



Consideration of the Impacts of Modeling External ICAP Imports on the Installed Reserve Margin

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I. Concern

As part of the process for setting the Installed Reserve Margin (IRM) for an upcoming capability year, forecasted external ICAP imports are modeled based on historic data. There is a concern that the amount of forecasted external imports included in the model may be limiting the amount of available emergency assistance and thus impacting the expected IRM and LCRs.

II. Background

A. 2008/2009 Capability Year

During the establishment of the IRM for the 2008/2009 Capability Year, the issue regarding the impact of the external ICAP imports was raised. To address the issue, a MARS run was completed at the Base Case point without the external ICAP imports modeled (*i.e.* the interface ties were set to their full rated value less Grandfathered Contracts - see Imports Modeling Equivalent, section 3B1.). The results obtained were the same as when the imports were included. Therefore, it was concluded that the imports modeled were not impacting the available emergency assistance needed to meet the reliability target.

B. 2009/2010 Capability Year

A similar run which restored the external ties at the Base Case point was completed for the 2009/2010 Capability Year. However, unlike the previous year, the results lowered the LOLE indicating that the amount of external imports modeled was impinging on the available emergency assistance. Although this impingement is relieved during the external ICAP Import Allocation Study, it was decided that further investigation was necessary.

III. Process Consideration

A. NYSRC Rules and Policy

NYSRC Rule A-R1, shown below, sets the LOLE criteria, including external assistance, to 0.1 days/year when establishing the Installed Reserve Margin.

The NYSRC shall establish the IRM requirement for the NYCA such that the probability (or risk) of disconnecting any firm load due to resource deficiencies shall be, on average, not more than once in ten years. Compliance with this criterion shall be evaluated probabilistically, such that the loss of load expectation (LOLE) of disconnecting firm load due to resource deficiencies shall be, on average, no more than 0.1 day per year. This evaluation shall make due allowance for demand uncertainty,

scheduled outages and deratings, forced outages and deratings, assistance over interconnections with neighboring control areas, NYS Transmission System emergency transfer capability, and capacity and/or load relief from available operating procedures.

NYSRC rule A-R3, below, states that ICAP from external sources is permitted to the extent that rule A-R1 is satisfied.

ICAP from resources external to the NYCA for satisfying a portion of LSE ICAP requirements must be demonstrated to be available and deliverable to the NYCA borders. ICAP from resources external to the NYCA shall be permitted to the extent A-R1 reliability requirements are satisfied.

In needs-type resource adequacy studies, such as are discussed here, ties with neighboring Control Areas (CAs) are available to share a combination of emergency assistance and ICAP imports, up to the level of their emergency rating.

As stated in Policy 5-2¹ Section 3.5.6, “[t]he primary consideration for developing the final load and capacity models for the Outside World Areas is to avoid overdependence on the Outside World Areas for emergency capacity support.” This consideration is satisfied, after incorporating newly obtained external Control Area data, by applying the following rules:

1. An Outside World Area’s LOLE cannot be lower than its own LOLE criterion;
2. its isolated LOLE cannot be lower than that of the NYCA; and
3. its IRM can be no higher than that Area’s minimum requirement.

Control Areas found outside of the above ranges are brought back by adding or removing load until the rules are met. Applying these rules creates external Control Area models that can provide realistic levels of emergency assistance on NYCA peak load days.

B. Study Process

1. *Installed Reserve Margin Study*

The first study conducted in the annual resource adequacy study cycle is the IRM Study. The IRM Study is the basis for the determination of the Statewide IRM and the lowest feasible locational requirements that must be maintained to meet the LOLE criterion for the upcoming capability year. The IRM Study is performed by the NYISO under the direction of the New York State Reliability Council’s Installed Capacity Subcommittee.

The IRM model includes interface ties between the external Control Areas and NYCA which will carry capacity made up of the following elements:

1. Grandfathered Contracts
2. Emergency Assistance
3. External Imports

Imports Modeling Equivalent

An equivalent methodology is used to represent external ICAP imports in the IRM and other needs-type studies. For the first year of the NYISO operation these external ICAP imports were modeled as actual contracts. These contracts had the effect of removing capacity from the sending area, reducing the amount of tie capability by the value of the contract, and finally adding capacity to the receiving area.

After modeling a contract, the ICS decided to add back into the sending area the same amount of capacity that was removed in order to make the external Control Area whole. In addition, the ICS had just completed the process of setting the models of the external Control Areas (per policy 5-2, section 3.5.6). This process was to determine the appropriate amount of emergency assistance on which the NYCA could rely. Changing the amount of capacity in the external area would interfere with this previous process.

Next, since the NYCA was long on capacity (had more capacity than the IRM required), capacity was removed to reach the 0.100 days/year LOLE criterion. The effect of adding a contract that delivered capacity in NYCA would just make it longer than it was and would then require removing that much more capacity to get to the 0.1 LOLE criterion. The effect of adding a contract and then removing the capacity it delivered is the same as not modeling the contract, in terms of NYCA capacity.

The ICS models external ICAP imports by reducing the interface tie ratings as an equivalent model to the above actions. The resultant capability of the ties is available for use as emergency assistance to meet the reliability needs of NYCA.

During the IRM study, the NYISO forecasts an amount of external ICAP imports. This forecast is based on historical import activity heavily weighed to the previous year's values. (There is a concern that this process may inhibit the emergency assistance availability and thus may affect the IRM.)

2. *Locational Capacity Requirements Study*
The second study is the Locational Capacity Requirements (“LCR”) study, conducted by the NYISO. This study determines the minimum LCRs (MLCR”)s) for specific zones that have been identified as “Localities”. Load Serving Entities (“LSE”)s) in these zones are required to obtain a minimum percentage of the forecast Locality peak load as Installed Capacity from resource suppliers located within their respective zones. When the LCR study is approved through the NYISO governance process, the resulting IRM and LCRs are used in the External ICAP Allocation Study.
3. *External ICAP Allocation Study*
The third study is the External ICAP Allocation Study or Imports Study, which the NYISO uses to determine Import Rights. This study determines the maximum amount of external ICAP that is allowable for the New York ICAP market and the maximum ICAP limit for each eligible CA. The sum total of the ICAP import rights for each CA may not exceed the simultaneous amount of external ICAP allowed. The database for the External ICAP Study is the same as the database used for the LCR Study.

In determining the allowable external ICAP imports, the interface ties are restored to their full rated value less the Grandfathered Contracts. This step allows the full amount of available emergency assistance to flow into NYCA. These ties are reduced until the LOLE criterion is violated. This point establishes the amount of emergency assistance needed to meet the NYCA reliability target and the maximum amount of external capacity available to the ICAP market.

IV. **Evaluations**

A. IRM-LCR Curve

To more fully understand the effect that the level of external ICAP imports has on the IRM, a full IRM-LCR curve was developed. This curve was completed by using the 2009/2010 IRM Capability Year Base Case Model and restoring the external ties to their full rated values less Grandfathered Contracts. Figures 1 and 2 illustrate the differences between the curve for the Base Case and the curve with the ties restored. Eliminating the external ICAP imports shifts the knee of the curve upwards and toward the left. That is, it reduces the required NYCA IRM while increasing the LCRs.

Figure 1: Locality J

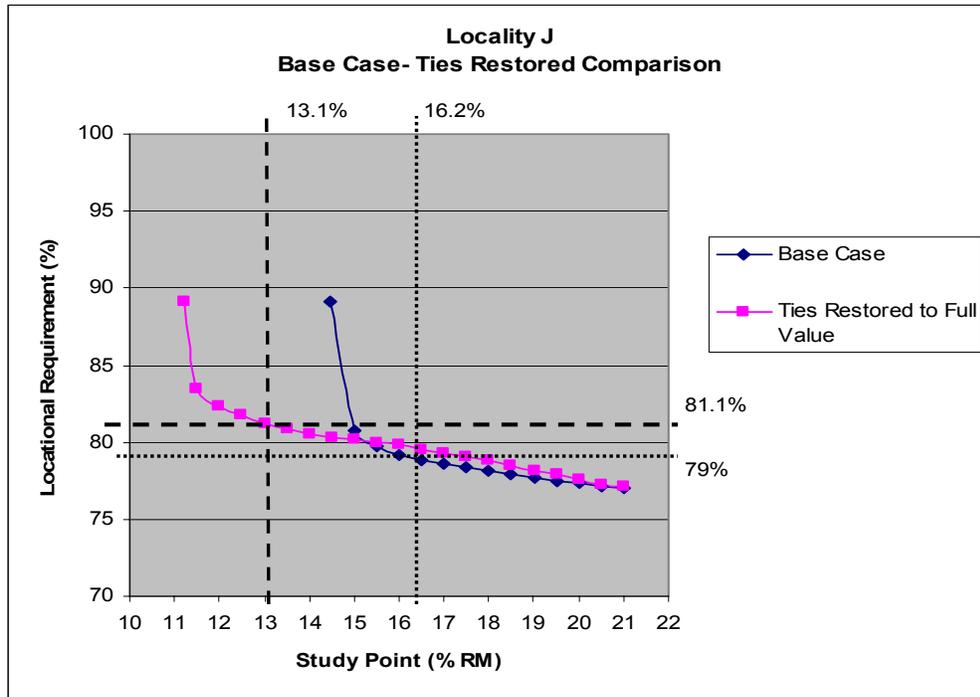
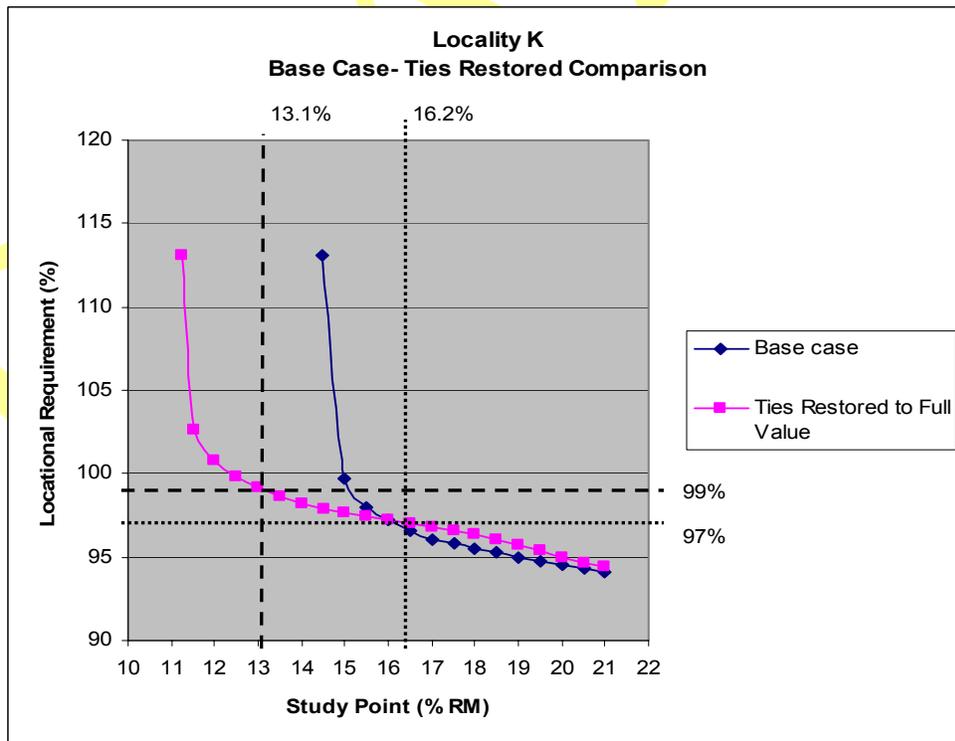


Figure 2: Locality K



C. Regression Analysis

In order to determine the Tan 45 anchor point for the Ties Restored curve, a regression analysis based on the methodology outlined in Policy 5-2 was performed. Table 1 compares the anchor points for the IRM, and Zone J's and Zone K's LCR values, from the Base Case with the values for the ties restored to full value.

Therefore, if the IRM was established without external imports included in the model, a lower IRM would have been set since more emergency assistance from the external control areas would have been available.

Table 1: Anchor Point Comparison

	IRM- Ave of J and K	Locality J- LCR	Locality K- LCR
Base Case	16.2%	80.0%	97.5%
No External Imports¹	13.1%	81.1%	99.1%

V. **Conclusions**

A review of the NYSRC rules regarding the establishment of the Installed Reserve Margin shows that the A-R1 rule includes a series of items to be addressed when considering whether a system meets the criterion, one of these being assistance over interconnections with neighboring Control Areas. In rule A-R3, external ICAP is permitted only to the extent that A-R1 is satisfied.

If External ICAP imports are allowed to be forecast during the setting of the IRM, they could impinge on the emergency assistance, as was shown during the 2009/2010 IRM study, and therefore cloud the modeling of the emergency assistance during that process. Because the NYSIO resets the imports before conducting the Imports Study, this impingement is relieved, and the LOLE criterion is ensured. Even so, the setting of the IRM, and in particular the establishment of realistic levels of emergency assistance, can be jeopardized when the NYISO forecasts high levels of external ICAP imports.

It is therefore recommended that forecasted external ICAP imports should not be modeled during the establishment of the IRM. The Grandfathered Contracts, however, should be modeled as they are established by tariff.

¹ This should not imply that the 2009 Installed Reserve Margin would have been lower. When replacing the external Control Areas, the ICS did not know that assistance was being impinged upon.

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