New York ISO
Independent System Operator

Summary of Preliminary 2021 Regional Load Growth Factor Criteria for IRM Study

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Preliminary 1+RLGF Evaluation Criteria for the IRM Forecast

- The NYISO has performed preliminary peak load growth modeling for Criteria 1, 2, and 3 to evaluate and project Regional Load Growth Factors for the 2021 IRM forecast.
- Criteria modeling is typically done for the ICAP forecast. However, given the unique impacts of COVID-19 on load levels this summer, the ISO will consider these preliminary Criteria results in their evaluation and projection of peak load growth for the 2021 IRM forecast.
- The NYISO will evaluate TO submitted RLGFs against these criteria and determine whether they are acceptable for use in the IRM forecast.
- In past years, for Transmission Owners who did not submit a preliminary RLGF, the NYISO typically used the final ICAP RLGF from the preceding year. However, given the shifts in load levels observed this summer, the NYISO will generally use a projected RLGF as modeled by Criteria 1 and 2 results for TOs who do not submit a preliminary value.
- The results listed in this presentation are preliminary. The NYISO may consider additional information given the uncertainty surrounding 2021 load levels, and may change their evaluation and projection of RLGFs used for the 2021 IRM forecast accordingly.

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Evaluation of RLGFs – Criteria 1, 2, and 3

- The Load Forecast Manual and Technical Bulletin 251 specify that the NYISO will evaluate Regional Load Growth Factors (RLGF) 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

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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

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

- Uses daily weather, peak and economic data from the most recent five 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 trend variable, and other variables 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.

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

- Regress historical summer energy against summer CTHI (Cumulative Temperature & Humidity Index), macroeconomic variable(s) if significant, energy efficiency trend variable, and other variables 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

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

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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

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Preliminary 2021 Criteria 1, 2 & 3 Summary

T.O.	Type	Lower Bound	Projected 2021 1+RLGF	Upper Bound	Test	2020 1+RLGF
Con Edison	Criterion 1 - Historical Peaks	0.9831	1.0410	0.9950	0	0.9998
Con Edison	Criterion 2 - Economic Projection	1.0258	1.0410	1.0480	1	0.9998
Con Edison	Criterion 3 - Summer Energy	1.0364	1.0410	1.0538	1	0.9998
Con Edison	Combined Criterion (1 & 2)	0.9891	1.0410	1.0369	0	0.9998
Central Hudson	Criterion 1 - Historical Peaks	0.9989	0.9880	1.0108	0	0.9910
Central Hudson	Criterion 2 - Economic Projection	0.9794	0.9880	1.0184	1	0.9910
Central Hudson	Criterion 3 - Summer Energy	0.9550	0.9880	0.9993	1	0.9910
LIPA	Criterion 1 - Historical Peaks	0.9865	0.9830	0.9966	0	0.9856
LIPA	Criterion 2 - Economic Projection	0.9655	0.9830	0.9948	1	0.9856
LIPA	Criterion 3 - Summer Energy	0.9780	0.9830	0.9939	1	0.9856
National Grid	Criterion 1 - Historical Peaks	0.9892	0.9995	1.0085	1	1.0000
National Grid	Criterion 2 - Economic Projection	0.9900	0.9995	1.0146	1	1.0000
National Grid	Criterion 3 - Summer Energy	0.9905	0.9995	1.0028	1	1.0000
NYSEG	Criterion 1 - Historical Peaks	1.0010	1.0031	1.0132	1	1.0001
NYSEG	Criterion 2 - Economic Projection	0.9868	1.0031	1.0105	1	1.0001
NYSEG	Criterion 3 - Summer Energy	1.0017	1.0031	1.0134	1	1.0001
O&R	Criterion 1 - Historical Peaks	0.9701	0.9736	1.0157	1	1.0080
O&R	Criterion 2 - Economic Projection	0.9572	0.9736	0.9914	1	1.0080
O&R	Criterion 3 - Summer Energy	0.9671	0.9736	0.9787	1	1.0080
RG&E	Criterion 1 - Historical Peaks	0.9790	0.9785	1.0180	0	0.9957
RG&E	Criterion 2 - Economic Projection	0.9661	0.9785	0.9989	1	0.9957
RG&E	Criterion 3 - Summer Energy	0.9674	0.9785	0.9815	1	0.9957

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.

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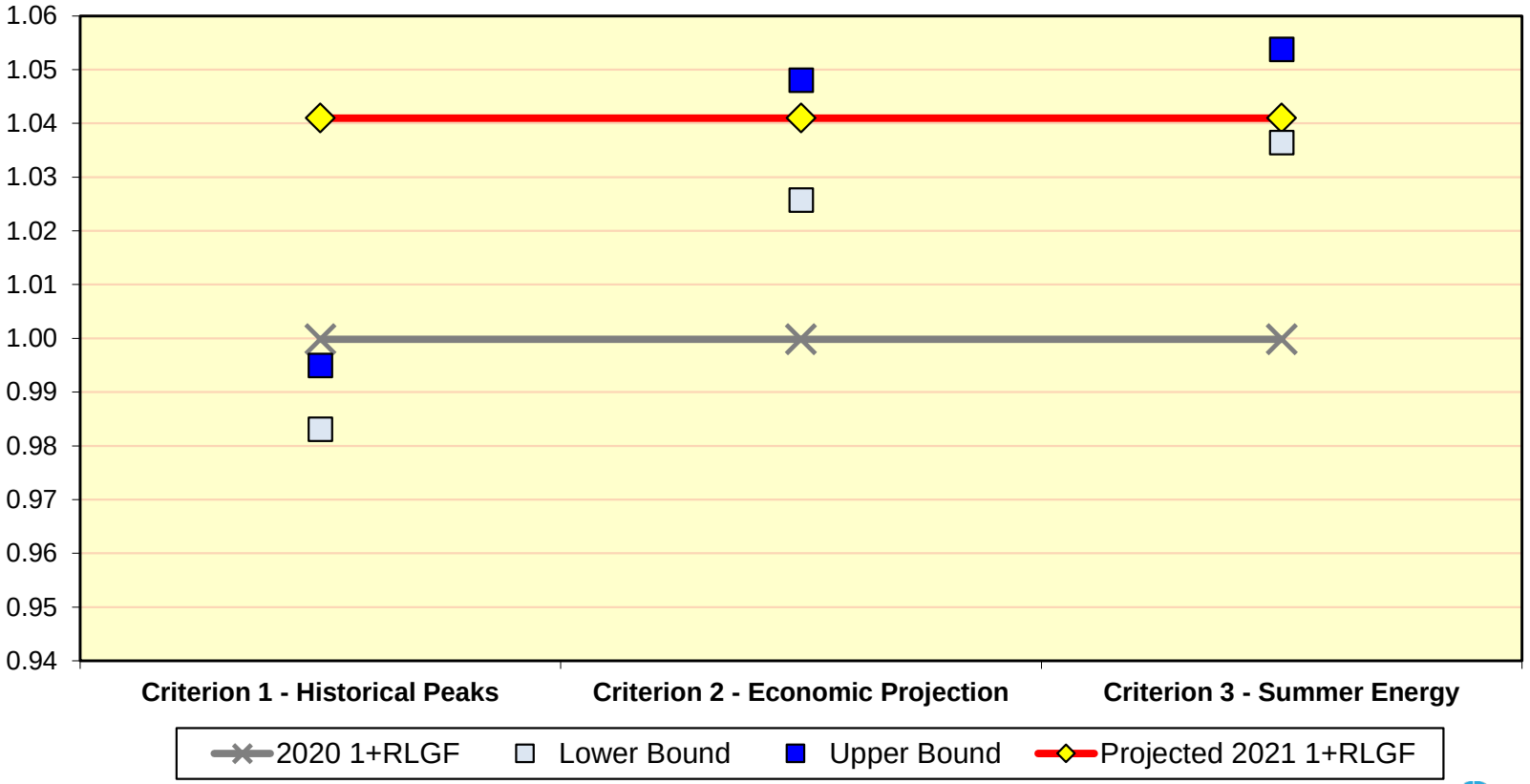
Con Edison Preliminary 1+RLGF Criteria



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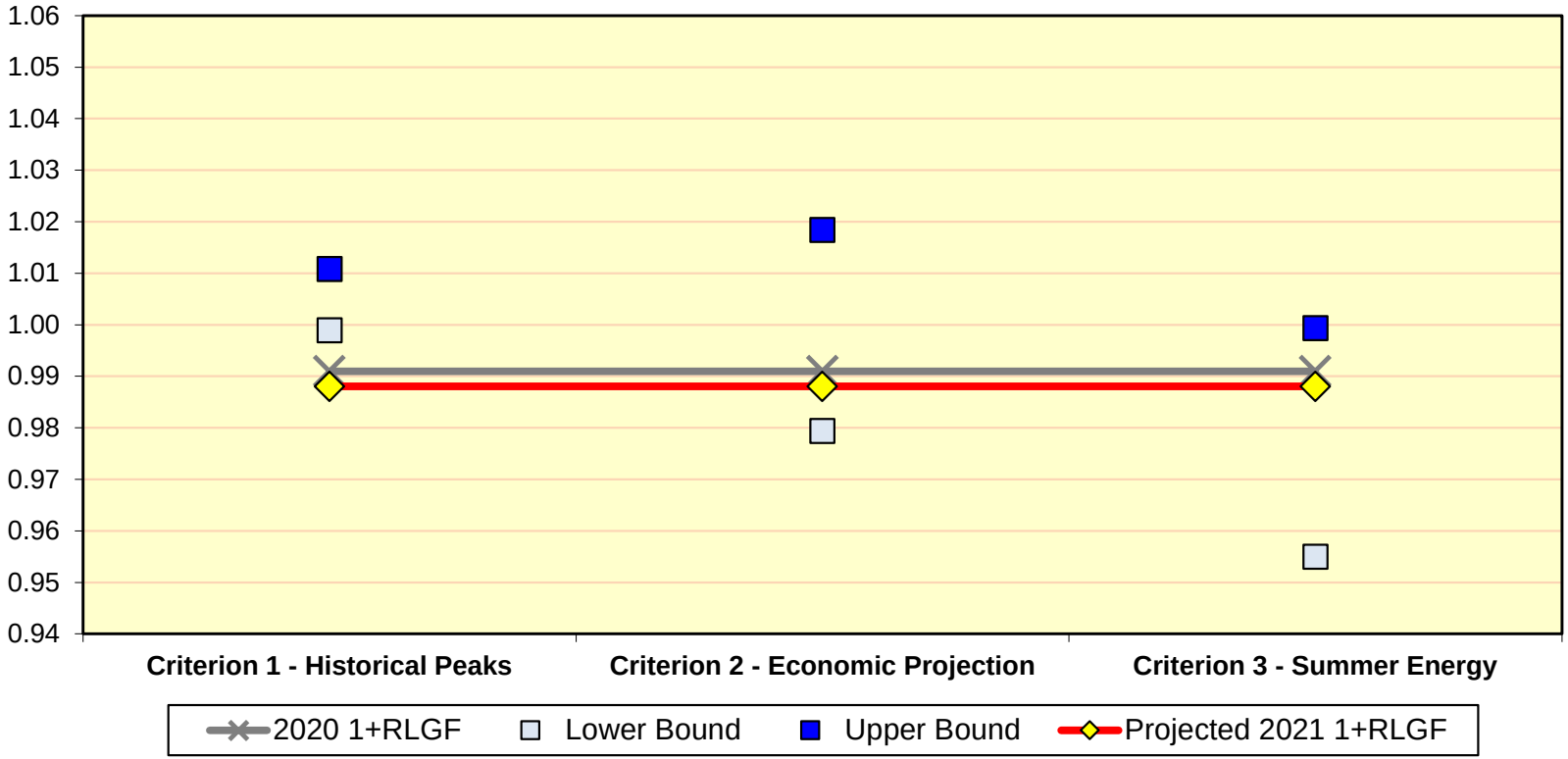
Central Hudson Preliminary 1+RLGF Criteria



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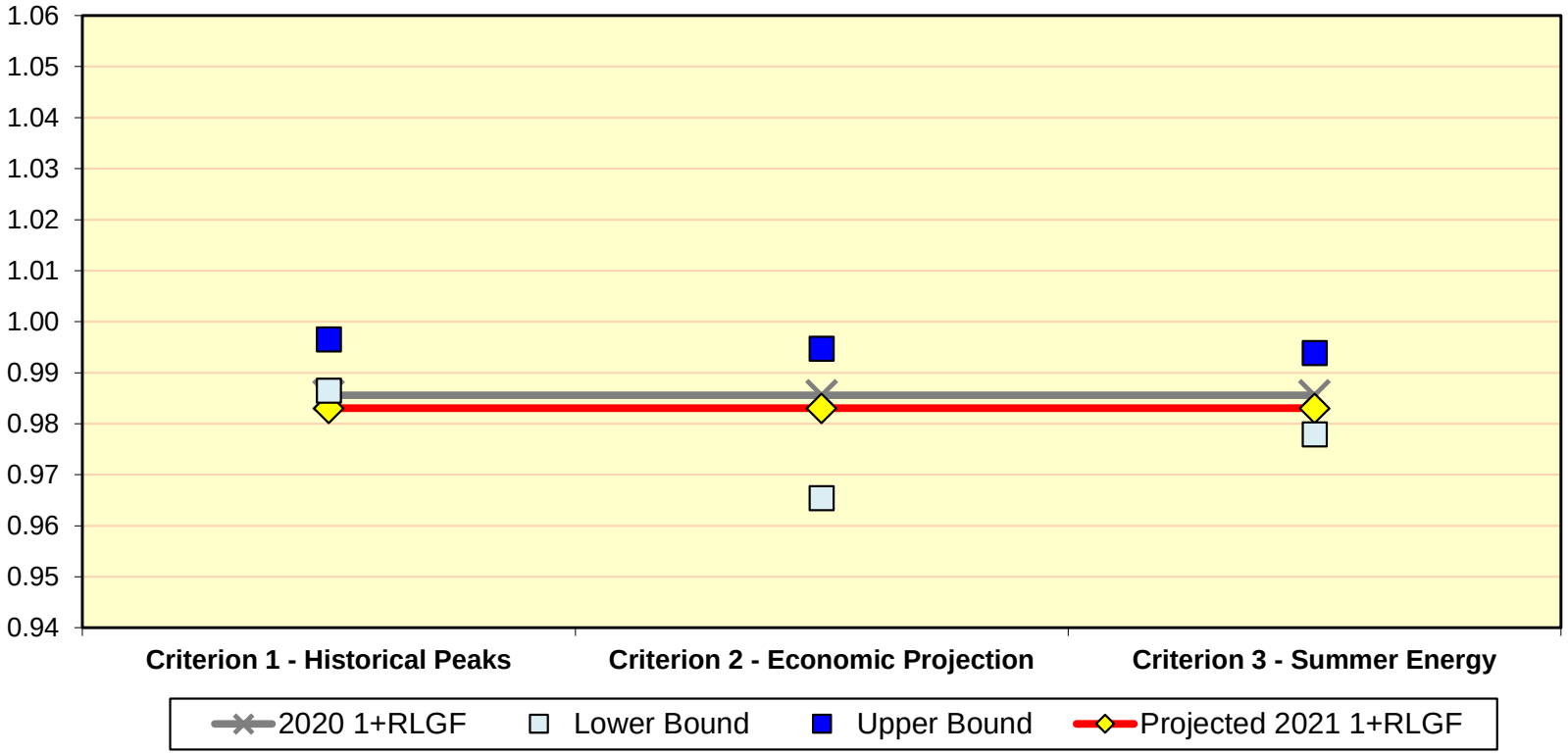
LIPA Preliminary 1+RLGF Criteria



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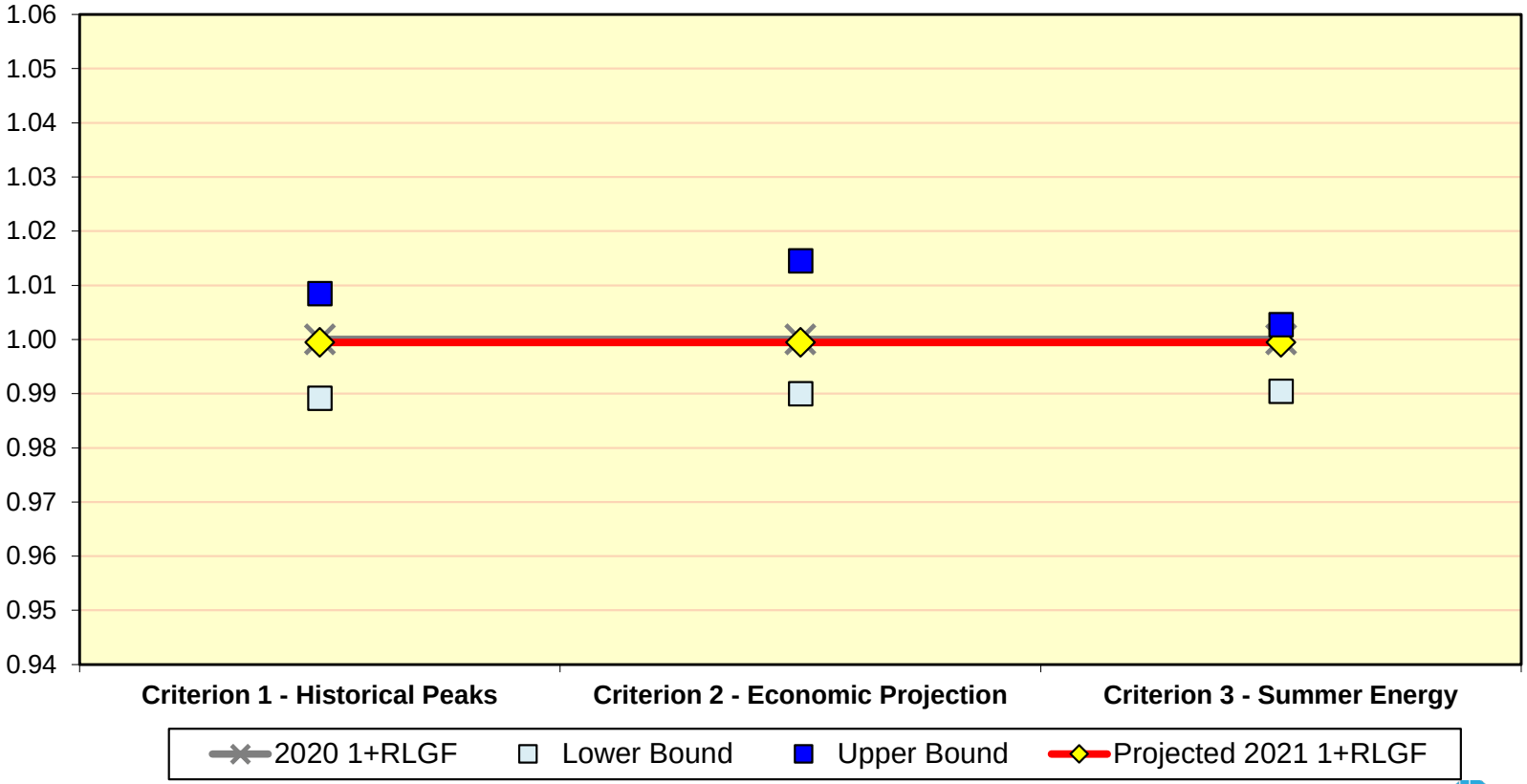
National Grid Preliminary 1+RLGF Criteria



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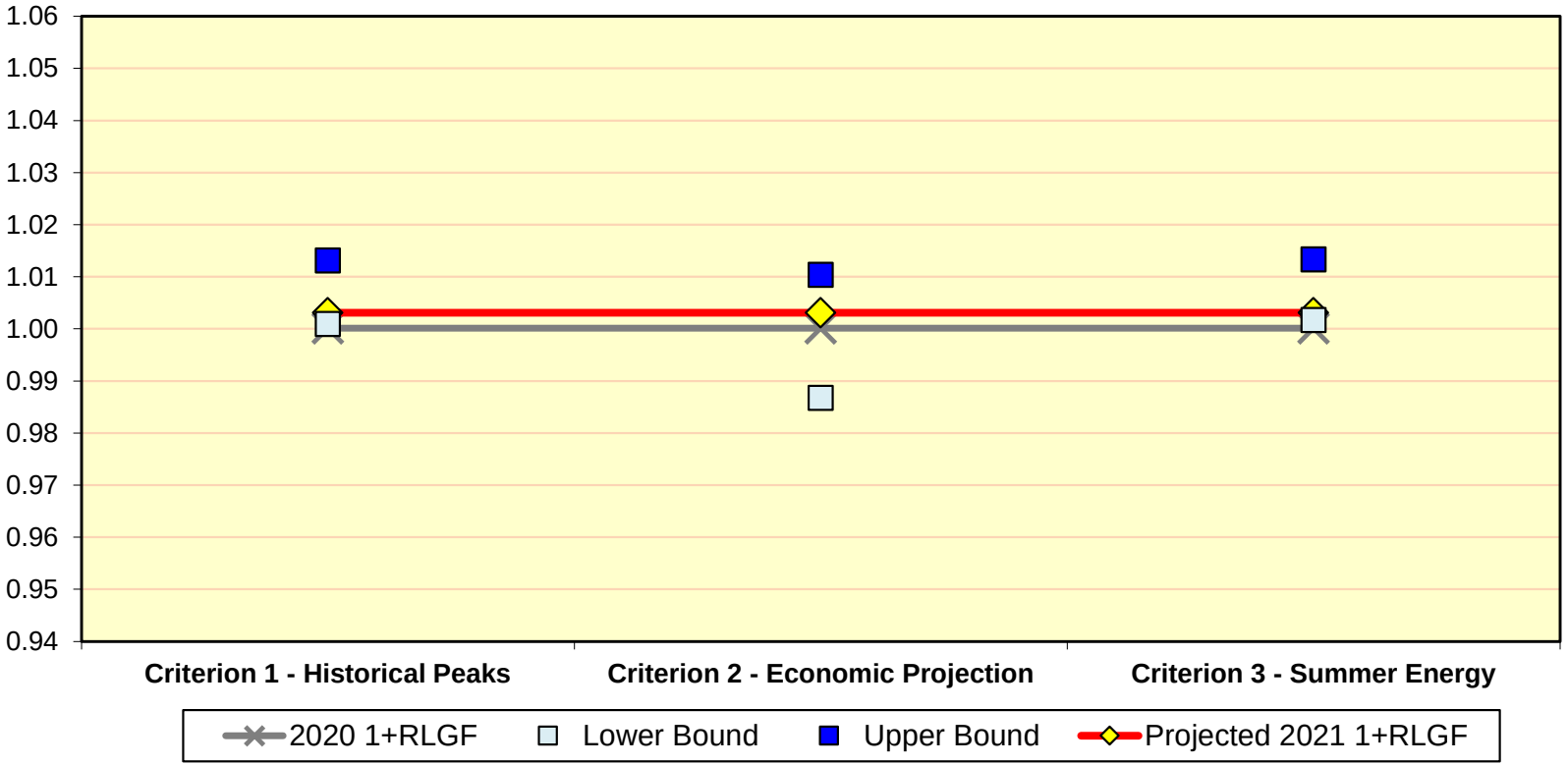
NYSEG Preliminary 1+RLGF Criteria



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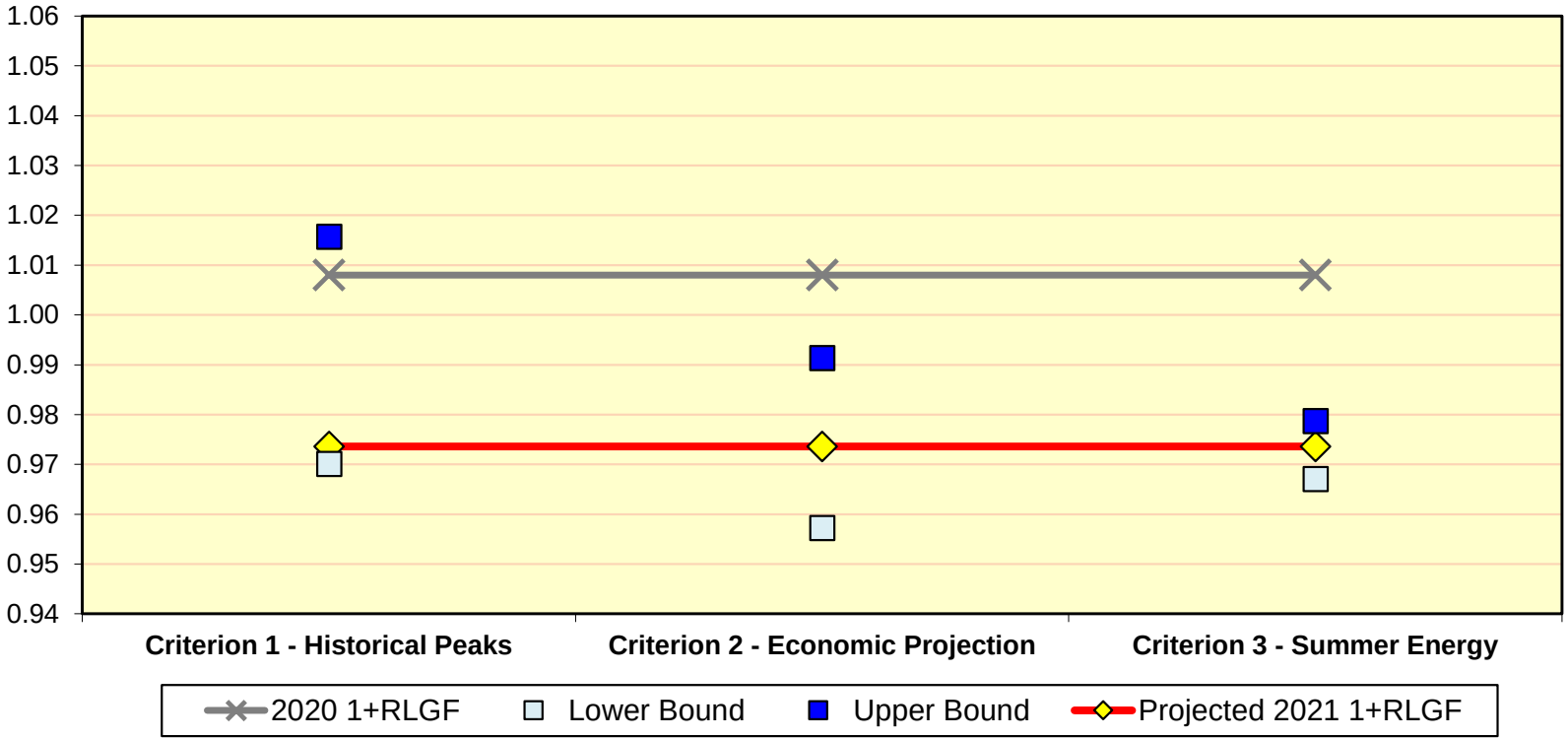
Orange & Rockland Preliminary 1+RLGF Criteria



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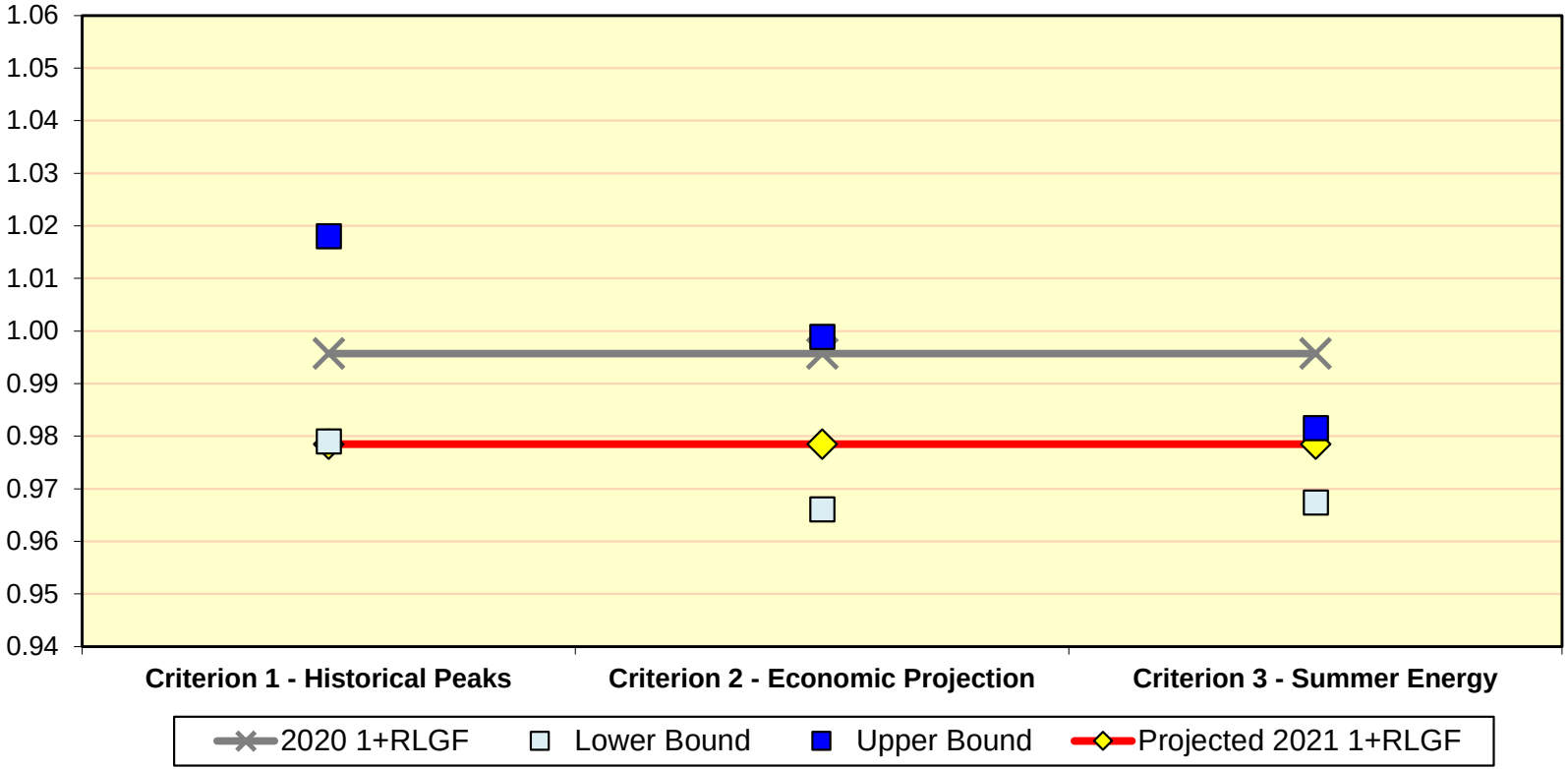
RG&E Preliminary 1+RLGF Criteria



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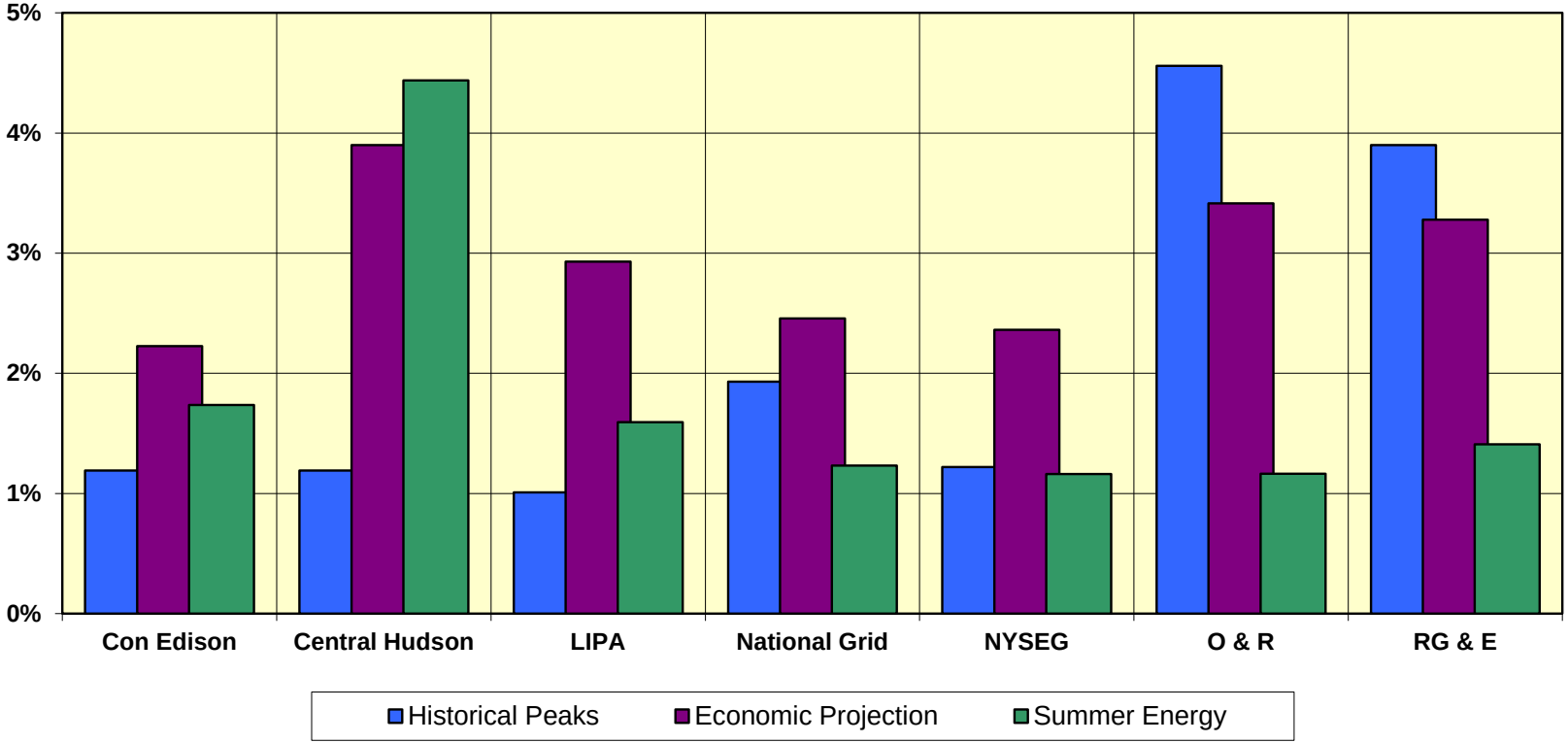
Summary of Criteria Bandwidths (Low to High)

Shows the Range of Variation for the Three Criteria



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Summary of Economic Data (1 of 2)

Variable & TD	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Con-Ed_Employment	1,000	4,268	4,358	4,453	4,600	4,733	4,825	4,903	4,976	5,131	4,530	4,704	4,864
Con-Ed_GDP	$ Millions	708,563	763,142	753,109	777,005	788,554	802,776	827,001	835,274	871,920	770,746	786,363	852,337
Con-Ed_Households	1,000	3,517	3,550	3,583	3,611	3,636	3,656	3,649	3,645	3,631	3,643	3,610	3,605
Con-Ed_Income-Real	$ Millions	544,112	566,871	566,749	589,386	613,411	632,668	681,953	693,534	712,778	737,776	703,802	733,791
Con-Ed_Population	1,000	9,234	9,311	9,364	9,403	9,434	9,443	9,407	9,357	9,299	9,281	9,274	9,288
Cen-Hud_Employment	1,000	190	190	191	191	193	195	196	198	200	182	189	194
Cen-Hud_GDP	$ Millions	22,301	22,790	22,830	22,801	23,048	22,974	23,529	23,758	24,266	22,225	22,730	24,315
Cen-Hud_Households	1,000	201	200	201	202	202	203	204	206	206	207	205	204
Cen-Hud_Income-Real	$ Millions	22,455	23,049	22,690	23,094	24,038	24,404	25,257	25,765	25,849	26,988	25,339	26,052
Cen-Hud_Population	1,000	530	527	525	523	521	519	520	520	519	517	516	516
LIPA_Employment	1,000	1,247	1,265	1,285	1,296	1,312	1,331	1,347	1,347	1,366	1,210	1,258	1,292
LIPA_GDP	$ Millions	164,396	171,122	168,984	173,773	177,528	176,774	180,018	178,598	179,822	161,854	165,391	177,443
LIPA_Households	1,000	958	960	966	970	973	976	978	982	982	985	977	974
LIPA_Income-Real	$ Millions	173,317	184,067	177,537	182,901	190,792	194,364	201,258	207,406	209,036	212,323	202,812	209,084
LIPA_Population	1,000	2,846	2,846	2,850	2,851	2,847	2,842	2,841	2,838	2,833	2,827	2,825	2,823
N-Grid_Employment	1,000	1,792	1,804	1,816	1,821	1,832	1,850	1,861	1,869	1,894	1,706	1,765	1,805
N-Grid_GDP	$ Millions	220,442	226,638	222,414	229,355	232,981	233,829	237,600	238,483	243,225	221,784	227,195	241,073
N-Grid_Households	1,000	1,633	1,638	1,648	1,655	1,659	1,665	1,671	1,679	1,677	1,680	1,665	1,661
N-Grid_Income-Real	$ Millions	163,366	166,624	165,348	167,466	174,105	173,821	181,909	182,552	184,499	193,467	181,477	185,193
N-Grid_Population	1,000	4,012	4,011	4,007	4,001	3,987	3,970	3,966	3,960	3,946	3,929	3,926	3,925

Data is from Moody's Analytics, August 2020.

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Summary of Economic Data (2 of 2)

Variable & TD	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NYPA_Employment	1,000	33	33	34	34	33	34	34	35	36	32	33	34
NYPA_GDP	$ Millions	3,975	3,713	3,762	3,769	3,798	3,877	3,948	4,021	4,124	3,817	3,921	4,163
NYPA_Households	1,000	32	32	32	32	32	33	33	33	33	33	33	33
NYPA_Income-Real	$ Millions	2,946	3,025	3,015	3,034	3,202	3,155	3,309	3,288	3,285	3,445	3,173	3,230
NYPA_Population	1,000	82	82	81	82	81	80	81	81	80	80	81	81
NYSEG_Employment	1,000	417	417	420	419	416	419	421	424	428	390	406	416
NYSEG_GDP	$ Millions	48,985	49,567	49,115	49,309	49,443	49,289	49,844	50,297	51,211	46,629	47,695	50,633
NYSEG_Households	1,000	419	420	421	421	421	422	421	423	421	422	418	417
NYSEG_Income-Real	$ Millions	39,904	41,625	40,197	40,796	41,942	41,619	43,366	43,750	44,152	46,079	42,918	43,809
NYSEG_Population	1,000	1,057	1,055	1,052	1,046	1,039	1,033	1,027	1,024	1,019	1,013	1,013	1,013
OR_Employment	1,000	256	257	261	266	271	275	282	289	300	266	277	288
OR_GDP	$ Millions	32,021	32,150	32,226	32,829	33,828	34,079	35,148	35,945	37,534	33,534	34,605	37,628
OR_Households	1,000	228	228	229	231	232	233	235	236	238	240	239	239
OR_Income-Real	$ Millions	32,070	32,956	32,505	33,164	34,587	34,541	35,771	36,614	36,840	39,246	37,135	38,349
OR_Population	1,000	690	691	694	696	699	701	705	708	711	712	715	720
RGE_Employment	1,000	496	499	501	504	507	512	514	518	524	470	488	500
RGE_GDP	$ Millions	61,380	62,786	61,918	63,155	64,289	65,279	65,087	65,915	66,753	60,896	62,597	66,625
RGE_Households	1,000	424	425	427	429	431	432	433	436	436	437	433	432
RGE_Income-Real	$ Millions	43,875	45,533	44,168	44,429	46,731	46,386	48,451	48,610	49,246	51,813	48,828	49,923
RGE_Population	1,000	1,056	1,055	1,055	1,053	1,049	1,046	1,043	1,043	1,041	1,036	1,035	1,035
Employment_NYCA	1,000	8,700	8,823	8,960	9,130	9,298	9,441	9,558	9,656	9,879	8,786	9,121	9,392
GDP_NYCA	$ Millions	1,262,061	1,331,908	1,314,358	1,351,995	1,373,469	1,388,876	1,422,176	1,432,290	1,478,856	1,321,486	1,350,497	1,454,217
Households_NYCA	1,000	7,412	7,453	7,508	7,552	7,586	7,621	7,625	7,641	7,625	7,648	7,581	7,567
Income_NYCA	$ Millions	1,022,047	1,063,750	1,052,207	1,084,269	1,128,809	1,150,957	1,221,275	1,241,520	1,265,685	1,311,137	1,245,483	1,289,433
Population_NYCA	1,000	19,505	19,577	19,628	19,653	19,656	19,634	19,589	19,530	19,449	19,395	19,384	19,400

Data is from Moody's Analytics, August 2020.

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Next Steps

- The NYISO will review the RLGFs and peak load forecast for the 2021-2022 IRM Study at the September 25, LFTF Meeting
- The NYISO will continue to refine the RLGFs at future LFTF meetings, leveraging updated information, for the ICAP market forecast

New York ISO

Our mission, in collaboration with our stakeholders, is to serve the public interest and provide benefit to consumers by:

- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policymakers, stakeholders and investors in the power system

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