Parametric Process Improvements Whitepaper

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Executive Summary

The parametric process is used during development of the Installed Reserve Margin (IRM) Preliminary Base Case (PBC) and Final Base Case (FBC) to evaluate impacts of model and assumption updates on the IRM before the subsequent Tan45 analysis. Because the parametric and Tan45 processes use different approaches to adjust the amount and location of capacity, differences between their results are expected. However, material divergence in recent study cycles has reduced the usefulness of the parametric process as an indicator of subsequent Tan45 outcomes. [1]

The NYSRC Installed Capacity Subcommittee (ICS) evaluated potential improvements to the parametric process with a focus on load forecast, generation, and transmission updates, which were identified as the primary drivers of material divergence between parametric and Tan45 results. [2] Testing found that the "Parametric Split" approach, which separately evaluates the Load Zones A-F (Upstate) and Load Zones G-K (Downstate) components of load forecast updates consistently reduced divergence from Tan45 in the cases evaluated. [3] [4]

Similar improvements were not consistently observed for generation updates, and material transmission changes may require evaluation beyond the parametric process. Based on these findings, the ICS approved the use of the Parametric Split approach for load forecast updates while retaining the existing parametric methodology for generation and transmission updates. [5]

The revised approach was implemented beginning with the 2027–2028 IRM study, with initial results showing closer alignment between the parametric process and subsequent Tan45 outcomes. The NYSRC will continue to monitor the relationship between parametric and Tan45 results and reevaluate the parametric methodology as appropriate, particularly if future changes are made to the Tan45 methodology.

1 Background

1.1 The Parametric Process

The parametric process provides an efficient means of estimating the incremental IRM impact of individual model and assumption updates during PBC and FBC development. These updates are evaluated sequentially, and the results help the ICS assess the impact of each update in isolation.

After each update, capacity is added or removed to return the system to the 0.1 event-days-per-year LOLE criterion. Capacity adjustments generally apply systemwide across Load Zones A-K. If an update affects only Upstate or Downstate, the adjustment is limited to Load Zones A-F or G-K, respectively. Within the applicable area, capacity additions/removals are allocated in proportion to each Load Zone's total Unforced Capacity (UCAP). [1]

1.2 Key Differences from Tan45

The principal distinction between the parametric and Tan45 methodologies is how each restores the system to the 0.1 event-days-per-year LOLE criterion. Tan45 develops an IRM-LCR curve that reflects the tradeoff between holding capacity Upstate (higher IRM and lower LCRs) or Downstate (lower IRM and higher LCRs). Tan45 then identifies the applicable balance of Upstate and Downstate capacity. The parametric process may limit adjustments to Load

[1] This UCAP reflects applicable derating and availability assumptions and does not represent perfect capacity.

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Zones A-F or G-K for regional updates but does not explicitly rebalance capacity between Upstate and Downstate.

A secondary distinction is the basis used to allocate capacity adjustments. The parametric process adds or removes capacity in proportion to total zonal UCAP in one step. Whereas Tan45 uses excess-UCAP ratios to inform the low-point on the curve. Additional curve points with higher IRM values are determined by shifting capacity out of Load Zones J and K in proportion to the capacity that could be removed from each in isolation.

For purposes of this whitepaper, "divergence" refers to the difference between the final parametric result for a study phase and the subsequent Tan45 result. Divergence between parametric and Tan45 IRM outcomes have been observed across multiple IRM study cycles. Historical results for the three preceding IRM study cycles are shown below. [2]

Table 1: Historical Parametric vs Tan45 IRM Comparison

Study Phase	Tan45 IRM (%)	Parametric IRM (%)	Delta (pp)
2024-2025 PBC	20.80%	19.31%	-1.49
2024-2025 FBC	23.10%	23.37%	+0.27
2025-2026 PBC	23.60%	25.08%	+1.48
2025-2026 FBC	24.40%	24.44%	+0.04
2026-2027 PBC	27.30%	25.82%	-1.48
2026-2027 FBC [2]	25.30%	27.51%	+2.21

Note: Delta is calculated as Parametric IRM minus Tan45 IRM. A positive value indicates that the parametric IRM was higher than the subsequent Tan45 IRM.

Historical divergence ranged from 1.49 percentage points below to 2.21 percentage points above the subsequent Tan45 IRM across the study phases reviewed. The 2026–2027 FBC produced the largest observed difference over the period reviewed. These results prompted a review of the parametric process to better understand the drivers of divergence and identify potential improvements.

[2] This Tan45 IRM represents the initial version and not the Special Sensitivity Case that was ultimately adopted by the EC as the final case.

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2 Objective

This whitepaper focuses on differences in IRM outcomes between the parametric and Tan45 processes. The objectives of this effort are to:

I. Identify the model and assumption updates that contribute to significant divergence between parametric and Tan45 IRM outcomes.
II. Assess potential modifications to the parametric process that could reduce divergence and improve its usefulness as an early indicator of subsequent Tan45 results.
III. Recommend targeted improvements while maintaining an efficient and transparent process that supports PBC and FBC development. [2]

3 Drivers of Divergence

Historical parametric and Tan45 results were reviewed alongside the material model and assumption updates to identify recurring contributors to divergence. The review identified load forecast, generation, and transmission updates as recurring contributors to divergence between parametric and Tan45 results. [2]

Load forecast updates can change the relative distribution of load between Upstate and Downstate. The 2026–2027 IRM study fall load forecast update was a significant contributor to the observed divergence and was used to evaluate potential improvements.

Generation updates can change the amount and location of available capacity. These updates can affect both the Upstate/Downstate capacity balance and the excess-UCAP ratios used in Tan45, which are not explicitly captured by the parametric process.

Transmission updates, particularly material topology changes, can alter transfer capability and the balance of capacity between Upstate and Downstate without changing zonal UCAP. Because Tan45 explicitly reflects these changes through capacity rebalancing while the parametric process does not, material transmission updates can produce different IRM impacts under the two methodologies.

4 Assessment of Potential Improvements

4.1 Options Considered

The NYSRC evaluated two modifications to the parametric process: the “Parametric Split” approach and the “Excess UCAP Shifting” approach. [4]

Parametric Split separates an assumption update into its Upstate and Downstate components. The Upstate component is applied first, and capacity is added or removed from Load Zones A-F until the 0.1 event-days-per-year LOLE criterion is restored. Then the Downstate component is applied, and capacity is added or removed within Load Zones G-K to restore the

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LOLE criterion. Within each component, capacity additions or removals are allocated among Load Zones in proportion to total zonal UCAP. The combined IRM and LCR impacts are reported as a single parametric line item. [3] This approach was evaluated as a potential improvement for updates that affect the relative balance between Upstate and Downstate.

Excess UCAP Shifting applies an assumption update across Load Zones A-K but allocates the required capacity adjustment using zonal excess UCAP ratios rather than total UCAP ratios. This approach was evaluated to determine whether incorporating the excess UCAP allocation used in portions of the Tan45 methodology would improve alignment between parametric and Tan45 results.

4.2 Testing and Findings

Testing was conducted in two stages. Initial testing evaluated both the Parametric Split and Excess UCAP Shifting approaches using the 2024–2025 FBC fall load forecast update, with the 2024–2025 PBC as a common starting point. Results from each alternative method and the current parametric methodology are compared with the corresponding Tan45 result. [4]

Table 2: 2024-2025 FBC Load Forecast Test, IRM Impact and Divergence from Tan45

Method	IRM Impact (%)	IRM Δ vs Tan45 (pp)
Tan45	0.25%	–
Parametric	0.93%	+0.68
Parametric Split	0.37%	+0.12
Excess UCAP	0.04%	-0.21

Note: IRM impacts represent the change from the common 2024-2025 PBC starting case after applying the FBC fall load forecast update. "IRM Δ vs Tan45" is calculated as each method's IRM impact minus the Tan45 IRM impact.

Both candidate methods reduced absolute IRM divergence from Tan45 relative to the current parametric method.

Although Excess UCAP Shifting reduced absolute IRM divergence, it also increased the Load Zone J locational capacity requirement (LCR) by 1.17 percentage points relative to Tan45. [4] Since Load Zone J had no excess UCAP, no capacity was removed from the zone, resulting in a higher Load Zone J LCR. NYSRC therefore did not advance Excess UCAP Shifting for additional testing.

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Based on the initial results, additional testing focused on the Parametric Split approach. The Parametric Split approach was tested across three additional updates using the 2026-2027 IRM FBC Special Sensitivity Case as the common starting point:

1) 500 MW of perfect capacity added to Load Zone D.
2) 500 MW of perfect capacity added to Load Zone J.
3) Evaluate the 2026-2027 fall load forecast update in isolation. Resetting load to the 2025 Gold Book forecast.

For each test, results from the current parametric method and the Parametric Split method were compared with the corresponding Tan45 result. [3]

Table 3: Parametric Split Testing, IRM Impact and Divergence from Tan45

Method	+500 MW Upstate Generation		+500 MW Downstate Generation		2026–2027 Load Forecast Revert	
	IRM Impact (%)	IRM Δ vs Tan45 (pp)	IRM Impact (%)	IRM Δ vs Tan45 (pp)	IRM Impact (%)	IRM Δ vs Tan45 (pp)
Tan45	-0.35%	–	-0.05%	–	0.26%	–
Existing Parametric	0.64%	0.99%	0.00%	0.05%	-0.84%	-1.10%
Parametric Split	-0.19%	0.16%	0.46%	0.51%	0.11%	-0.15%

The Parametric Split approach reduced the absolute IRM divergence from Tan45 for both load forecast tests. Divergence decreased from 0.68 to 0.12 percentage points for the 2024–2025 fall load forecast update and from 1.10 to 0.15 percentage points for the 2026–2027 fall load forecast update. However, results for changes in generation were mixed. The divergence decreased for the Load Zone D capacity addition but increased for the Load Zone J addition.

The results support applying the Parametric Split approach to load forecast updates, where improvement was observed in both cases tested. Generation addition testing did not show consistent improvement from the Parametric Split approach and therefore did not support changing the existing methodology for generation updates. Section 5 presents the resulting recommendations.

5 Recommended Parametric Improvement Process

Based on the testing and findings, the NYSRC ICS approved a targeted modification to the parametric process for load forecast updates while retaining the existing methodology for generation and transmission updates. [5], [6]

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Load forecast updates: The Parametric Split approach was approved for load forecast updates. Under this approach, the Upstate and Downstate forecast components are evaluated sequentially, with capacity adjusted within each respective region. The resulting IRM impacts are then combined and reported as a single parametric line item.

Generation updates: The current methodology was retained for generator updates. Capacity additions/removals will continue to be applied systemwide unless an update affects only Upstate or Downstate, in which case the adjustment will be applied regionally.

Transmission updates: The current methodology was retained for transmission updates. In limited cases where a material transmission update warrants additional evaluation, a separate Tan45 assessment may be performed independently and in parallel with PBC or FBC development to better evaluate the impact of changes in transfer capability on the resulting IRM.

6 Initial Implementation in 2027-2028 IRM Study

The recommended parametric process was initially implemented in the PBC study for the 2027–2028 IRM cycle. The resulting parametric and Tan45 IRMs are summarized in Table 4. The 2027-2028 PBC parametric process produced an IRM of 31.74%, representing a 6.14 percentage point increase over the starting case. The subsequent Tan45 analysis produced an IRM of 30.80%, a 5.2 percentage point increase from the prior year. Although the parametric IRM was 0.94 percentage points higher than the Tan45 result, the two methodologies produced similar estimates of the overall increase in IRM.

The 2027-2028 FBC parametric process produced an IRM of 30.89%, compared with the Tan45 IRM of 30.90%, a difference of 0.01 percentage points. These results indicate that the parametric process provided a reasonable indication of the subsequent Tan45 IRM during both phases of the 2027–2028 IRM study.

Table 4: 2027-2028 IRM Parametric and Tan45 Alignment

Study Phase	Tan45 IRM (%)	Parametric IRM (IRM %)	Absolute Difference (pp)
2027-2028 PBC	30.80%	31.74%	0.94
2027-2028 FBC	30.90%	30.89%	0.01

In addition, sensitivity cases S07: No New Generator Inclusion and S08: 2020–2024 Thermal EFORd Update were evaluated as part of the 2027–2028 IRM study. [7] These assumption updates were also evaluated through the parametric process and therefore provide additional reference points for comparing the IRM impacts produced by the parametric and Tan45 methodologies for generator updates. The results of this comparison are shown in Table 5.

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Table 5: 2027-2028 IRM Selected PBC Update Comparisons

Update	Tan45 IRM Impact (%)	Parametric IRM Impact (%)	Absolute Difference (pp)
New Generator Inclusion	3.20%	3.40%	0.20
EFORd Update	1.10%	1.12%	0.02

The selected generation update comparisons also showed relatively small differences between the parametric and Tan45 IRM impacts for the 2027-2028 IRM study. The new generator inclusion resulted in a 0.20 percentage point difference between the parametric and Tan45 outcomes, while the EFORd update resulted in a 0.02 percentage point difference. Although these comparisons are limited to two updates for the 2027-2028 IRM study, the results provide additional support for retaining the existing parametric methodology for generation updates.

Overall, the initial 2027–2028 IRM study results indicate that the approved improvements to the parametric process facilitated results that provide a reasonable early indication of subsequent Tan45 IRM outcomes.

7 Conclusion

Historical differences between the parametric and Tan45 IRM results prompted a review of the parametric process. The analysis identified load forecast, generation, and transmission updates as recurring contributors to divergence, particularly when those updates affect the relative balance between Upstate and Downstate.

Testing demonstrated that the Parametric Split approach consistently reduced divergence from Tan45 for the load forecast update cases evaluated, while similar improvements were not consistently observed for generation updates. Based on these findings, the NYSRC ICS approved use of the Parametric Split approach for load forecast updates beginning with the 2027-2028 IRM study and retained the existing parametric methodology for generation and transmission updates.

The 2027–2028 IRM study was the first to apply the revised approach. Table 6 extends the historical comparison in Table 1 to include the 2027-2028 PBC and FBC results.

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Table 6: Historical Parametric vs Tan45 IRM Comparison (Extended)

Study Phase	Tan45 IRM (%)	Parametric IRM (%)	Delta (pp)
2024-2025 PBC	20.80%	19.31%	-1.49
2024-2025 FBC	23.10%	23.37%	+0.27
2025-2026 PBC	23.60%	25.08%	+1.48
2025-2026 FBC	24.40%	24.44%	+0.04
2026-2027 PBC	27.30%	25.82%	-1.48
2026-2027 FBC	25.30%	27.51%	+2.21
2027-2028 PBC	30.80%	31.74%	+0.94
2027-2028 FBC	30.90%	30.89%	-0.01

The NYSRC will continue to monitor parametric and Tan45 IRM outcomes and reevaluate the parametric methodology as appropriate, particularly if future changes to the Tan45 methodology affect the relationship between the two processes.

8 References

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