prior to the 2018/19 Market Efficiency window (November 1, 2018).

Decision-Making Method

Tier 1, consensus (unanimity) on a single proposal



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