New York ISO
Independent System Operator

Review of 2024 Regional Load Growth Factors

Max Schuler
Demand Forecasting & Analysis

Load Forecasting Task Force

December 5, 2023

Agenda

- Regional Load Growth Factor (RLGF) Evaluation Criteria
- 2023 Economic Data
- Evaluation of 2024 RLGFs

New York ISO

RLGF Evaluation Criteria

New York ISO

Evaluation of RLGFs – Criteria 1, 2, and 3

- Regional Load Growth Factors are submitted to the NYISO by the Transmission Owners, and reflect expected growth in summer peak load. The 1+RLGF is expressed as the ratio of the forecast year peak load to the current year weather normalized peak.

- The Load Forecasting Manual specifies that the NYISO will evaluate Regional Load Growth Factors (RLGFs) in the current year for each Transmission District based upon three criteria:

  - Criterion 1 – Index of Recent Historical Peak Load Growth
    Bandwidth based only on the recent growth of weather-adjusted peaks
  - Criterion 2 – Projection of Peak Load Growth in Relation to Economic Growth
    Projection of peak load growth based on a regression of historical summer daily peaks, historical economic data and other variables, and projected economic growth
  - Criterion 3 – Projections Performed by the ISO
    An independent projection of load growth currently based upon a regression of historical summer energy, historical economic data and other variables, and projected economic growth

- If at least two of the three criteria are satisfied, then the load growth factor for the Transmission District is accepted.

New York ISO

Criterion 1 – Index of Recent Historical Peak Load Growth

- Calculate annual growth in weather normalized peaks over the past five years, using Transmission Owner's weather normalized peaks
- Select the 2nd highest annual growth rate of weather-normalized peaks as the upper bound on growth and the 2nd lowest annual growth rate of weather normalized peaks as the lower bound on growth, with a minimum of a 1% difference between the two

New York ISO

Criterion 2 – Projection of Peak Load Growth in Relation to Economic Growth

- Uses daily weather, peak and economic data from the most recent 5 to 15 summers
- Regression model based on top ten Transmission District peak load days from each summer
- Regress daily peak MW against daily weather, annual macroeconomic variable(s), energy efficiency and BTM solar growth variable if significant, and other variables as appropriate to determine next year's predicted peak load using the projected economic growth
- Calculate a 25th to 75th percentile confidence interval for the predicted peak load based on the standard error of the regression to obtain the upper and lower bounds for the RLGF, with a minimum of a 1% difference between the two. The NYISO may take into account additional factors when establishing the range for Criterion 2

New York ISO

Criterion 3 – Projections Performed by the ISO: Summer Energy Growth

- Regress historical summer energy (July and August GWh) against summer CTHI (Cumulative Temperature & Humidity Index), macroeconomic variable(s) if significant, energy efficiency and BTM solar growth variable, and other variables as appropriate to determine the predicted summer energy for the following year

- Calculate a 25th to 75th percentile confidence interval for the predicted summer energy based on the standard error of the regression to obtain the upper and lower bounds for the RLGF, with a minimum of a 1% difference between the two. The NYISO may take into account additional factors when establishing the range for Criterion 3

- The Criterion 3 methodology is developed by the ISO, and is an independent measure separate from Criteria 1 and 2. The NYISO may change the Criterion 3 methodology as necessary

New York ISO

Combined Criterion (Criteria 1 and 2)

- In the event that the ranges for Criterion 1 and Criterion 2 are mutually exclusive, the NYISO will construct an alternate Criterion by combining the ranges of Criterion 1 and Criterion 2
- The upper and lower bounds of the combined Criterion shall typically be calculated by averaging the upper bounds of Criterion 1 and Criterion 2, and averaging the lower bounds of Criterion 1 and Criterion 2, with a minimum 1% difference between the upper and lower bounds
- In the event that Criterion 1 and Criterion 2 are combined, then it is sufficient for the RLGF to satisfy either the Combined Criterion or Criterion 3

New York ISO

Historical and Forecast Economic Data

Economic projections are derived from the Moody's Analytics August 2023 data delivery

Summary of Economic Data (1 of 2)

Variable & TD	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Con-Ed_Employment	4,597	4,734	4,823	4,918	4,996	5,182	4,466	4,667	4,965	5,082	5,106	5,119
Con-Ed_GDP	780,575	788,415	813,704	823,576	853,285	892,608	835,638	898,779	934,645	957,811	964,292	981,012
Con-Ed_Households	3,682	3,734	3,784	3,807	3,837	3,828	3,730	3,576	3,658	3,634	3,639	3,640
Con-Ed_Income-Real	578,492	603,502	623,079	666,090	669,549	676,202	705,807	718,418	671,752	680,474	694,838	703,537
Con-Ed_Population	9,572	9,670	9,751	9,792	9,819	9,846	9,769	9,442	9,405	9,410	9,407	9,402
Cen-Hud_Employment	191	193	195	196	198	200	176	184	189	189	190	191
Cen-Hud_GDP	22,697	22,883	23,078	23,109	23,917	24,402	22,189	24,044	23,961	24,227	24,576	25,156
Cen-Hud_Households	201	201	202	204	206	205	205	207	210	209	209	209
Cen-Hud_Income-Real	23,203	24,197	24,517	25,346	25,319	27,124	28,498	29,382	27,492	27,816	28,382	28,745
Cen-Hud_Population	519	517	516	517	518	517	524	530	525	525	524	523
LIPA_Employment	1,297	1,313	1,333	1,347	1,349	1,367	1,190	1,284	1,329	1,343	1,351	1,355
LIPA_GDP	174,482	177,940	179,278	180,257	181,653	185,403	171,398	188,597	189,883	193,412	194,808	198,349
LIPA_Households	974	980	987	994	1,002	998	993	990	1,021	1,013	1,014	1,014
LIPA_Income-Real	184,785	192,893	196,854	203,153	205,374	214,585	222,822	228,210	215,451	217,490	220,857	222,810
LIPA_Population	2,853	2,858	2,864	2,873	2,882	2,884	2,914	2,923	2,900	2,900	2,895	2,889
N-Grid_Employment	1,821	1,830	1,850	1,859	1,865	1,885	1,672	1,751	1,807	1,840	1,848	1,854
N-Grid_GDP	229,742	233,250	237,034	238,086	242,245	250,597	234,192	251,687	252,373	257,342	259,508	264,911
N-Grid_Households	1,652	1,659	1,669	1,680	1,693	1,684	1,673	1,669	1,705	1,693	1,694	1,692
N-Grid_Income-Real	166,228	173,297	172,984	180,280	179,243	185,244	200,178	202,373	187,493	189,388	191,496	192,986
N-Grid_Population	3,993	3,987	3,983	3,991	3,996	3,987	4,021	4,027	3,988	3,989	3,981	3,971

Variable	Unit
Employment	1,000
GDP-Real	$ Million (2012)
Households	1,000
Income-Real	$ Million (2012)
Population	1,000

Values listed are for July of a given year.

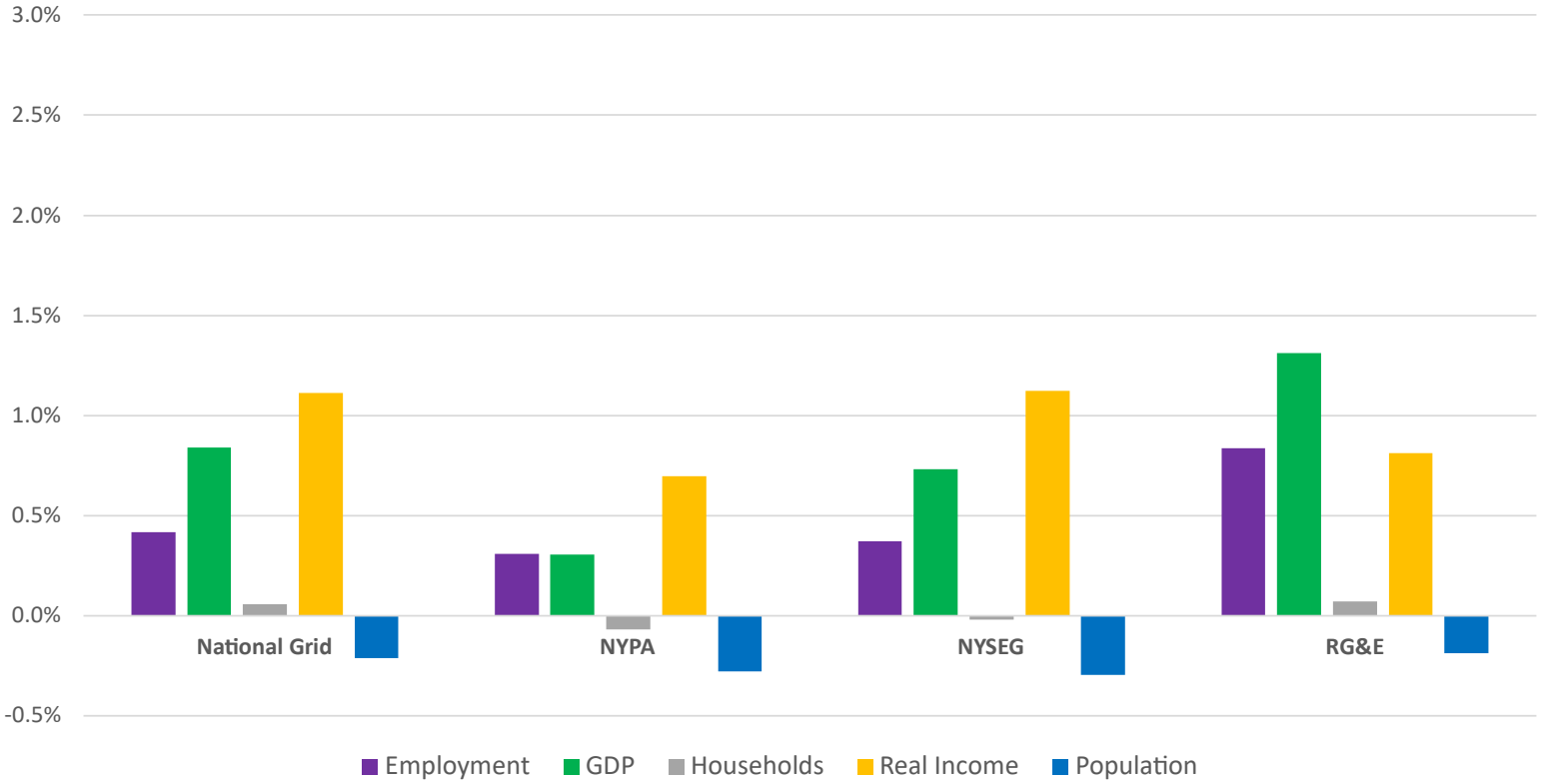
Summary of Economic Data (2 of 2)

Variable & TD	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
NYPA_Employment	34	33	34	35	35	35	30	32	33	34	34	34
NYPA_GDP	3,640	3,682	3,789	3,913	3,993	4,078	3,606	3,887	3,927	3,921	3,933	3,997
NYPA_Households	32	32	32	32	33	32	32	32	32	32	32	32
NYPA_Income-Real	3,040	3,212	3,163	3,285	3,201	3,265	3,489	3,507	3,155	3,166	3,188	3,198
NYPA_Population	81	80	80	80	80	79	80	80	78	79	78	78
NYSEG_Employment	419	416	419	421	424	427	375	393	406	411	412	413
NYSEG_GDP	48,445	48,738	49,029	49,049	50,488	52,001	47,180	51,135	51,240	51,756	52,135	53,160
NYSEG_Households	419	419	420	421	423	420	417	415	421	419	419	418
NYSEG_Income-Real	40,768	41,983	41,586	43,193	43,123	44,517	47,669	48,591	44,504	44,901	45,405	45,765
NYSEG_Population	1,039	1,034	1,029	1,027	1,025	1,020	1,028	1,029	1,015	1,015	1,012	1,009
OR_Employment	266	272	276	282	286	297	263	286	307	318	324	329
OR_GDP	32,835	33,745	34,393	34,634	35,757	37,965	35,196	38,987	40,630	41,789	42,431	43,640
OR_Households	230	232	234	236	238	238	237	236	244	246	249	252
OR_Income-Real	33,189	34,741	34,749	35,849	36,011	37,535	39,792	41,156	38,515	39,073	40,004	40,614
OR_Population	698	703	708	715	721	727	739	745	746	756	765	774
RGE_Employment	504	507	512	513	517	522	464	485	501	507	511	513
RGE_GDP	63,239	64,373	65,969	64,930	66,569	68,601	62,943	67,791	67,921	68,912	69,817	71,494
RGE_Households	428	430	433	435	439	438	435	433	439	437	437	437
RGE_Income-Real	44,297	46,632	46,290	48,156	47,869	49,115	52,788	52,908	48,868	49,366	49,767	50,090
RGE_Population	1,049	1,048	1,047	1,048	1,050	1,049	1,058	1,057	1,048	1,048	1,046	1,044
Employment_NYCA	9,130	9,298	9,441	9,570	9,671	9,915	8,636	9,082	9,538	9,723	9,775	9,807
GDP_NYCA	1,355,654	1,373,026	1,406,275	1,417,554	1,457,909	1,515,655	1,412,342	1,524,909	1,564,580	1,599,171	1,611,498	1,641,719
Households_NYCA	7,617	7,686	7,762	7,809	7,872	7,842	7,721	7,560	7,731	7,681	7,693	7,693
Income_NYCA	1,074,002	1,120,458	1,143,223	1,205,351	1,209,690	1,237,588	1,301,042	1,324,545	1,237,229	1,251,674	1,273,937	1,287,746
Population_NYCA	19,805	19,897	19,978	20,043	20,090	20,109	20,133	19,834	19,705	19,723	19,710	19,690

Values listed are for July of a given year.

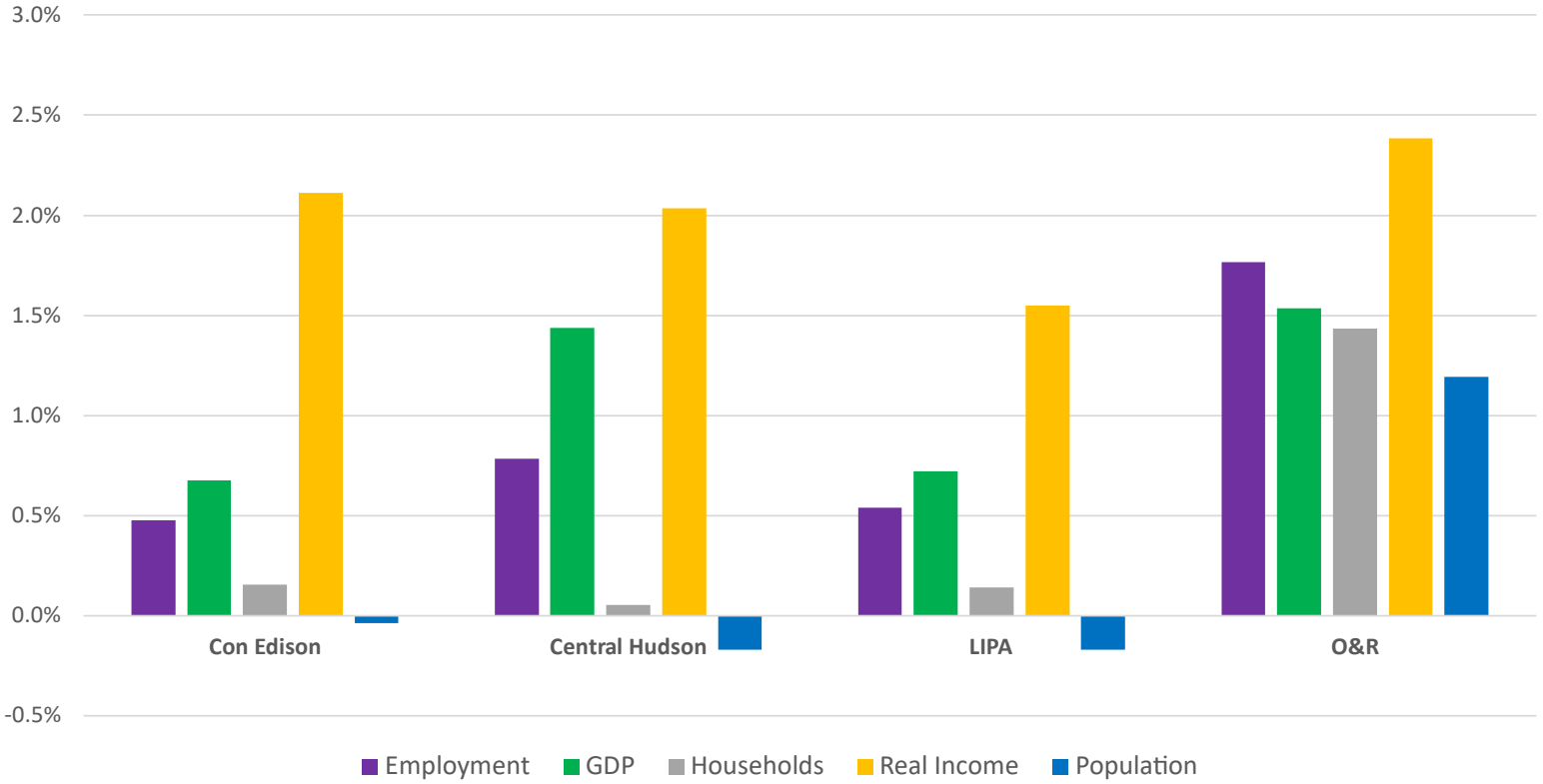
Transmission District Economic Indicators (1 of 2)

Forecasted percent growth – July 2023 to July 2024



Transmission District Economic Indicators (2 of 2)

Forecasted percent growth – July 2023 to July 2024



Evaluation of 2024 RLGFs

New York ISO

2024 Criteria 1, 2 & 3 RLGF Evaluation Summary

Load Growth Criteria

A '1' in the column labeled 'Test' indicates that the RLGF is between the upper and lower bandwidths.

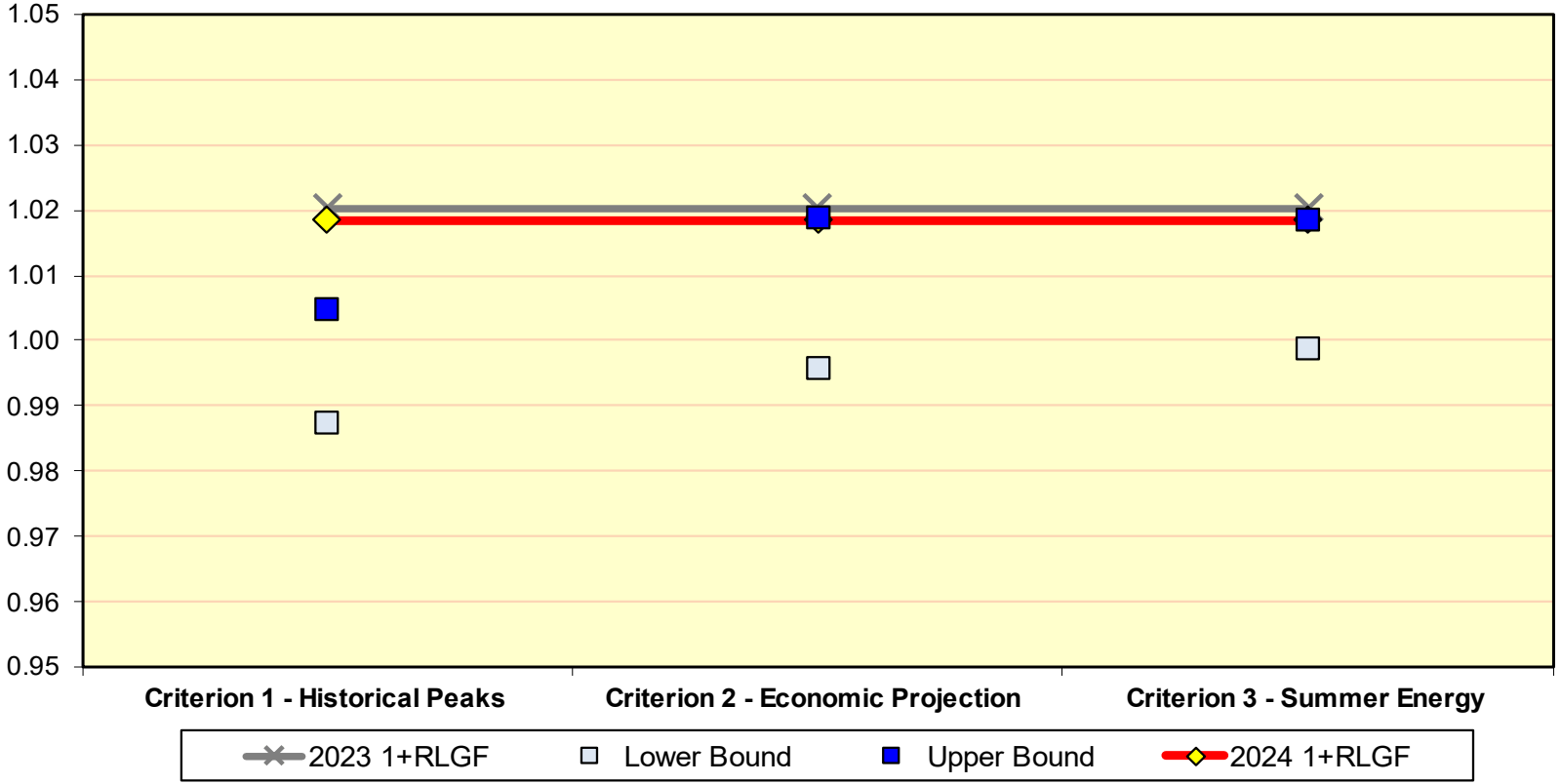
A '0' in the column labeled 'Test' indicates that the RLGF is not between the upper and lower bandwidths.

Each RLGF must fall within 2 of the 3 criteria. In the event that Criteria 1 and 2 are mutually exclusive and a Combined Criterion is required, it is sufficient for the RLGF to fall within either the Combined Criterion or Criterion 3.

T.O.	Criterion	Lower Bound	2024 1+RLGF	Upper Bound	Test	2023 1+RLGF
Con Edison	Criterion 1 - Historical Peaks	0.9873	1.0185	1.0050	0	1.0203
Con Edison	Criterion 2 - Economic Projection	0.9959	1.0185	1.0190	1	1.0203
Con Edison	Criterion 3 - Summer Energy	0.9989	1.0185	1.0186	1	1.0203
Central Hudson	Criterion 1 - Historical Peaks	0.9697	0.9869	1.0077	1	0.9928
Central Hudson	Criterion 2 - Economic Projection	0.9734	0.9869	1.0113	1	0.9928
Central Hudson	Criterion 3 - Summer Energy	0.9778	0.9869	1.0006	1	0.9928
LIPA	Criterion 1 - Historical Peaks	0.9816	0.9775	1.0049	0	0.9874
LIPA	Criterion 2 - Economic Projection	0.9735	0.9775	1.0020	1	0.9874
LIPA	Criterion 3 - Summer Energy	0.9761	0.9775	0.9881	1	0.9874
National Grid	Criterion 1 - Historical Peaks	0.9907	1.0012	1.0073	1	1.0039
National Grid	Criterion 2 - Economic Projection	0.9707	1.0012	1.0009	0	1.0039
National Grid	Criterion 3 - Summer Energy	0.9811	1.0012	1.0016	1	1.0039
NYSEG	Criterion 1 - Historical Peaks	0.9676	1.0065	1.0150	1	0.9944
NYSEG	Criterion 2 - Economic Projection	0.9846	1.0065	1.0106	1	0.9944
NYSEG	Criterion 3 - Summer Energy	0.9835	1.0065	1.0018	0	0.9944
O&R	Criterion 1 - Historical Peaks	0.9774	1.0172	1.0308	1	1.0036
O&R	Criterion 2 - Economic Projection	0.9908	1.0172	1.0323	1	1.0036
O&R	Criterion 3 - Summer Energy	0.9927	1.0172	1.0106	0	1.0036
RG&E	Criterion 1 - Historical Peaks	0.9652	0.9994	1.0180	1	1.0145
RG&E	Criterion 2 - Economic Projection	0.9837	0.9994	1.0153	1	1.0145
RG&E	Criterion 3 - Summer Energy	0.9884	0.9994	1.0013	1	1.0145

New York ISO

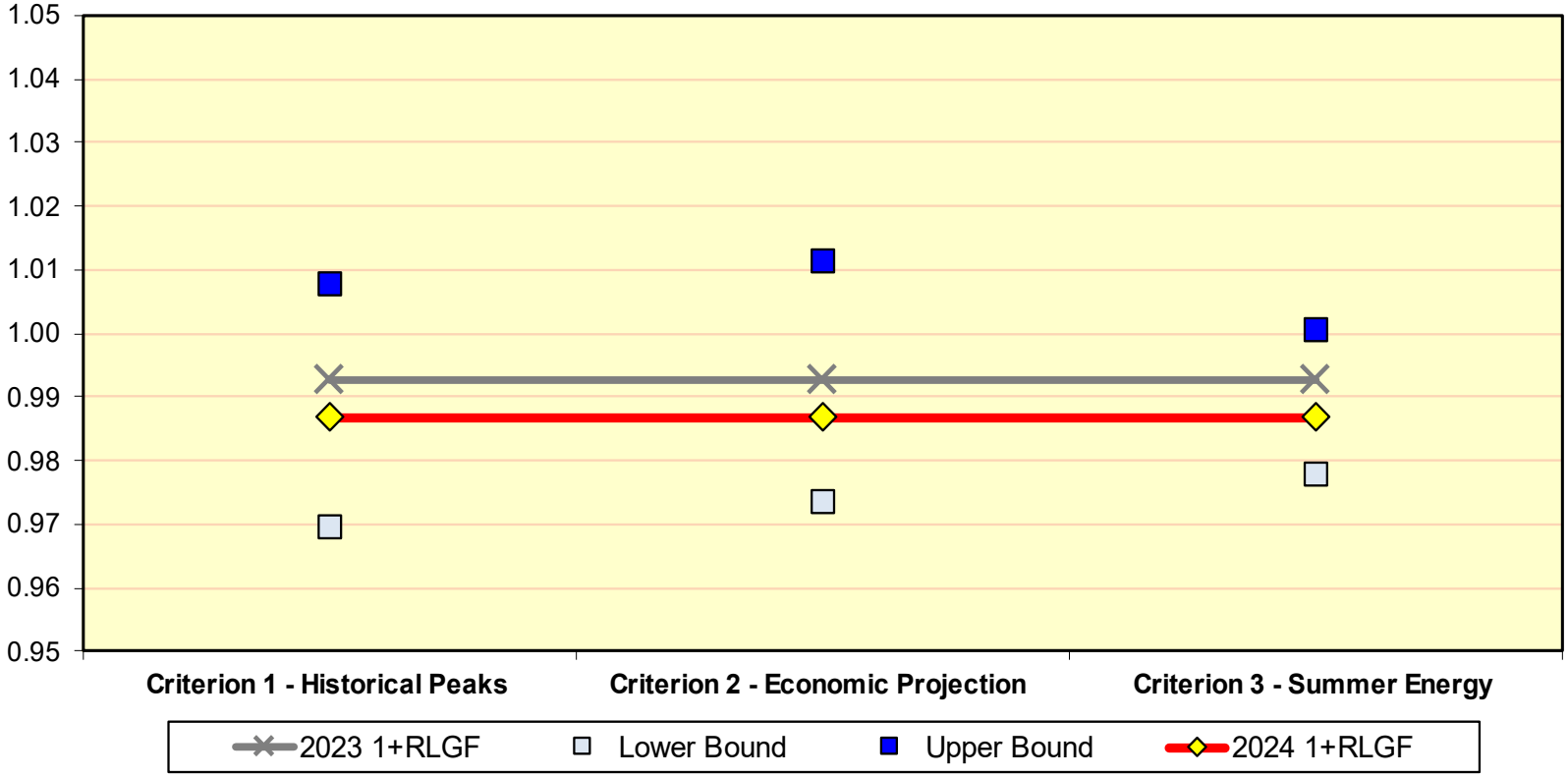
Con Edison 1+RLGF Criteria



The Con Edison 1+RLGF of 1.0185 passes Criteria 2 and 3, and is accepted.

New York ISO

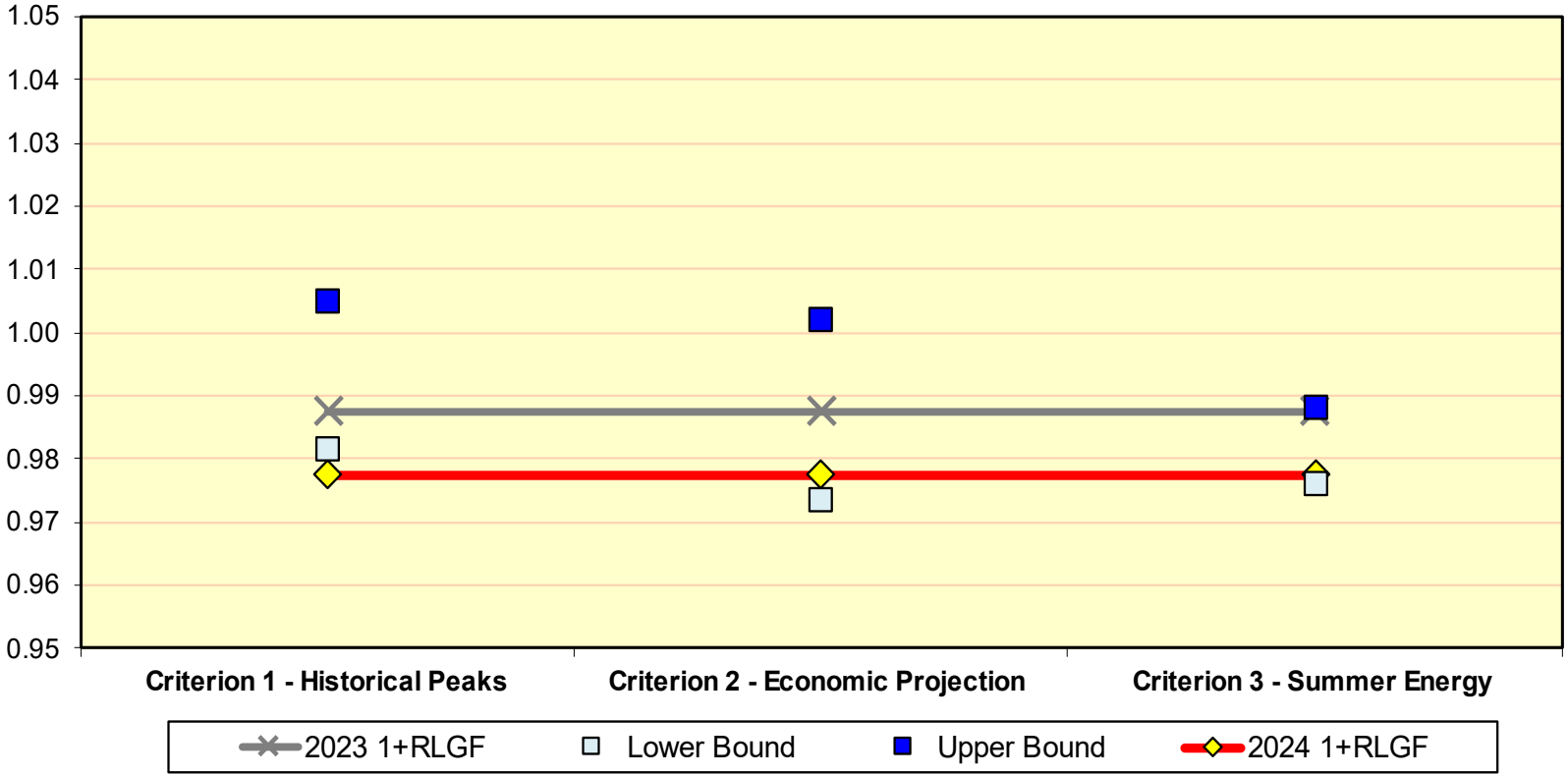
Central Hudson 1+RLGF Criteria



The Central Hudson 1+RLGF of 0.9869 passes all three Criteria and is accepted.

New York ISO

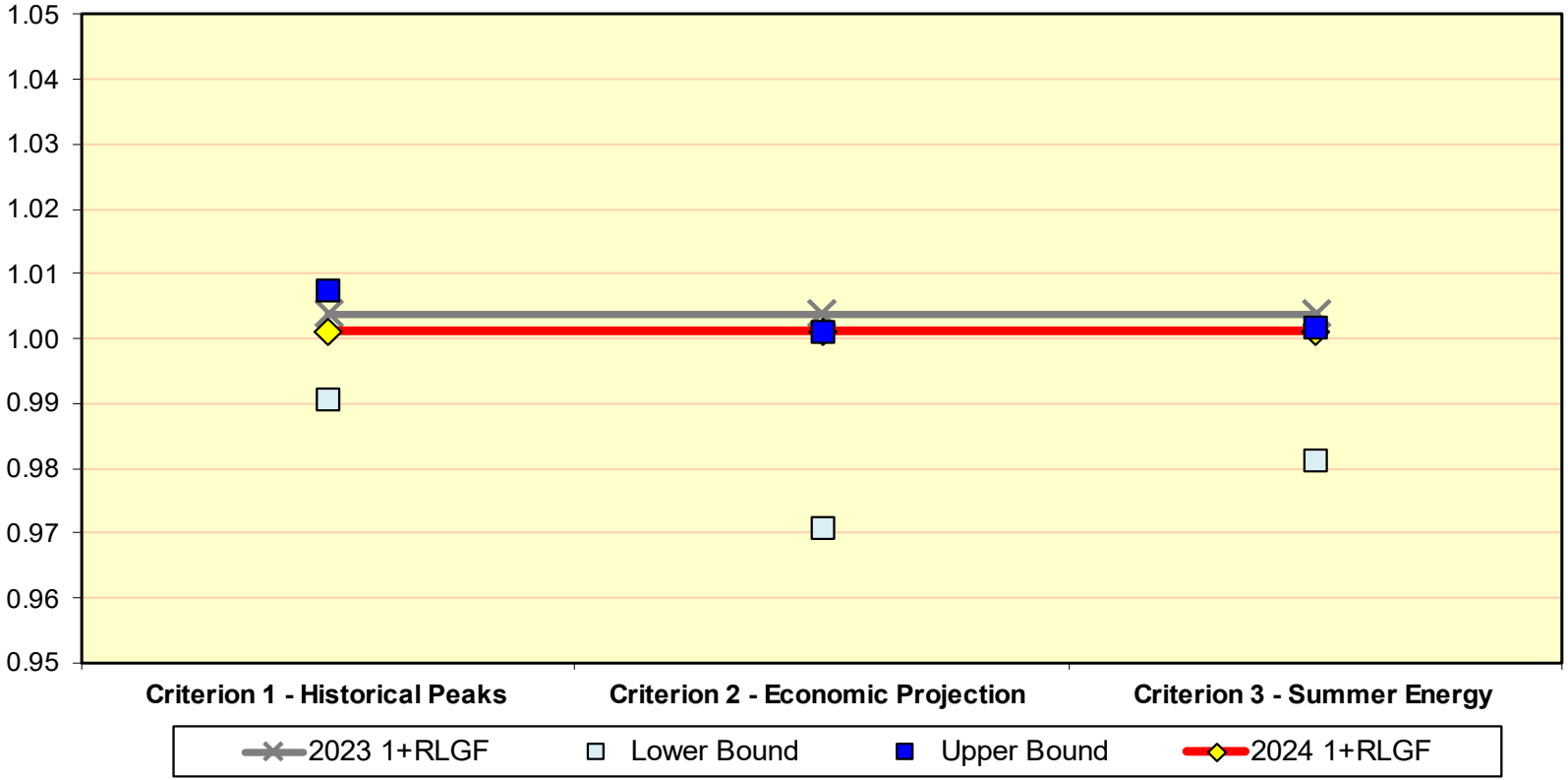
LIPA 1+RLGF Criteria



The LIPA 1+RLGF of 0.9775 passes Criteria 2 and 3, and is accepted.

New York ISO

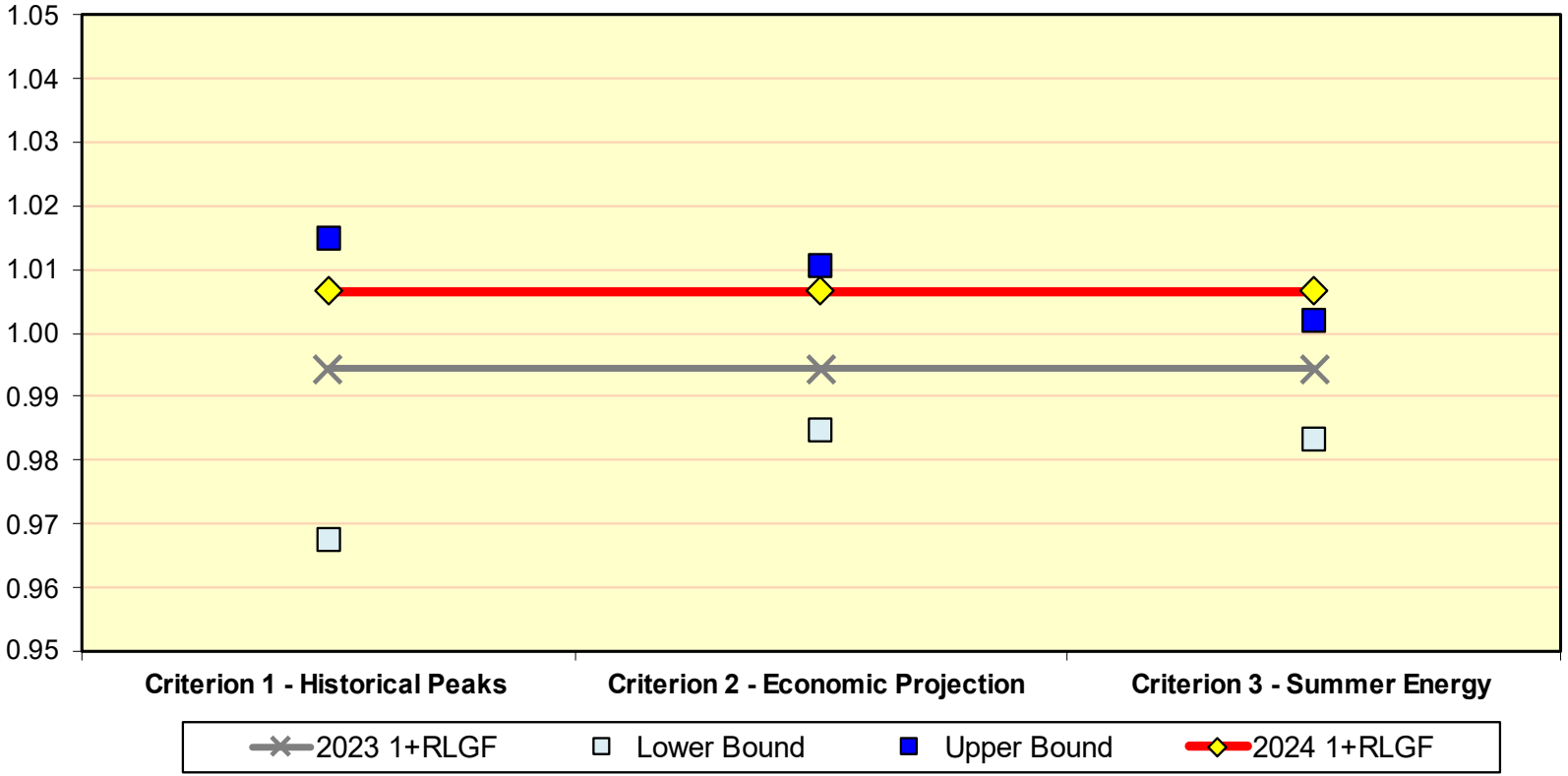
National Grid 1+RLGF Criteria



The National Grid 1+RLGF of 1.0012 passes Criteria 1 and 3, and is accepted.

New York ISO

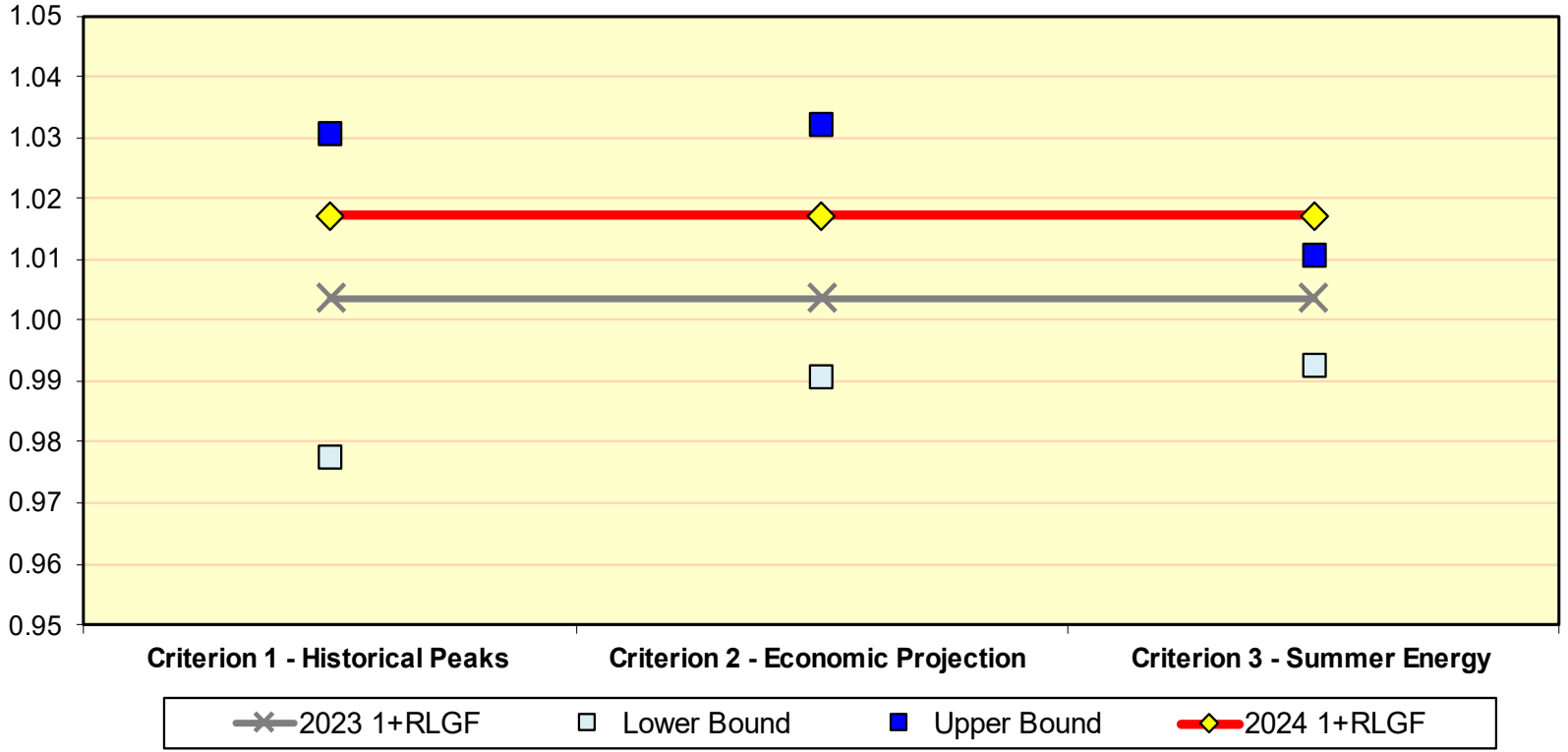
NYSEG 1+RLGF Criteria



The NYSEG 1+RLGF of 1.0065 passes Criteria 1 and 2, and is accepted.

New York ISO

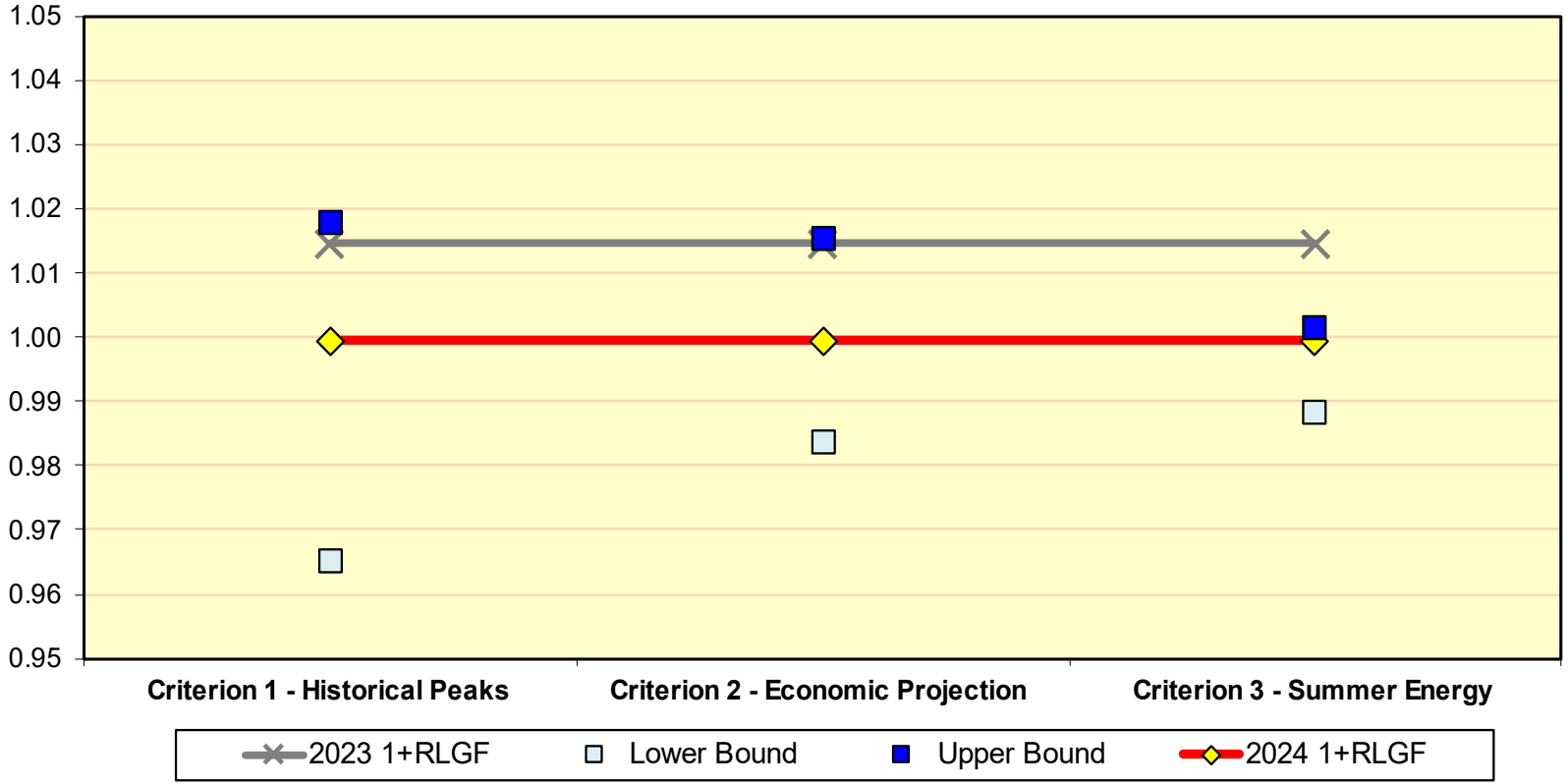
Orange & Rockland 1+RLGF Criteria



The Orange & Rockland 1+RLGF of 1.0172 passes Criteria 1 and 2, and is accepted.

New York ISO

RG&E 1+RLGF Criteria

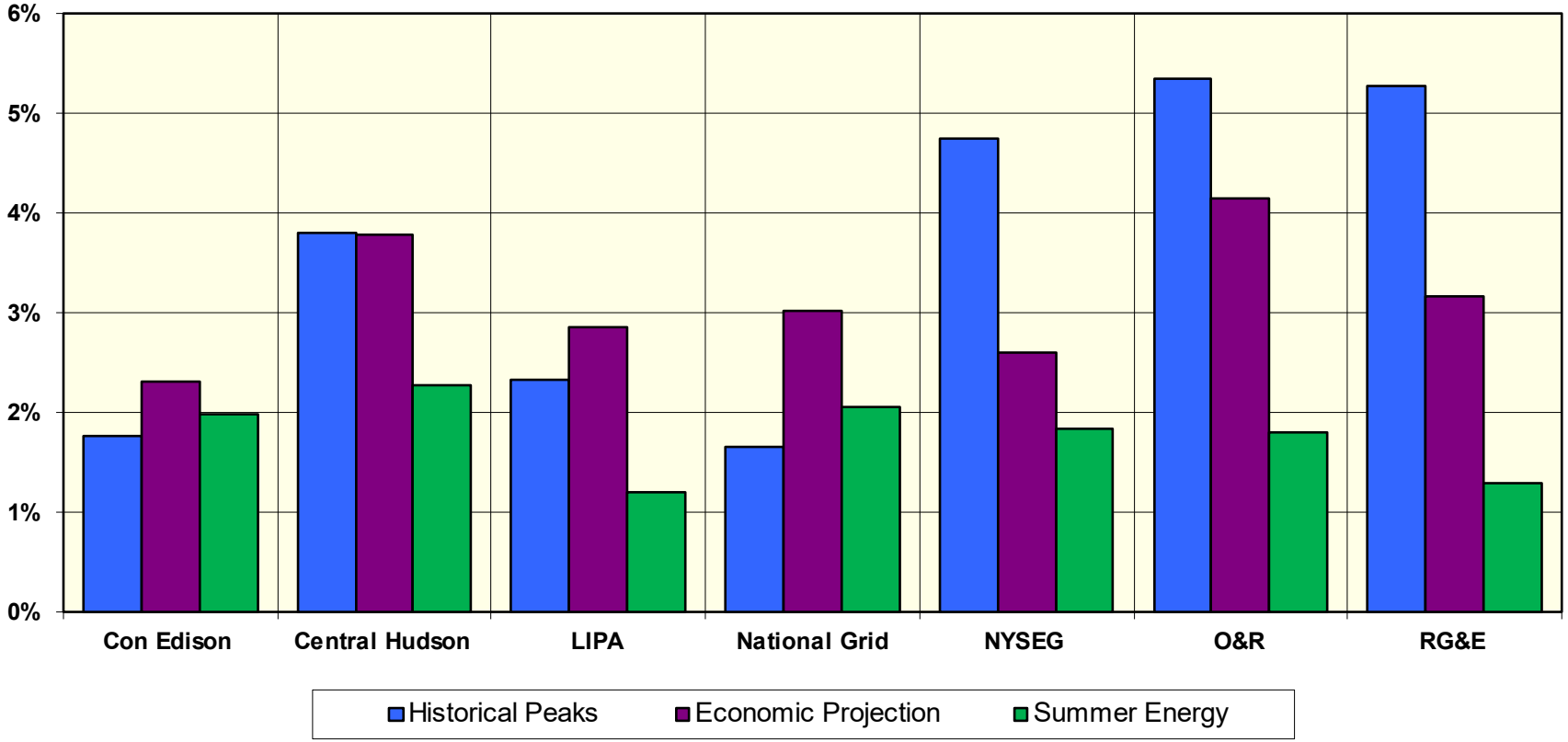


The RG&E 1+RLGF of 0.9994 passes all three Criteria and is accepted.

New York ISO

Summary of Criteria Bandwidths (Low to High)

Shows the Range of Variation for the Three Criteria



New York ISO

Questions?

New York ISO

Our Mission & Vision

Mission

Ensure power system reliability and competitive markets for New York in a clean energy future

Vision

Working together with stakeholders to build the cleanest, most reliable electric system in the nation

New York ISO