Draft
Load Forecasting Manual

1. OVERVIEW

1.1 PURPOSE AND SCOPE

This manual has two purposes.

The first is to explain the data reporting, weather-normalization methodology, and load forecasting methodology requirements that are prescribed in the NYISO Services Tariff Sections 5.10 and 5.11 and used in the calculation of the NYCA Unforced Capacity Requirement.

The second is to explain the load forecasting methodology and load data submission requirements that the NYISO fulfills in its submissions to NPCC, NERC, FERC, and other reliability and regulatory bodies.

The requirements and procedures related to the load forecast data used in the daily system and market operations are covered in the **NYISO Manual for Day Ahead Scheduling**.

2. NYCA UNFORCED CAPACITY REQUIREMENTS FOR LOAD DATA, WEATHER-NORMALIZATION, AND LOAD FORECASTING METHODOLOGY SUBMISSION REQUIREMENTS

This section describes:

1. Notification procedures to be followed by the NYISO
2. Data submission requirements for Transmission Owners (TOs) and Municipal Electric Systems (MESs)
3. The procedures the NYISO follows for
    - Evaluating the TO and MES submitted actual and weather-normalized loads at the time of the NYCA peak (and locality peaks)
    - Calculating NYCA Weather-Normalized Load + Losses (WNL+L) at the NYCA peak hour for the current capability year
    - Evaluating TO and MES Regional Load Growth Factors (RLGFs)
    - Calculating the NYCA ICAP Peak Forecast and each TO and MES load at the time of the forecasted NYCA peak

2.1 Notification Procedures to be followed by the NYISO

Notifications will include:

1. **Capability Year Peak and Date and Hour of Occurrence:** The NYISO will provide preliminary information to the TOs and MESs by September 15. Confirmation will be provided by November 1, the beginning of the winter capability period.
2. **EDRP and SCR Impacts during the NYCA Peak Hour:** The NYSIO will provide preliminary information by September 15, confirmation by November 15.
3. **ICAP Load Forecast Schedule:** The NYISO will release a schedule by September 30 of every year that will list the dates of when data submissions and analyses are to be completed.
4. **Evaluation of TO and MES Weather-Normalized Loads:** in November, as determined in the Schedule
5. **Evaluation of TO and MES RLGFs:** in January, as determined in the Schedule
6. **Preliminary ICAP Load Forecast:** in January, as determined by Schedule
7. **Final ICAP Load Forecast:** in February, as determined by Schedule

2.2 Data submission requirements for TOs and MESs

TOs and MESs shall submit to the NYISO

1. Hourly loads for a quarter-year (first quarter is January – March, etc.) within 90 days of the quarter's end
2. Actual load at the time of the NYCA peak including a statement of whether or not transmission losses are included . Actual load is to be calculated net of Station Power. Station Power should be shown separately.
3. The weather-normalized load at the time of the NYCA peak
4. The previous five years' values for 2. and 3. (except that weather-normalized data will not be required for years before 2003)
5. The MW impact of Emergency Operating Procedures (EOPs) and load modifiers operating at the time of the NYCA peak
6. For TOs with locational UCAP requirements, the actual and weather-normalized locality peak load
7. Regional Load Growth Factors

The due dates for items 2. – 7. will be provided in the schedule the NYISO provides.

2.2.1 Hourly Loads

TO and MES hourly loads are required to verify loads at the time of the NYCA peak and for other purposes as described in Section 3 of this manual. Data may be submitted in any common electronic format.

2.2.2 Actual Load at the Time of the NYCA Peak

TOs and MESs will provide

1. Their load in MW at the time of the NYCA peak for the current capability year
2. Station Load for each plant or unit in its Transmission District.
3. A statement saying whether or not the load provided in 2.2.2.1. includes transmission losses

2.2.3 Weather-normalized Load at the Time of the NYCA Peak and Supporting Material

TOs and MESs will provide the weather-normalized load corresponding to their actual loads provided in 2.2.2.1, 2, and 3. TOs and MESs may calculate their weather-normalized load using their own procedures. However, the design criteria employed by each TO and MES shall be such that it at ensures, at a maximum, a 0.50 probability of occurrence on an annual basis.

The following supporting material will be provided:

1. A written description of the method used to derive the weather-normalized load from the actual load
2. If a statistical model is used, the model, its statistics and the data from which it was derived
3. A description and supporting data for the design conditions used in calculating the weather-normalized load

2.2.4 Actual and Weather-normalized Load at the Time of the NYCA Peak for the Five Preceding Years

Data prior to 2003 will not be required. For these years, TO and MES weather-normalized non-coincident peak load data that was previously submitted will be used. This data is used by the NYISO to evaluate RLGFs provided by TOs and MESs. If required, supporting documentation will be made available.

2.2.5 MW Impact of EOPs and load modifiers operating at the Time of the NYCA Peak

TOs and MESs shall provide the MW reduction the above measures achieved at the time of the NYCA peak. If none of these measures were in operation at that time, a statement to that fact will be provided instead. Supporting documentation will be made available if required by the NYISO.

2.2.6 Actual and Weather-normalized Locality Peaks

TOs and MESs may have locality peaks that occur at a different time than the NYCA peak hour. If that is the case, they shall provide the data in Sections 2.2.2 – 2.2.5 for the hour of their locality peak.

2.2.7 Regional Load Growth Factors (RLGFs)

TOs and MESs will provide the NYISO RLGFs. An RLGF is the ratio of the forecasted load at the time of the NYCA peak for the projected capability year to the weather-normalized load at the time of the NYCA peak in the current capability year.

2.3 Procedures for Determining the NYISO UCAP Load Forecast

This sections describes procedures the NYISO will follow to produce the UCAP Load Forecast for the projected capability year. The following analyses will be performed.

1. Reconciliation of TD loads at NYCA Peak
2. Calculation of TO and MES Load Less Losses (LLL)
3. Evaluation of TO and MES Weather-normalized Load and Losses
4. Allocation of Weather-normalized Losses to TOs and MESs
5. Evaluation of TO and MES Regional Load Growth Factors
6. Forecast of TO/MES load at time of predicted NYCA Peak

1. Reconciliation of TD load at NYCA Peak

TOs and MESs submit their load at the time of the NYCA peak in accordance with Section 2.2.2 of this manual. NYISO will calculate TD loads by adding TO and appropriate MES loads. These will be compared to TD billing loads from the NYISO Decision Support System (DSS). Adjustments will be made as necessary to account consistently for losses, load modifiers and other demand modifications. If the TD loads calculated from the TO and MES data does not match the DSS TD load, NYSIO will discuss and try to resolve the difference with the TO and MES. If the unresolved difference is less than 1%, NYISO will accept the TO plus MES calculation. If the unresolved difference exceeds 1%, the Load Forecasting Task Force will recommend to the ICAP Working Group the appropriate load for the TD.

2. Calculation of TO and MES Load Less Losses

Losses will be obtained from the NYISO DSS system for each TD. In cases where TOs reported their load inclusive of losses, the LLL will be calculated by deducting the NYISO DSS system losses from the reported load. In cases where the TO reported load does not include losses, no loss deduction is necessary. MES loads are reported net of losses.

3. Evaluation of TO and MES Weather-normalized Load and Losses

NYISO will produce its own estimate of the weather-normalized load for each TO and MES. These estimates will be produced using models and design criteria the NYISO develops. The NYISO will compare its own estimates with those submitted by the TOs and MESs in accordance with Section 2.2.3**. If the adjustments to the actual load calculated by the NYISO and a TO or MES differ by 25% or less, the NYISO will accept the submitted estimate. If the difference exceeds 25%, the NYISO and TO will investigate and attempt to reconcile it.**

The percent difference between the NYCA and TO/MES weather adjustments at the time of the NYCA peak shall be defined as:

$$[\text{Absolute value}(WAdj_{NYCA} - WAdj_{TO/MES})] / WAdj_{NYCA}$$

If it not possible to reconcile the difference, the NYISO will use its own estimate of the weather-normalized load for that TO. The TO may dispute the NYISO's decision to substitute its weather-normalized load for the TOs, pursuant to the Expedited Dispute Resolution Procedures specified in the NYISO Services Tariff Section 5.16.

If a MES does not submit a weather-normalized load, the NYISO will calculate one for it by applying the ratio of the weather-normalized to actual load of the TO in whose TD the MES is located to the MES actual load.

Losses will be weather-normalized for each TO using the same proportion of weather-normalized load to actual load as was determined for it.

4. Allocation of Weather-normalized Losses to TOs and MESs

The total of all TO and MES weather-normalized loads will be calculated. This is the NYCA weather-normalized peak load less losses (W/N LLL).

The total of all weather-normalized losses will be calculated by adding all TO weather-normalized losses.

Total weather-normalized losses will be allocated to each TO and MES according to the ratio of its W/N LLL to the NYCA W/N LLL. The result will be the weather-normalized load plus losses (W/N L+L) for each TO and MES.

The sum of all TO and MES W/N L+Ls will be the NYCA weather-normalized peak load for the capability year.

Each TO and MES W/N L+L will be the basis to which its RLGF will be applied to calculate its forecasted load at the time of the NYCA peak in the forecasted capability year.

5. Evaluation of TO and MES Regional Load Growth Factors

NYISO will evaluate Capability Year RLGFs by comparing them to:

1. Recent Historical Load Growth - RLGFs should be within a range of historical year-to-year growth rates of AAPL experienced in the previous five calendar years.

2. Relationship to Economic Indicators - The NYISO will clearly outline for all market participants the economic parameters it will use in developing these relationships no less than thirty days before the date the TOs are required to submit RLGFs.

    a. The ratio of the annual growth in TO/MES load at the time of NYCA peak, reflected in the RLGFs, to annual growth in economic indicators, as provided to the NYISO by its economic forecasting consultant, shall be calculated by the NYISO for each TO.
    b. The ratio of each predicted RLGF to the annual growth in economic indicators, as provided to the NYISO by its economic forecasting consultant, shall be calculated by the NYISO.
    c. The ratios calculated in 1. should be consistent with the ratios calculated in 2. The selection of indicators and criteria for deciding consistency between 1. and 2. are to be determined by the LFTF.

3. Projections performed by NYISO - NYISO will develop independent projections of RLGFs and use them in evaluating those submitted for Section 2.2.7. The NYISO will post on the

NYISO website for all market participants the assumptions and methodologies used to develop its projected RLGFs for each Transmission District.

If the NYISO determines that a TO/MES forecast is not consistent with at least two of the three criteria above, the NYISO and TO/MES will attempt to reconcile and explain the difference. If the difference cannot be reconciled, the NYISO will inform the TO/MES of that fact and that it intends to substitute its RLGF for the submitted one. The TO/MES may dispute the NYISO's decision to substitute its RLGF, pursuant to the Expedited Dispute Resolution Procedures specified in the NYISO Services Tariff Section 5.16.

If, as a result of the deliberations between the NYISO and TO required under Section 5.16.1, the NYISO decides to accept a TO forecast that does not meet at least two out of three of the above criteria, any market participant may dispute that decision pursuant to the Expedited Dispute Resolution Procedures specified in the NYISO Services Tariff Section 5.16.

The only RLGFs, which may be, disputed under the Expedited Dispute Resolution Procedures are those developed by the TO/MSE and the NYISO.

6. Forecast of TO/MSE Load at time of predicted NYCA Peak

The forecast of each TOs and MESs load at the time of the NYCA peak for the upcoming capability year will be calculated by multiplying the W/N L+L for each, as determined in Section 2.3.4, by the appropriate RLFG, calculated in 2.3.5.

The sum of the TO and MES loads at the time of the NYCA peak will be the NYCA peak forecast for the capability year.

3. OTHER LOAD DATA REPORTING PROCEDURES

Load forecast data is used to satisfy reliability agency requirements and by the NYISO in its own analyses of the adequacy and reliability of the NYCA system in the Electric System Planning Process (ESPP). To meet these requirements, the NYISO produces ten-year forecasts of sendout and summer and winter peak for the NYCA and each of its eleven zones.

This section describes the process followed by the NYISO to produce these forecasts.

NYISO develops statistical models that relate total NYCA sendout to economic, weather, and other variables. The current model is based on annual data from 1975 to 2003. The sendout model statistics and data are presented in Appendix A. (The model is developed in log-log form.)

The NYCA sendout model is used to predict annual energy requirements for a ten year period. This output is further used in the NYCA model of forecasted summer peak demand (Appendix B) and of winter peak demand (Appendix C).

Historical and forecast data for these models is presented in Appendices D and E.

The NYISO forecasts of annual sendout, summer peak and winter peak demand are published in the annual Load & Capacity Report.

Note: Appendices are updated every year showing the current year's work and results.