

Guidelines for Market Efficiency Projects Selection Process

Schedule 6 section 1.5.8 (e) of the PJM Operating Agreement discusses Market Efficiency criteria used in considering the inclusion of Market Efficiency projects in the recommended plan. This document provides 'bright line' primary and 'other' secondary consideration criteria that could be utilized as guidelines in order to facilitate the recommendation process.

'Bright line' Primary Considerations –

1) Congestion Mitigation:

Consistent with the Operating Agreement (OA) Schedule 6 section 1.5.7 (b) (iii) and OA Schedule 6 section 1.5.8 (e), a Market Efficiency proposal will relieve one or more economic constraint(s). If a proposal is submitted to mitigate one congestion driver, then in order to meet this criteria the proposal shall relieve projected congestion on the driver by at least \$1. Similarly, if a proposal is submitted to address multiple congestion drivers, then in the order to meet this criteria the proposal shall relieve projected congestion on all the drivers by at least \$1.

(Economic constraints may be either energy or capacity market congestion. Energy market uplift charges typically born due to local reactive support issues are addressed in the Operational Performance category.)

2) Benefit/Cost (B/C):

Consistent with the OA Schedule 6 section 1.5.7 (d), a Market Efficiency proposal addressing one or more target congestion driver(s) must meet a B/C ratio threshold of at least 1.25:1, calculated over the first 15 years of the life of the proposal. The B/C ratio is calculated using the procedure described in Manual 14B, section 2.6.5. The Market Efficiency Discount Rate and Fixed Carrying Charge Rate are subject to change for any given 24-month Market Efficiency cycle. Therefore, during every cycle, these values are published along with other Market Efficiency input assumptions. Rates published during the 2016/17 cycle are documented in the appendix.

3) Cost Estimate Review:

Consistent with the OA Schedule 6 section 1.5.7 (g), for a Market Efficiency proposal with costs in excess of \$50 million, an independent review of such costs will be performed.

A proposal that does not meet the minimum B/C ratio test will not proceed further in the analysis to address the specific congestion constraint(s) for which it was submitted. However, the proposal will not be necessarily rejected because, the proposal, or a portion of the proposal, could be combined with other proposal(s) or a portion of other proposal(s) to address specific congestion issue(s) or other congestion issues as part of an overall plan to address system wide congestion issues. Any project that is composed of previously submitted, but heretofore not accepted; proposals will undergo the same consideration criteria listed above.

Similarly, a proposal that meets the minimum B/C ratio test will not proceed further in the analysis to address the specific congestion constraint(s) for which it was submitted if the proposal does not relieve the specific constraint(s) congestion. However, the proposal will not be necessarily rejected because,

the proposal, could relieve system level congestion and as a result it could relieve congestion on some other congestion constraint(s) in the system.

'Other' Secondary Considerations –

When primary considerations do not identify an obvious cost effective solution, differentiate between proposals, or if PJM decides that further analysis is required to address potential constructability and reliability consequences, then some or all of the following secondary factors shall be considered in the Market Efficiency projects selection process. (For example, a project proposal with a high 10:1 B/C ratio is clearly cost effective, but a proposal with a lower or marginal B/C ratio closer to 1.25:1 may require other considerations to be addressed)

1) Zonal/Total Savings:

Consistent with the OA Schedule 6 section 1.5.7 (e), a Market Efficiency proposal with zonal/total benefits such as production cost savings, load payments (net and gross) reductions, Auction Revenue Rights (ARR) credits, total system congestion savings, capacity market savings (capacity market cost savings and load capacity payments savings) shall be considered during the final selection process.

2) Risk Evaluation:

Cost escalation risks, schedule delay risks, and project development risks, such as siting and permitting, shall be considered during the final selection process. PJM will assess the applicable risks, consider their impacts on the execution of the project, and consider that analysis in the selection decision.

Cost escalation risks can be addressed with cost containment provisions that may be included by the project sponsor in the proposal. In such cases, PJM will evaluate the risk mitigation of the cost containment provisions by a subjective analysis of the potential for cost escalation and the ability of the cost containment proposal to address the risk for those aspects of the proposal for which the cost containment provisions apply. To the degree that the analysis confirms risk mitigation benefits, the proposal with cost containment will be given preference in the overall selection process.

3) Sensitivity Evaluation:

Consistent with the OA Schedule 6 section 1.5.3, sensitivities of future conditions shall be considered within the Market Efficiency project selection process in order to mitigate the potential for inappropriately including or excluding Market Efficiency projects. Some of these future sensitivities may include but are not limited to load forecast uncertainty, transfer level variations, fuel cost variations, generator retirements, and uncertainties as a result of constructability evaluation. The degree to which each sensitivity is applied in the selection decision varies with each proposal, but the magnitude of the potential economic impact of each sensitivity is the main driver. PJM typically will study future sensitivity impacts on load forecast variations and fuel (gas) cost

variations for eligible proposals. While the sensitivities may vary based on expected volatility, a reasonable range for load and gas sensitivities is documented in the appendix. Given the scenario where multiple projects are proposed to address the same congestion driver, all other factors being equal, PJM may select the proposal that exceeds 1.25:1 B/C for all the sensitivities considered in its selection process compared to other proposals that did not consistently meet the 1.25:1 B/C for all the sensitivities considered in the selection process.

4) Reliability Impact:

Prior to recommending a Market Efficiency project for board approval, PJM will perform a reliability impact study to ensure the proposed project will not create any reliability violations requiring additional reliability upgrades or expansions in addition to the proposed solution. Any reliability violations and resulting upgrade and expansion costs to mitigate those violations will be considered added costs to the initially proposed solution and will trigger a holistic evaluation effort including primary and other considerations, including recalculation of the B/C ratio. Such additional evaluation efforts may impact the overall performance evaluation of the project.

5) Outage Impact:

The duration of the outages and the transmission congestion associated with the outages required to install the project will be assessed. The outage congestion will not be included in the B/C ratio calculation for the project, but rather, as an ancillary cost sensitivity associated with the project.

Recommending RTEP market efficiency proposals –

Consistent with the OA Schedule 6 section 1.5.6(h), based on aforementioned primary and other considering factors, PJM will ultimately recommend proposals (for board approval) that relieve transmission constraints and which are economically justified.

Appendix:

Qualitative Examples

Example 1 – Comparing a Large proposal (>\$50M) with a Small proposal (<\$50M) relieving same congestion driver

When a large proposal is compared against a small proposal, following pros and cons are likely factors that may influence the selection process.

Type	Pros	Cons
Large	<ul style="list-style-type: none">➤ Relieves congestion driver significantly➤ Relieves additional system congestion	<ul style="list-style-type: none">➤ Cost and schedule risks➤ Outcome of sensitivities need to verify robustness
Small	<ul style="list-style-type: none">➤ Minimum cost and schedule risks➤ Sensitivities is a plus	<ul style="list-style-type: none">➤ Less relief on congestion driver➤ No additional system congestion relief

Example 2 – Comparing a Greenfield proposal with an Upgrade proposal relieving same congestion driver

When a Greenfield proposal is compared against an Upgrade proposal, following pros and cons are likely factors that may influence the selection process.

Type	Pros	Cons
Greenfield	<ul style="list-style-type: none">➤ Minimum outage related congestion	<ul style="list-style-type: none">➤ Siting, permitting and scheduling risks
Upgrade	<ul style="list-style-type: none">➤ Minimum siting, permitting and scheduling risks	<ul style="list-style-type: none">➤ Outage related congestion

Tables:

Rates	Values based on 2016/17 cycle
Discount Rate	7.4%
Fixed Carrying Charge Rate	15.3%

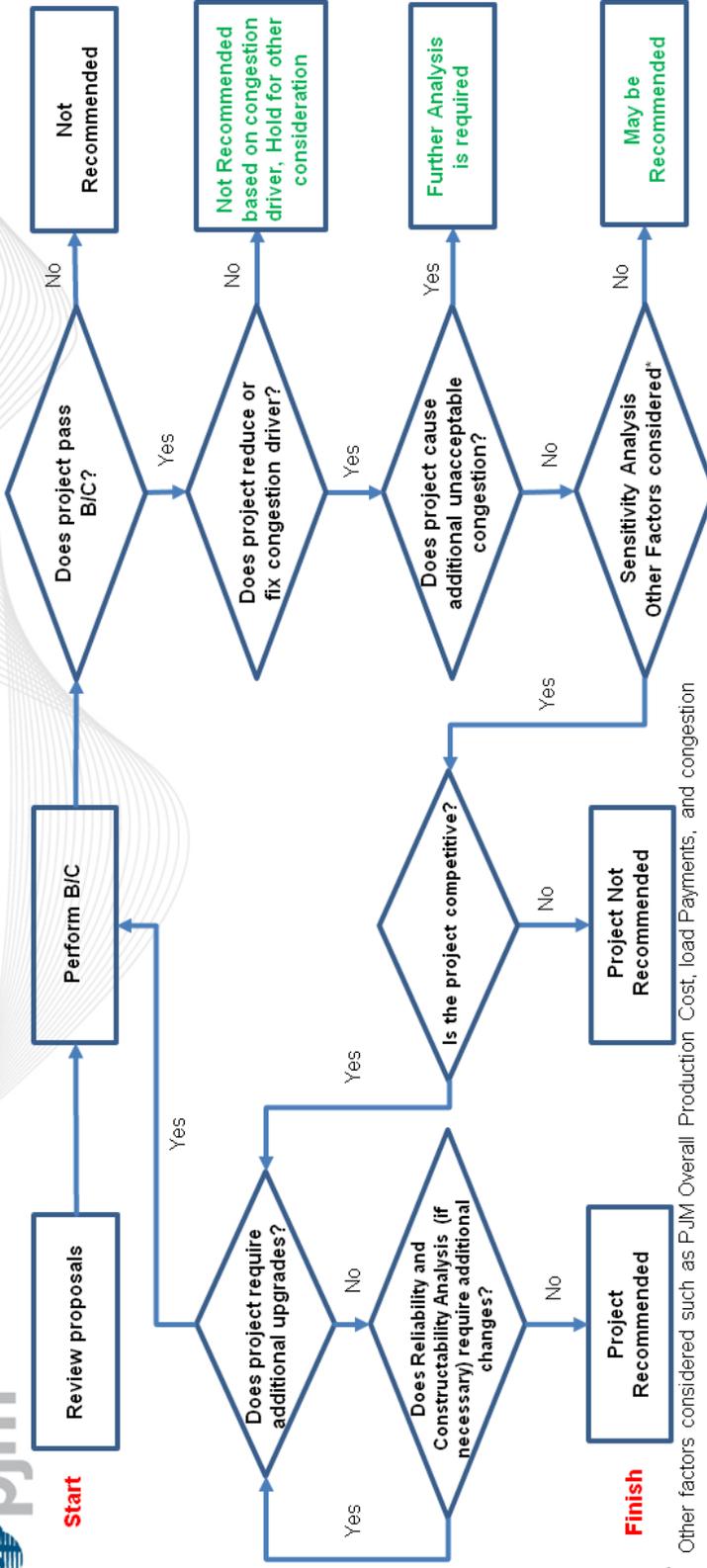
Table 1 – Discount and Fixed Carrying Charge Rates

Sensitivity	Range based on 2016/17 cycle
Load	Plus or Minus 2%
Gas	Plus or Minus 20%

Table 2 – Sensitivity Ranges



Market Efficiency Project Selection – Multiple Proposals per Congestion Driver



* Other factors considered such as PJM Overall Production Cost, load Payments, and congestion

Figure 2 – Project Selection Decision Tree for Multiple Proposals