



2017 ICAP Forecast - Review of Regional Load Growth Factors

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Evaluation of Forecast Growth Rates

- **The Load Forecast Manual specifies that the load growth in the current year for each transmission district should be evaluated based on three criteria:**
 - **Historic Peak Demand Growth: Bandwidth based only on the historic growth of weather-adjusted peaks;**
 - **Ratio of Peak Demand to Economic Growth: Projection based on next year's economic growth, using a regression of historic peaks, historic economic data and projected economic growth;**
 - **Ratio of Summer Energy to Economic Growth: A third criteria selected by the NYISO, which is a projection based on regression of historic summer energy, historic economic data and projected economic growth.**
- **If at least two of the three criteria are satisfied, then the load growth for the Transmission District is accepted.**

Criterion 1

- ◆ **Calculate annual growth in weather normalized peaks over the past 5 years, using Transmission Owner's weather normalized peaks.**
- ◆ **Select the 2nd highest as the upper bound on growth and the 2nd lowest as the lower bound on growth, with a minimum of a 1% difference between the two.**

Criterion 2

- ◆ **Uses daily weather, energy and economic data from 2005 to 2016**
- ◆ **Uses every weekday from those 12 years where temperature was within 4 degrees of TO PP-CTHI**
- ◆ **Regress daily MW against daily weather, annual macroeconomic variable, energy efficiency trend and binary variables to determine 2017 predicted peak load**
- ◆ **Calculate a +/-25% confidence interval for the 2017 peak load based on standard error of the regression to obtain the upper and lower bounds for the RLGf**

Criterion 3

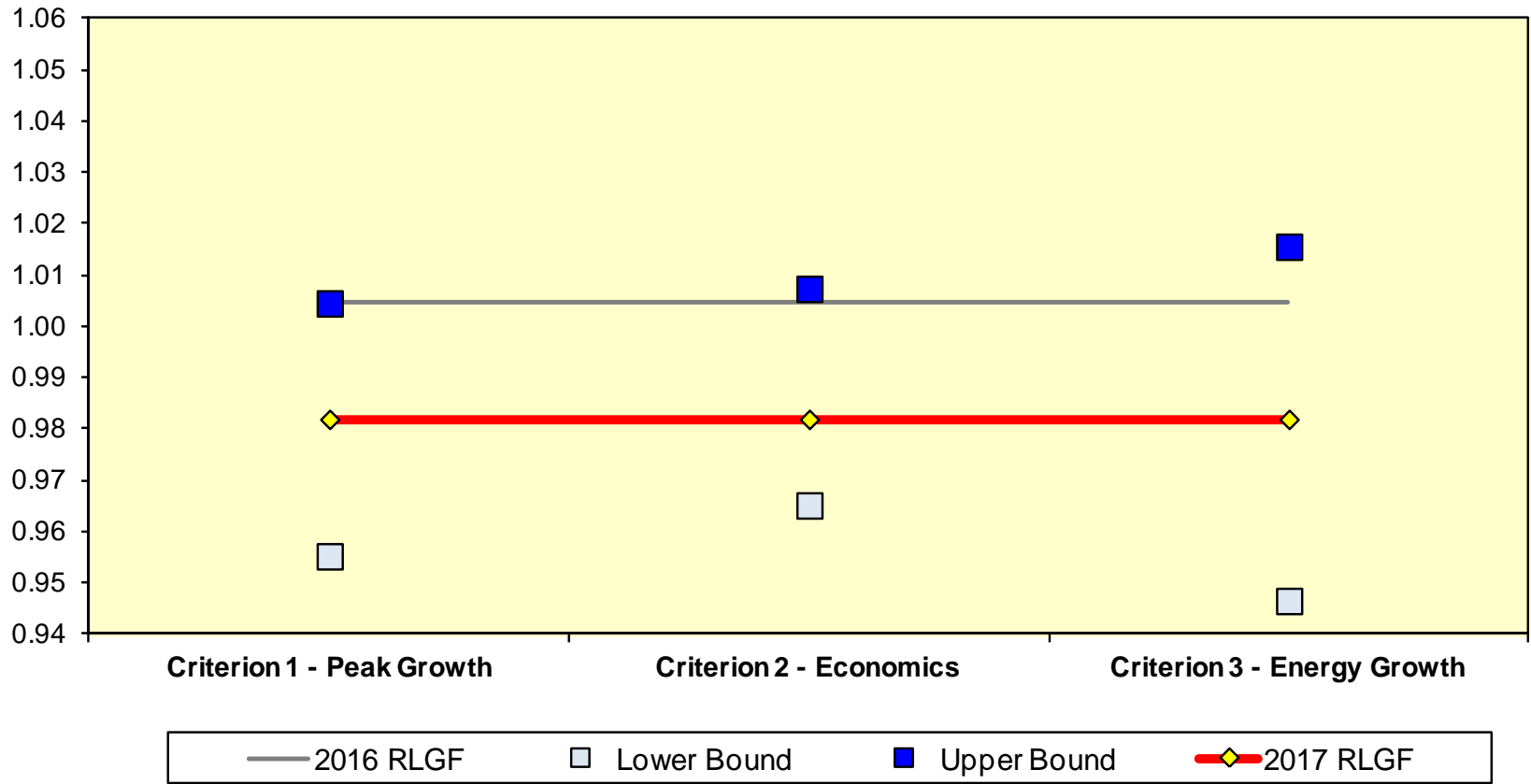
- ◆ **Regress summer energy against summer CTHI, macroeconomic variable (if significant) and EE trend to determine 2017 predicted summer energy**
- ◆ **Using the variation in predicted summer energy from each model, construct +/- 25% bandwidths on 2017 summer energy due to variations in weather and the economy**

Criteria 1, 2 & 3 Summary

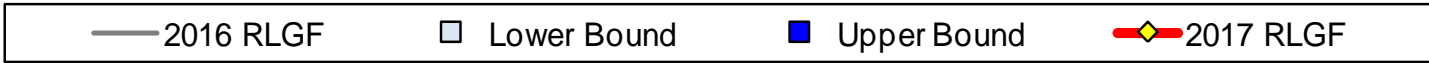
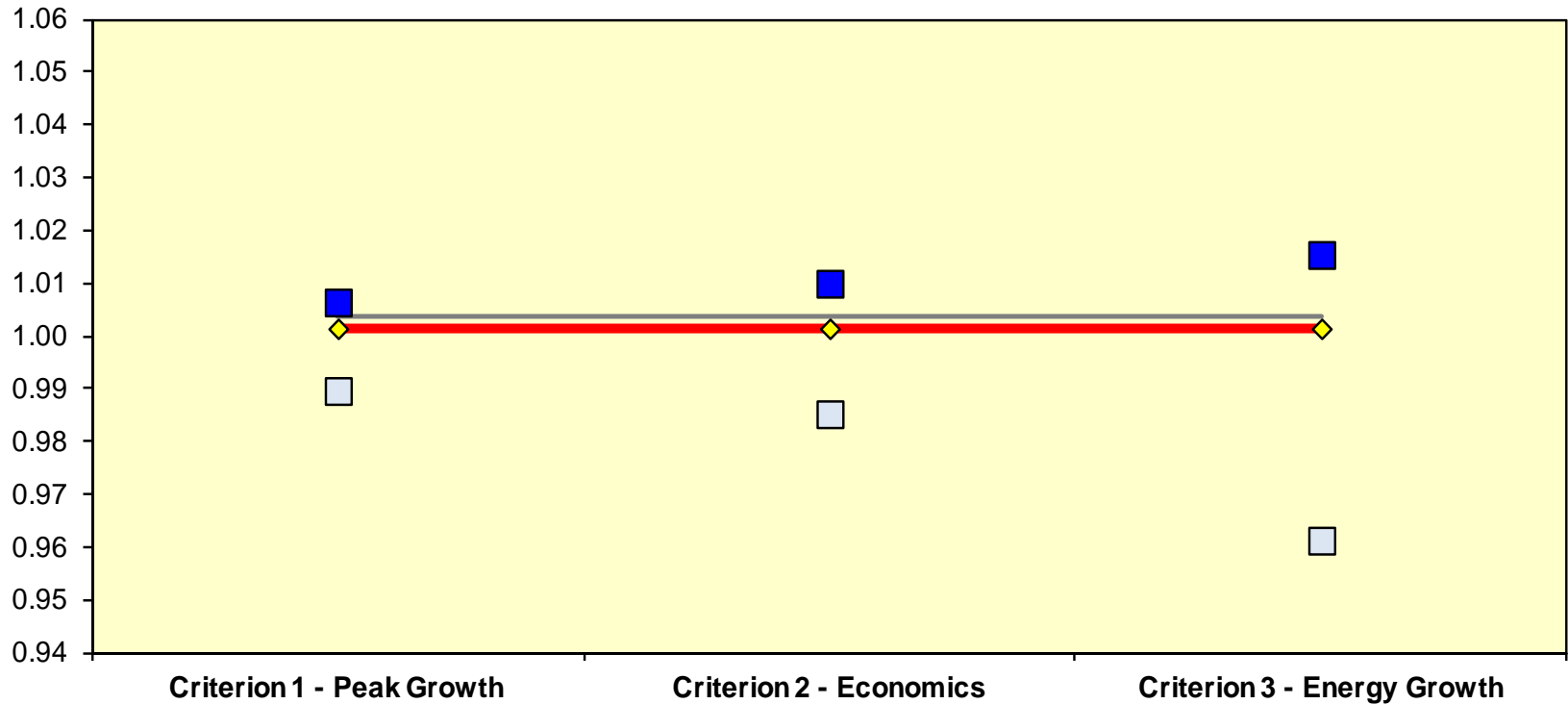
All RLGFs are Within at Least 2 of 3 Bounds

T.O	Type	Lower Bound	2017 RLGf	Upper Bound	Test	2016 RLGf
Central Hudson	Criterion 1 - Peak Growth	0.9553	0.9820	1.0046	1	1.0045
Central Hudson	Criterion 2 - Economics	0.9652	0.9820	1.0074	1	1.0045
Central Hudson	Criterion 3 - Energy Growth	0.9466	0.9820	1.0156	1	1.0045
Con Edison	Criterion 1 - Peak Growth	0.9897	1.0015	1.0065	1	1.0037
Con Edison	Criterion 2 - Economics	0.9853	1.0015	1.0100	1	1.0037
Con Edison	Criterion 3 - Energy Growth	0.9614	1.0015	1.0155	1	1.0037
LIPA	Criterion 1 - Peak Growth	0.9914	0.9937	1.0074	1	1.0000
LIPA	Criterion 2 - Economics	0.9798	0.9937	1.0206	1	1.0000
LIPA	Criterion 3 - Energy Growth	0.9617	0.9937	1.0219	1	1.0000
National Grid	Criterion 1 - Peak Growth	0.9931	1.0030	1.0130	1	1.0060
National Grid	Criterion 2 - Economics	0.9889	1.0030	1.0126	1	1.0060
National Grid	Criterion 3 - Energy Growth	0.9828	1.0030	1.0307	1	1.0060
NYSEG	Criterion 1 - Peak Growth	0.9996	1.0040	1.0215	1	1.0050
NYSEG	Criterion 2 - Economics	0.9929	1.0040	1.0219	1	1.0050
NYSEG	Criterion 3 - Energy Growth	0.9903	1.0040	1.0394	1	1.0050
O & R	Criterion 1 - Peak Growth	0.9670	1.0035	1.0151	1	1.0093
O & R	Criterion 2 - Economics	0.9788	1.0035	1.0096	1	1.0093
O & R	Criterion 3 - Energy Growth	0.9613	1.0035	1.0218	1	1.0093
RG & E	Criterion 1 - Peak Growth	0.9917	1.0028	1.0017	0	1.0070
RG & E	Criterion 2 - Economics	0.9873	1.0028	1.0227	1	1.0070
RG & E	Criterion 3 - Energy Growth	0.9816	1.0028	1.0469	1	1.0070

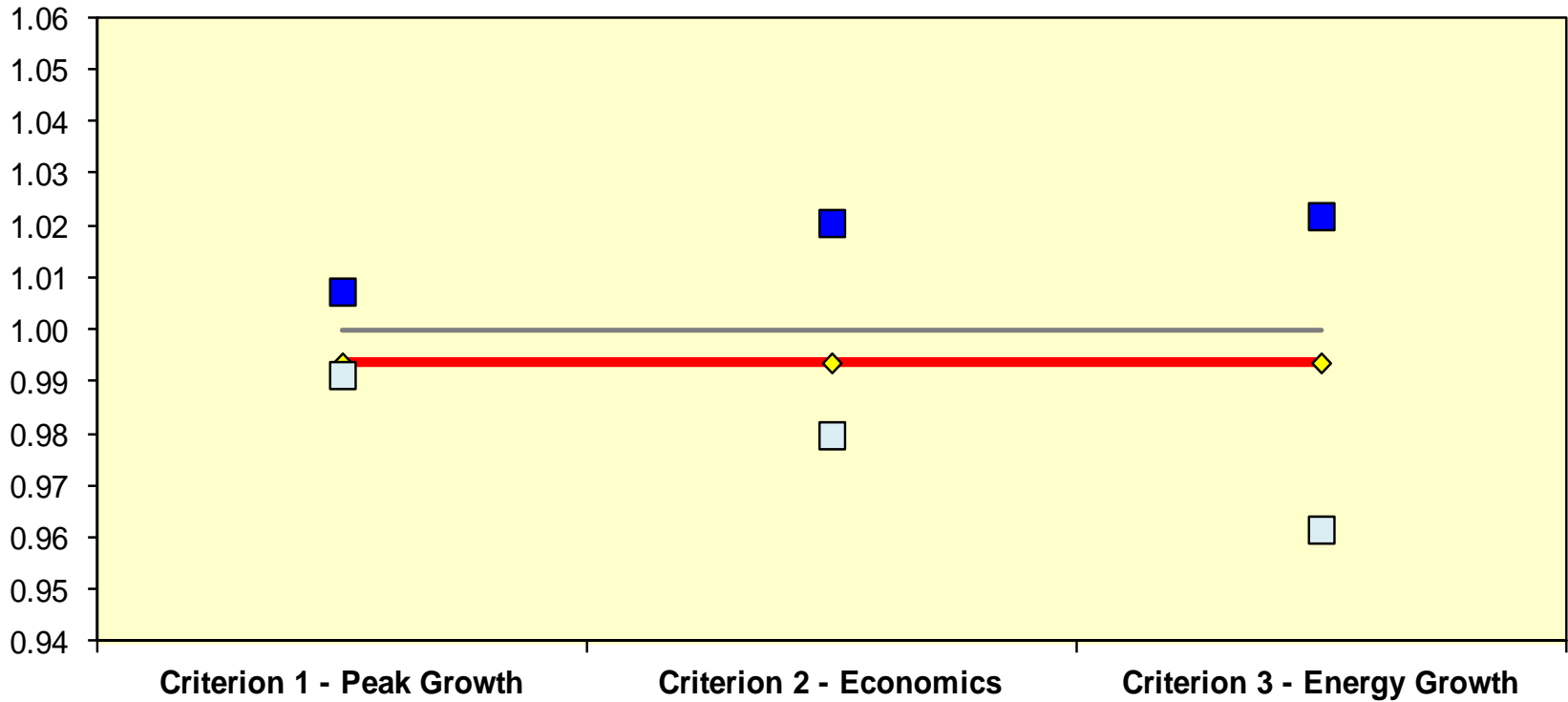
Central Hudson RLG Review



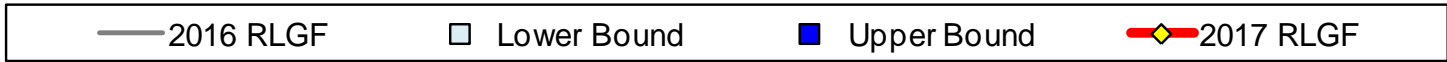
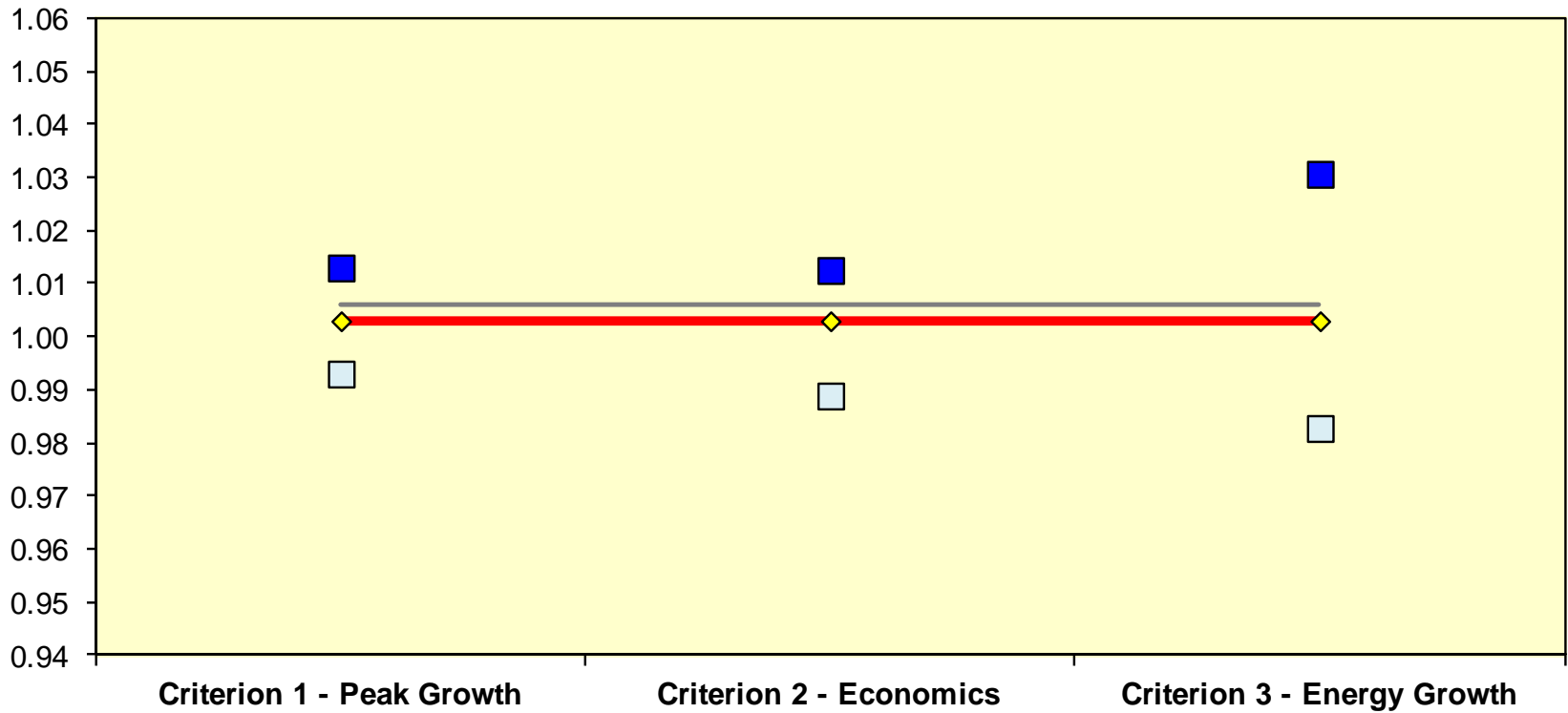
Consolidated Edison RLG Review



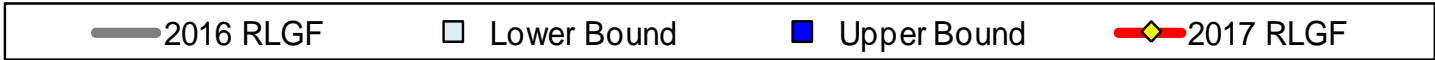
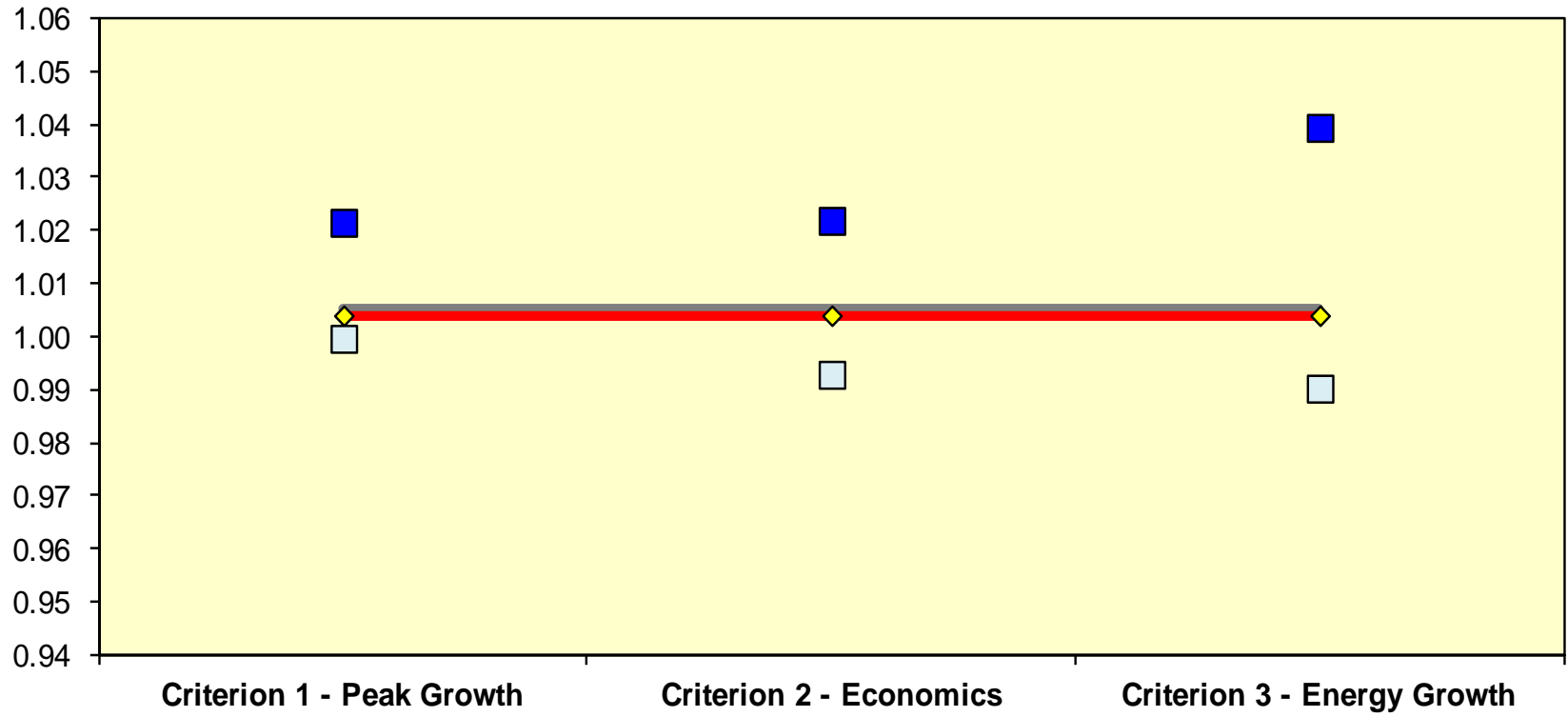
LIPA RLG Review



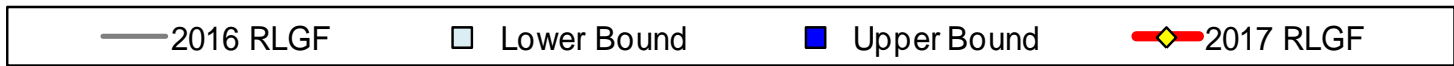
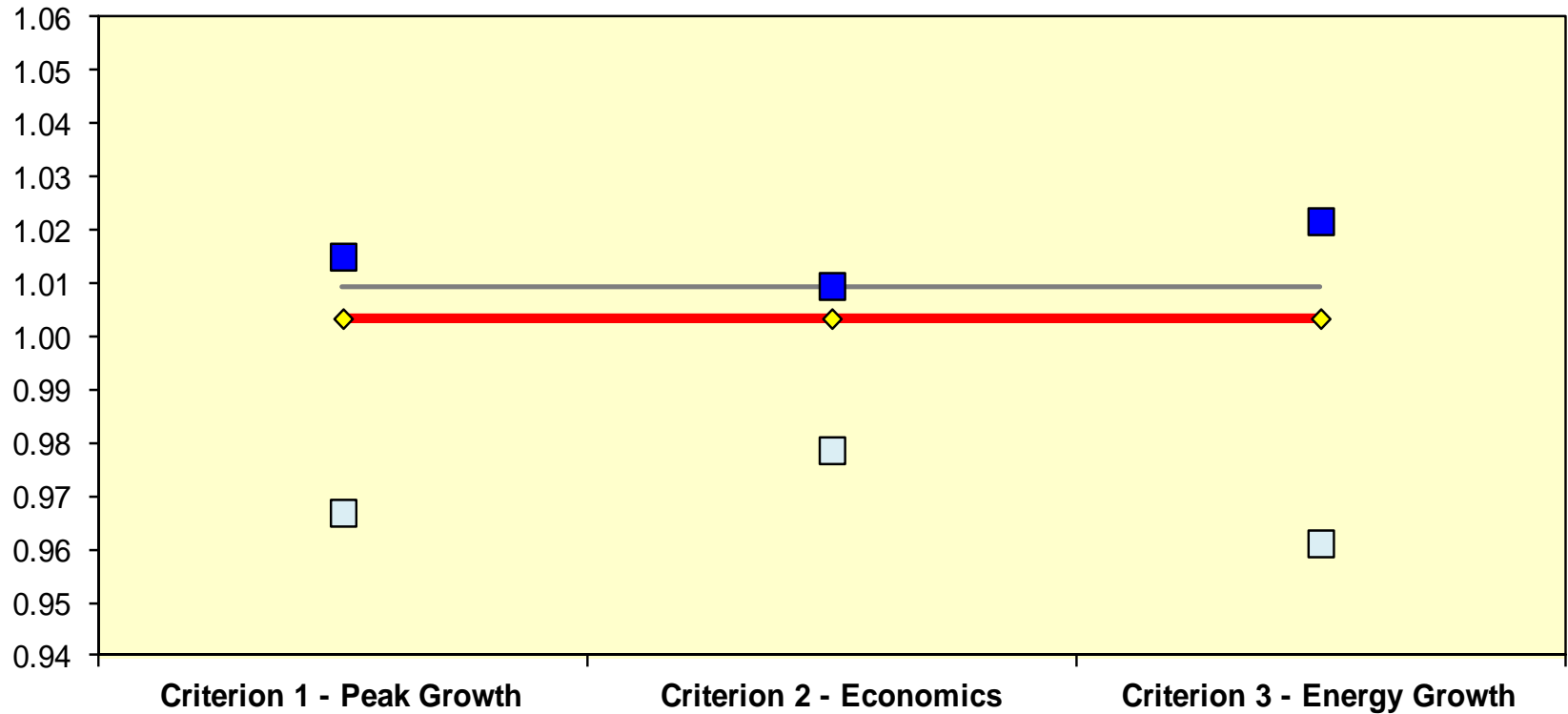
National Grid RLGf Review



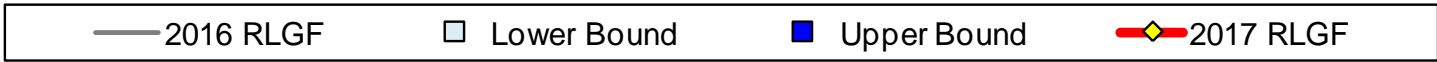
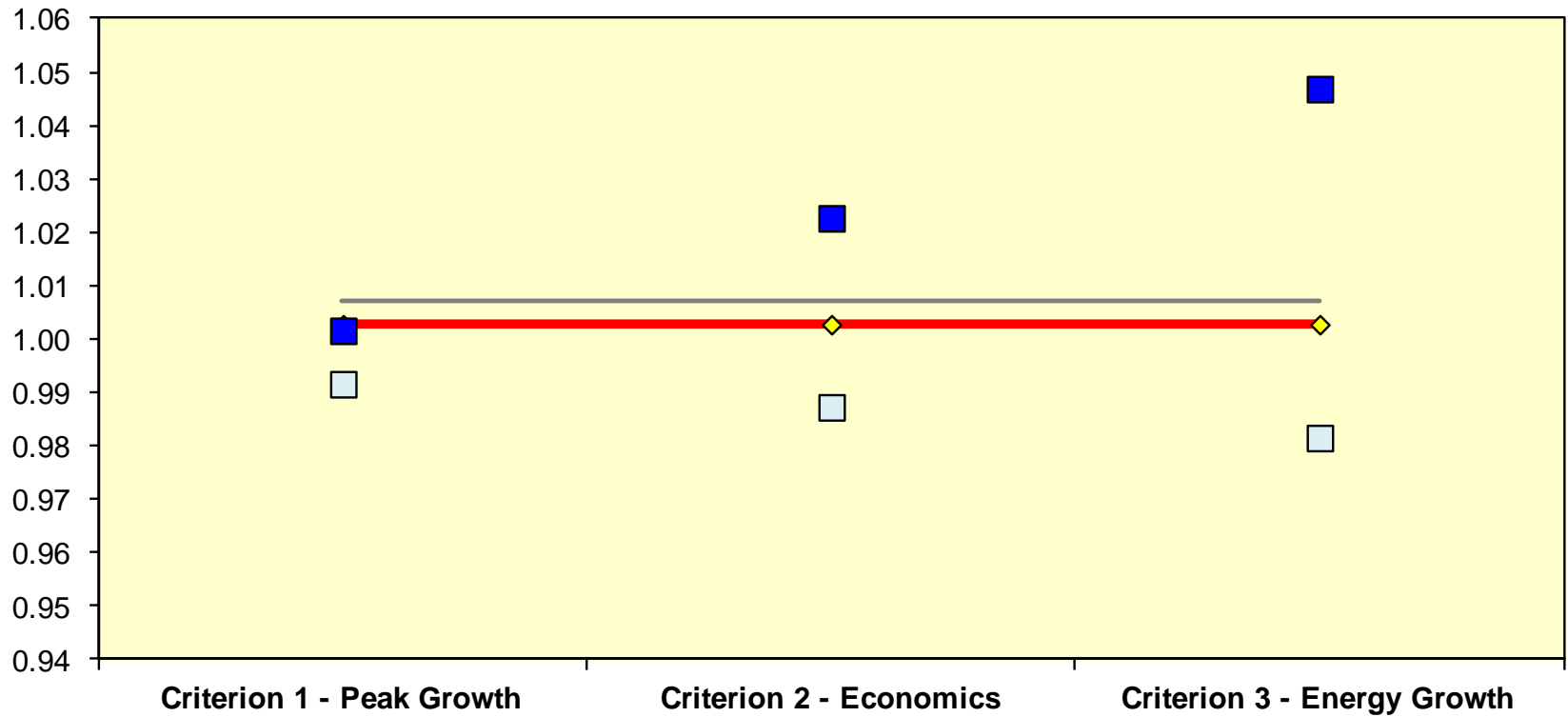
NYSEG RLG Review



Orange & Rockland RLG Review

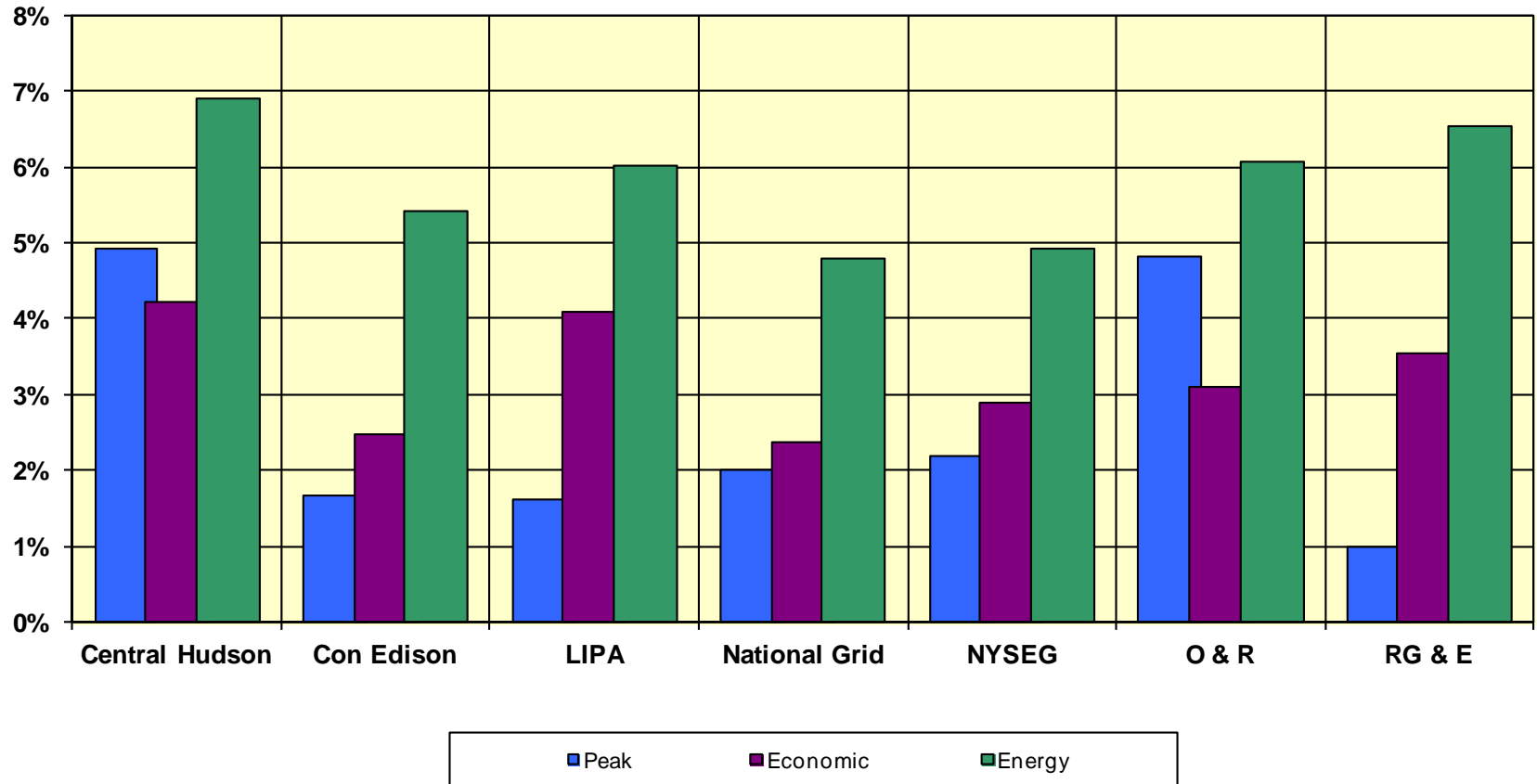


Rochester Gas & Electric RLG Review



Summary of Overall Bandwidths (Low to High)

Shows the Range of Variation for the Three Criteria



Summary of Economic Data

Variable & TD	Unit	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Cen-Hud_Employment	1,000	195	191	190	190	190	191	192	194	197	200	202
Cen-Hud_GDP	\$ Millions	20,650	20,872	21,199	21,100	21,216	21,124	21,257	21,650	22,204	22,654	23,015
Cen-Hud_Households	1,000	198	199	199	198	197	195	195	196	198	200	202
Cen-Hud_Income-Real	\$ Millions	20,722	20,361	20,596	20,999	20,990	21,031	21,740	22,454	23,159	23,878	24,393
Cen-Hud_Population	1,000	529	529	530	529	527	526	525	527	528	528	529
Con-Ed_Employment	1,000	4,184	4,101	4,166	4,261	4,348	4,465	4,597	4,689	4,743	4,789	4,834
Con-Ed_GDP	\$ Millions	609,560	644,010	663,205	679,792	692,648	700,717	722,993	730,369	739,962	750,059	760,208
Con-Ed_Households	1,000	3,445	3,456	3,467	3,480	3,489	3,494	3,500	3,526	3,571	3,616	3,654
Con-Ed_Income-Real	\$ Millions	491,204	489,486	509,395	524,695	528,991	532,834	553,210	573,188	589,331	605,503	615,654
Con-Ed_Population	1,000	9,038	9,104	9,188	9,284	9,363	9,435	9,494	9,549	9,603	9,656	9,710
LIPA_Employment	1,000	1,247	1,223	1,234	1,249	1,268	1,284	1,298	1,311	1,321	1,334	1,346
LIPA_GDP	\$ Millions	149,227	152,856	155,430	156,632	159,314	159,770	161,779	164,269	167,823	170,642	172,991
LIPA_Households	1,000	946	949	950	948	946	943	942	947	956	966	974
LIPA_Income-Real	\$ Millions	160,914	156,787	159,781	165,670	166,812	166,328	172,704	178,288	182,803	187,108	190,005
LIPA_Population	1,000	2,811	2,827	2,843	2,850	2,854	2,859	2,866	2,875	2,881	2,886	2,892
N-Grid_Employment	1,000	1,822	1,787	1,787	1,797	1,811	1,820	1,829	1,842	1,858	1,878	1,893
N-Grid_GDP	\$ Millions	203,547	207,605	210,608	210,904	212,509	212,435	215,645	217,919	220,729	223,595	226,026
N-Grid_Households	1,000	1,604	1,612	1,613	1,606	1,601	1,595	1,590	1,605	1,605	1,617	1,625
N-Grid_Income-Real	\$ Millions	147,292	149,252	151,922	154,838	155,373	155,284	159,045	163,580	167,266	171,106	173,555
N-Grid_Population	1,000	3,998	4,001	4,005	4,006	4,005	4,002	3,998	3,997	3,996	3,993	3,990
NYPA_Employment	1,000	35	34	33	33	34	34	34	35	35	35	36
NYPA_GDP	\$ Millions	4,233	4,357	4,145	3,785	3,666	3,629	3,641	3,709	3,794	3,885	3,941
NYPA_Households	1,000	31	32	31	31	31	31	31	31	31	31	32
NYPA_Income-Real	\$ Millions	2,711	2,781	2,786	2,779	2,797	2,793	2,855	2,938	3,016	3,097	3,160
NYPA_Population	1,000	82	82	82	82	82	82	82	82	82	82	82
NYSEG_Employment	1,000	407	400	401	403	406	407	407	409	414	420	424
NYSEG_GDP	\$ Millions	42,907	43,912	44,814	44,306	44,307	43,868	44,113	44,887	45,862	46,737	47,334
NYSEG_Households	1,000	395	396	396	393	391	387	385	387	390	392	395
NYSEG_Income-Real	\$ Millions	34,779	34,865	35,245	36,180	36,267	35,671	36,579	37,547	38,388	39,331	39,953
NYSEG_Population	1,000	1,008	1,008	1,007	1,006	1,004	1,000	997	997	997	996	996
OR_Employment	1,000	256	251	254	257	259	264	270	275	278	280	282
OR_GDP	\$ Millions	30,468	30,918	30,941	30,602	30,783	30,931	31,375	32,040	32,699	33,306	33,793
OR_Households	1,000	224	225	226	225	224	224	224	225	228	230	232
OR_Income-Real	\$ Millions	30,024	29,633	29,775	30,428	30,428	30,609	31,835	32,857	33,652	34,471	35,051
OR_Population	1,000	678	683	688	691	693	697	701	703	706	707	709
RGE_Employment	1,000	533	524	529	534	537	540	543	544	546	552	557
RGE_GDP	\$ Millions	61,927	63,054	63,687	63,612	63,961	63,603	64,546	66,017	67,927	69,513	70,803
RGE_Households	1,000	441	444	446	444	442	440	440	442	446	450	454
RGE_Income-Real	\$ Millions	42,417	42,391	43,177	44,473	44,728	44,426	45,498	46,704	47,621	48,701	49,354
RGE_Population	1,000	1,111	1,114	1,116	1,118	1,118	1,118	1,117	1,118	1,120	1,122	1,124
Employment_NYCA	1,000	8,678	8,511	8,595	8,725	8,854	9,004	9,170	9,299	9,391	9,488	9,574
GDP_NYCA	\$ Millions	1,122,520	1,167,585	1,194,028	1,210,734	1,228,403	1,236,077	1,265,348	1,280,861	1,301,001	1,320,393	1,338,110
Households_NYCA	1,000	7,285	7,314	7,328	7,326	7,320	7,309	7,307	7,348	7,426	7,504	7,567
Income_NYCA	\$ Millions	930,063	925,555	952,676	980,060	986,386	988,976	1,023,466	1,057,556	1,085,236	1,113,195	1,131,125
Population_NYCA	1,000	19,255	19,349	19,458	19,564	19,647	19,719	19,779	19,849	19,912	19,972	20,032

Data is from Moody's Analytics, August 2016.

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

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