2018 ICAP Forecast - Review of Regional Load Growth Factors

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Evaluation of Forecast Growth Rates

- The Load Forecast Manual specifies that the NYISO will evaluate Regional Load Growth Factors (RLGF) in the current year for each Transmission District are evaluated based upon 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; and
  - 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.

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Criterion 1 – Historical Peak Growth

- Calculate annual growth in weather normalized peaks over the past 5 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.

Criterion 2 – Ratio of Peak to Economic Growth

- Uses daily weather, energy and economic data from 2005 to 2017.
- Uses every weekday from those 13 years where temperature was within five degrees of TO PP-CTHI (Peak-Producing Cumulative Temperature & Humidity Index).
- Regress daily MW against daily weather, annual macroeconomic variable, energy efficiency trend and binary variables to determine 2018 predicted peak load.
- Calculate a +/-25% confidence interval for the 2018 predicted peak load based on standard error of the regression to obtain the upper and lower bounds for the RLGF.

Criterion 3 – Energy Growth

- Regress summer energy against summer CTHI, macroeconomic variable (if significant) and energy efficiency trend to determine 2018 predicted summer energy.
- Using the variation in predicted summer energy from each model, construct +/- 25% bandwidths on 2018 predicted summer energy due to variations in weather and the economy.
- Criterion 3 is independent of Criteria 1 and 2.

Criteria 1, 2 & 3 Summary

T.O.	Type	Lower Bound	2018 RLGF	Upper Bound	Test	2017 RLGF
Central Hudson	Criterion 1 - Peak Growth	0.9807	0.9920	1.0200	1	0.9820
Central Hudson	Criterion 2 - Economics	0.9767	0.9920	1.0198	1	0.9820
Central Hudson	Criterion 3 - Energy Growth	0.9724	0.9920	0.9972	1	0.9820
Con Edison	Criterion 1 - Peak Growth	0.9891	1.0023	1.0114	1	1.0015
Con Edison	Criterion 2 - Economics	0.9848	1.0023	1.0127	1	1.0015
Con Edison	Criterion 3 - Energy Growth	0.9956	1.0023	1.0056	1	1.0015
LIPA	Criterion 1 - Peak Growth	0.9926	0.9955	1.0027	1	0.9937
LIPA	Criterion 2 - Economics	0.9855	0.9955	1.0238	1	0.9937
LIPA	Criterion 3 - Energy Growth	0.9858	0.9955	1.0114	1	0.9937
National Grid	Criterion 1 - Peak Growth	0.9759	1.0010	1.0202	1	1.0030
National Grid	Criterion 2 - Economics	0.9867	1.0010	1.0140	1	1.0030
National Grid	Criterion 3 - Energy Growth	0.9923	1.0010	1.0078	1	1.0030
NYSEG	Criterion 1 - Peak Growth	0.9936	0.9982	1.0192	1	1.0040
NYSEG	Criterion 2 - Economics	0.9876	0.9982	1.0133	1	1.0040
NYSEG	Criterion 3 - Energy Growth	0.9956	0.9982	1.0072	1	1.0040
O&R	Criterion 1 - Peak Growth	0.9690	1.0019	1.0157	1	1.0035
O&R	Criterion 2 - Economics	0.9713	1.0019	1.0140	1	1.0035
O&R	Criterion 3 - Energy Growth	0.9866	1.0019	0.9998	0	1.0035
RG&E	Criterion 1 - Peak Growth	0.9926	0.9904	1.0071	0	1.0028
RG&E	Criterion 2 - Economics	0.9812	0.9904	1.0191	1	1.0028
RG&E	Criterion 3 - Energy Growth	0.9896	0.9904	1.0037	1	1.0028

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.

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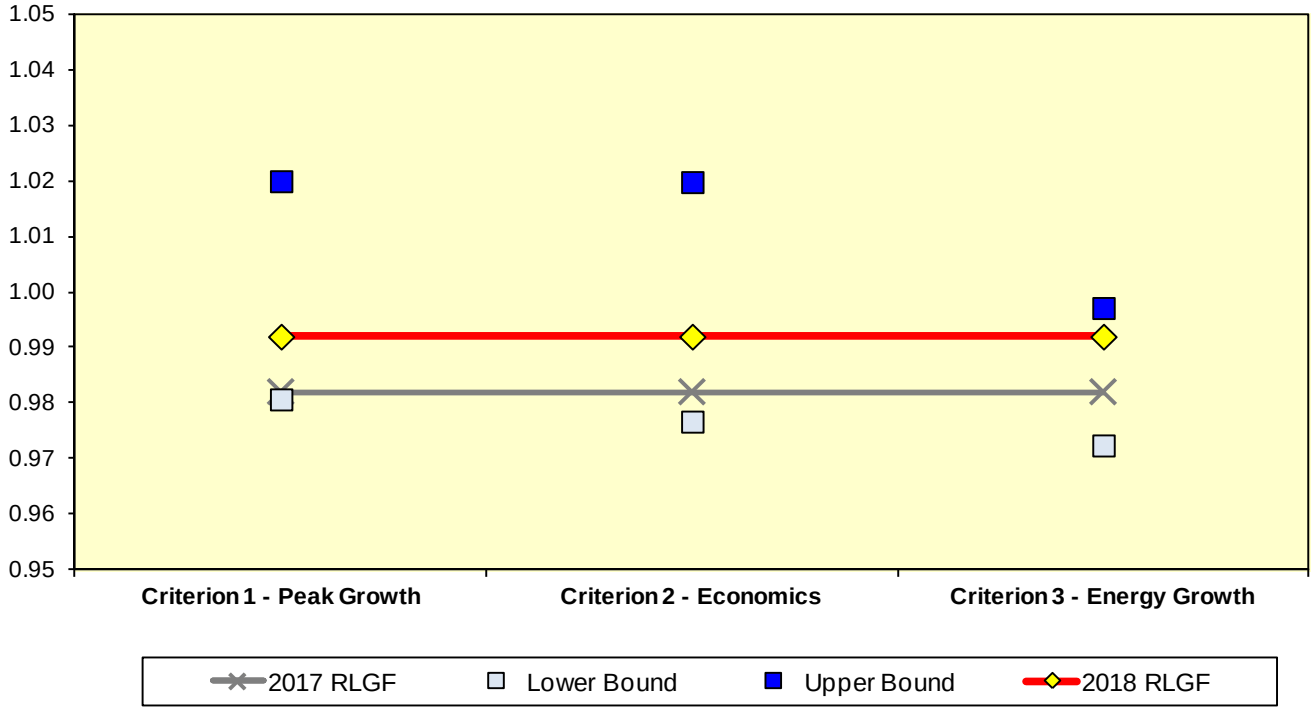
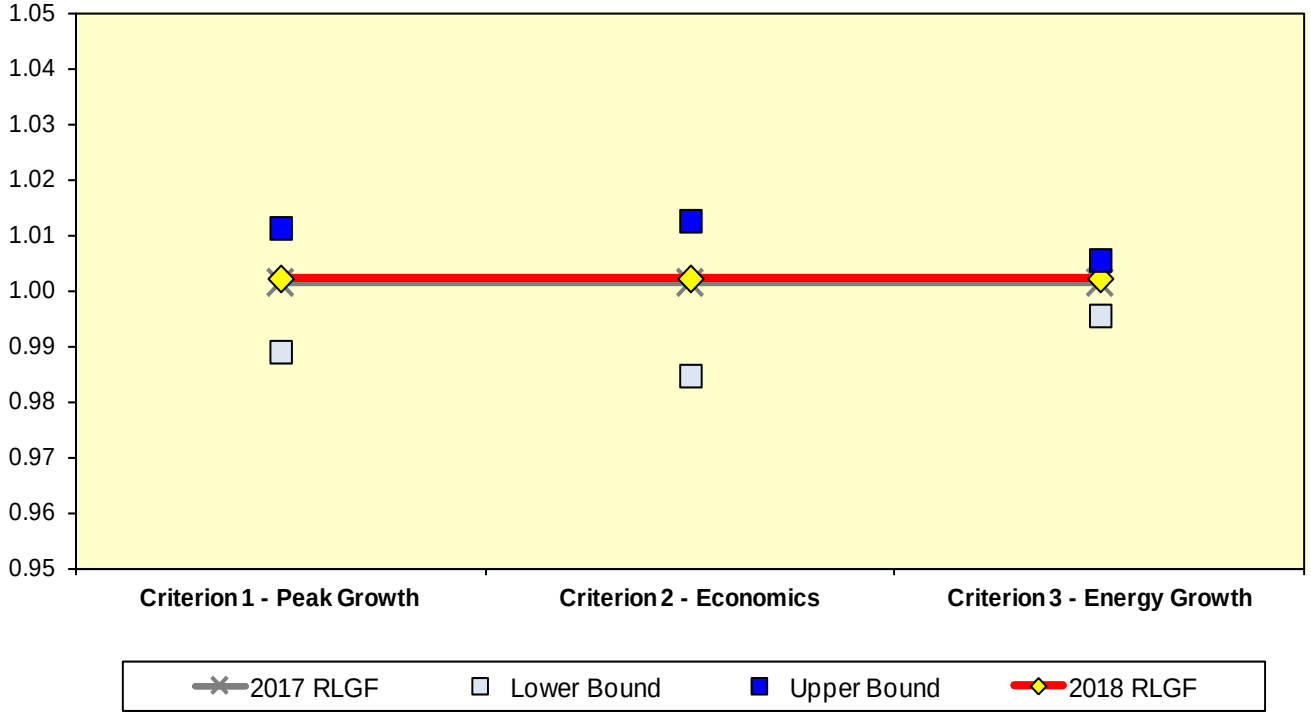
Central Hudson RLGF Review

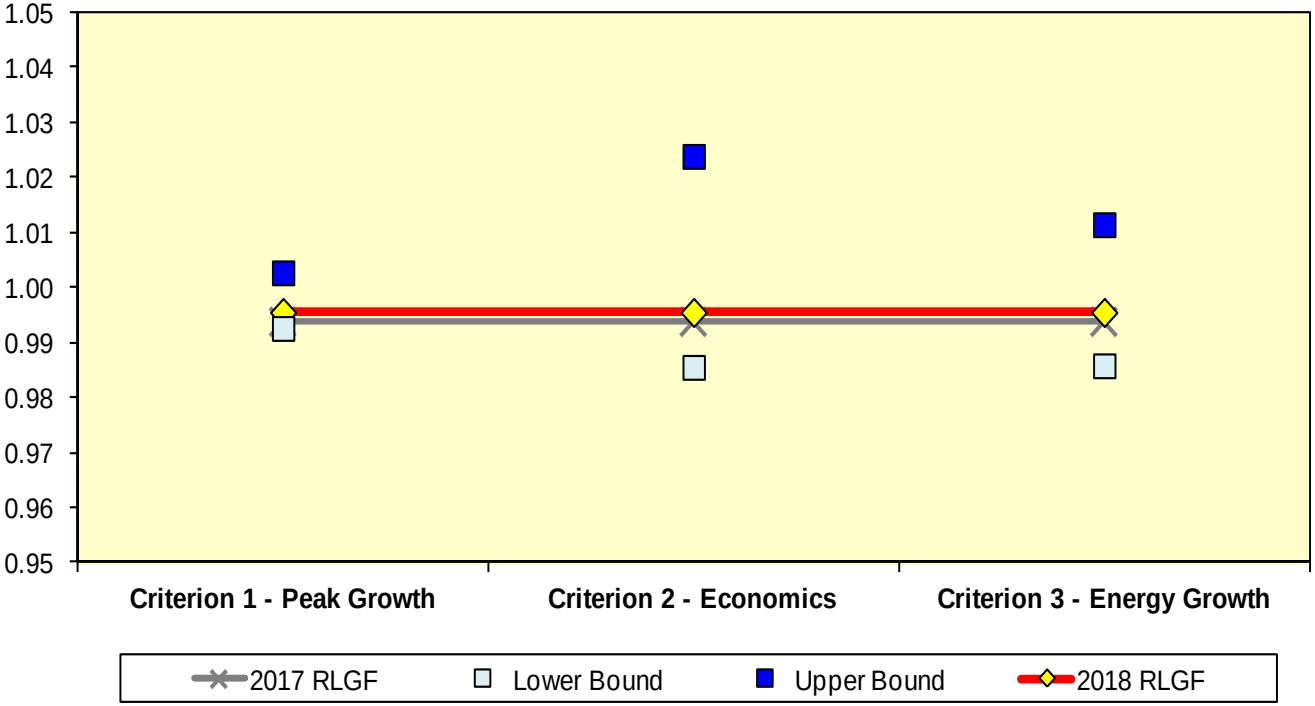


DRAFT – FOR DISCUSSION PURPOSES ONLY

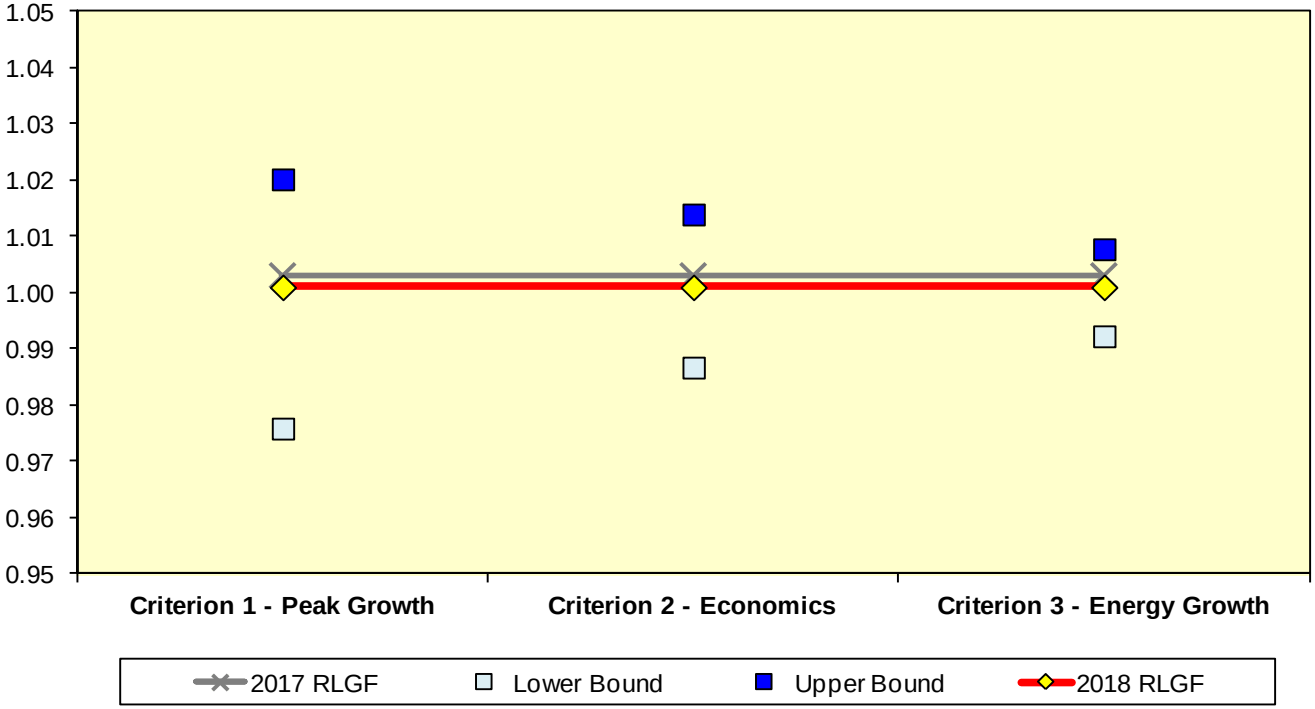
Consolidated Edison RLGF Review



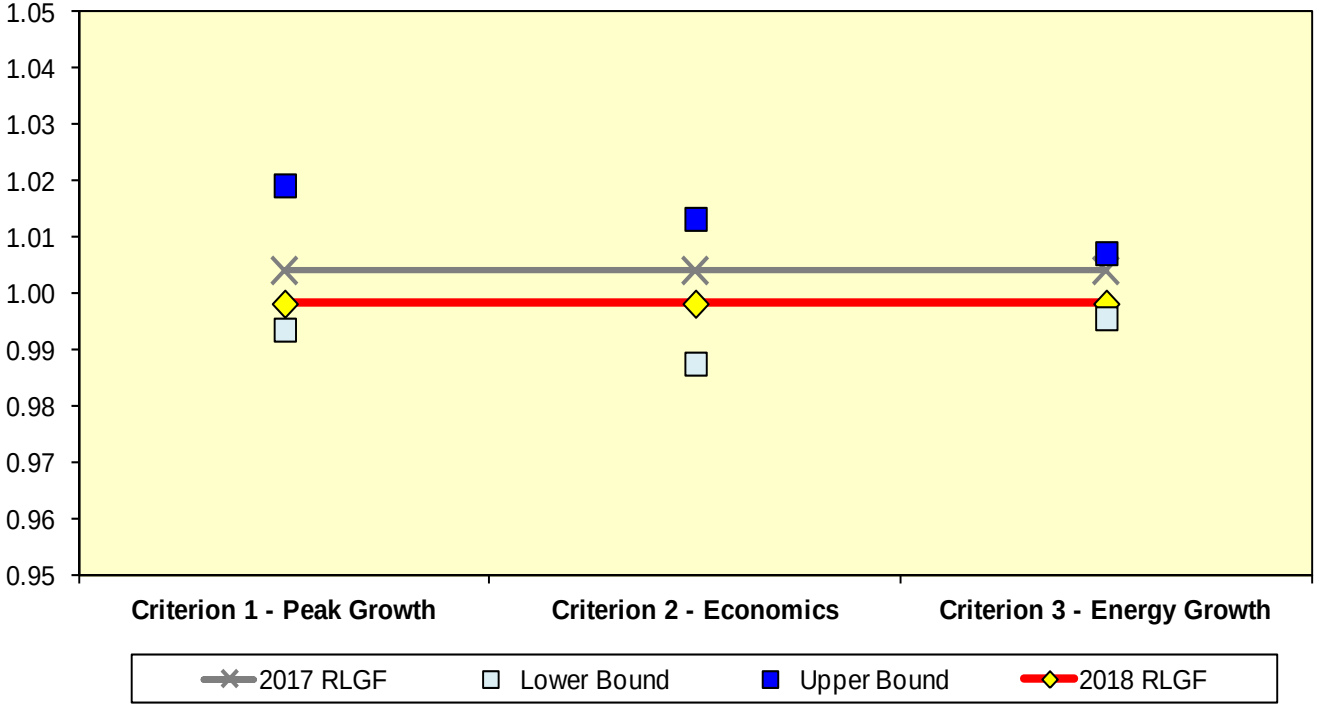
LIPA RLGF Review



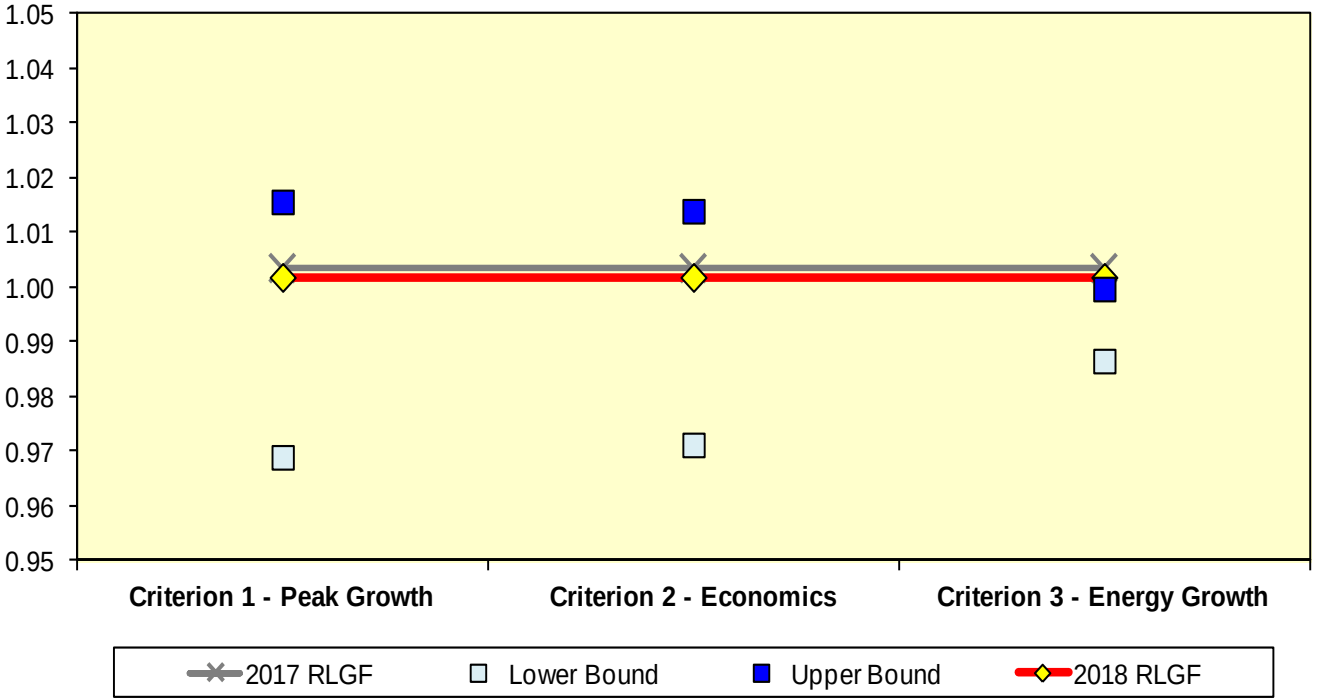
National Grid RLGF Review



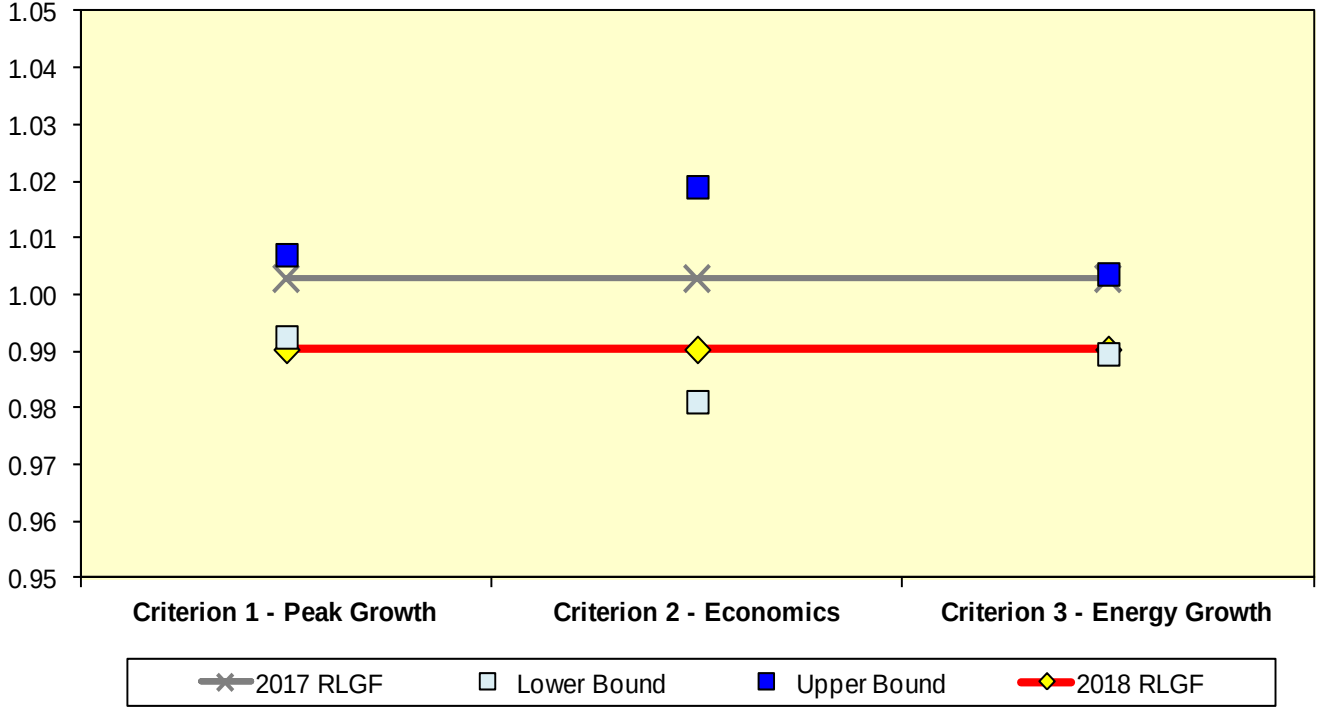
NYSEG RLGF Review



Orange & Rockland RLGF Review

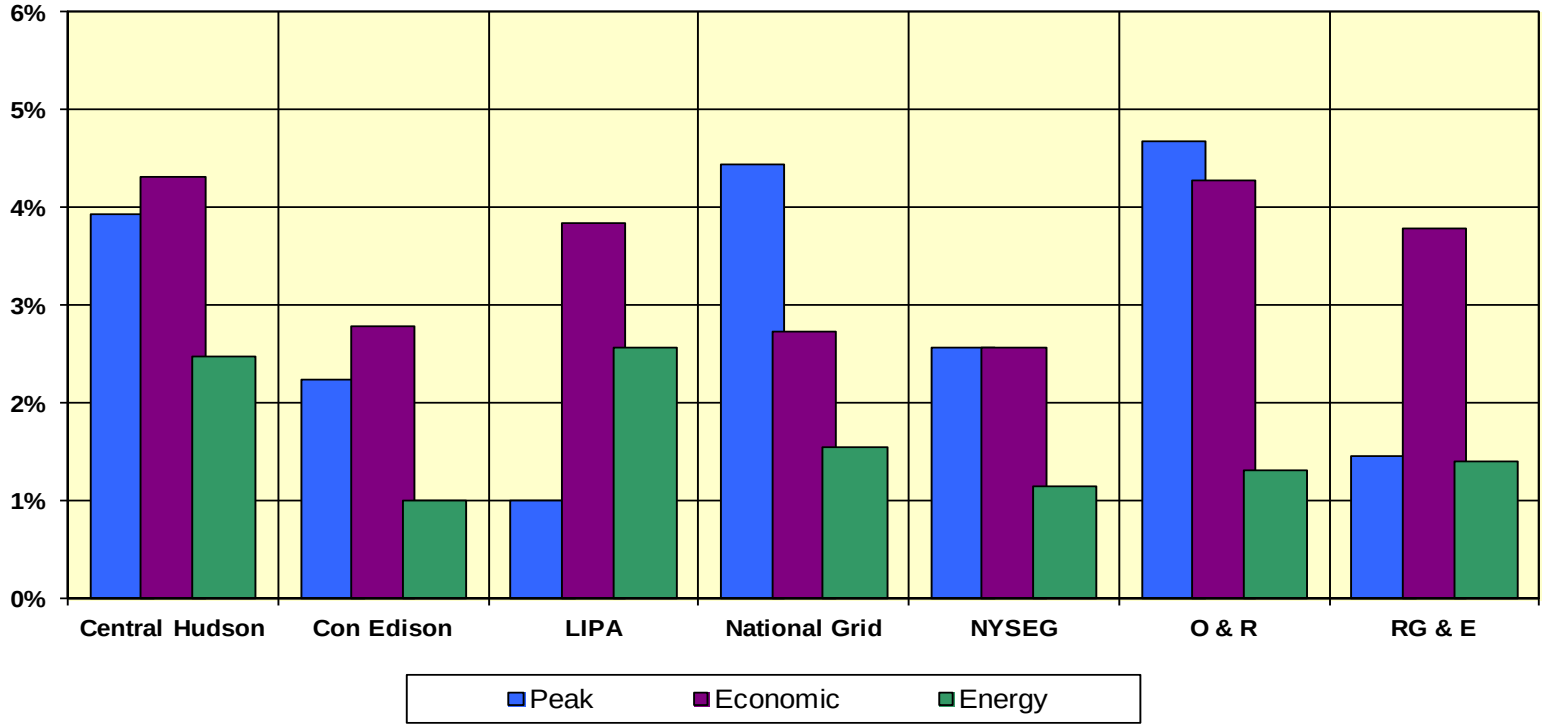


Rochester Gas & Electric RLGF Review



Summary of Overall Bandwdiths (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	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Cen-Hud_Employment	1,000	257	259	260	260	263	267	271	275	278	280	282
Cen-Hud_GDP	$ Millions	29,641	30,240	29,608	29,843	29,990	30,015	30,342	30,463	30,992	31,735	32,284
Cen-Hud_Households	1,000	259	259	262	261	262	263	263	265	266	268	270
Cen-Hud_Income-Real	$ Millions	30,473	30,634	31,177	32,475	31,642	32,268	33,552	33,899	34,364	34,880	35,358
Cen-Hud_Population	1,000	736	739	742	741	742	743	743	744	745	746	747
Con-Ed_Employment	1,000	4,025	4,058	4,158	4,247	4,339	4,483	4,613	4,697	4,769	4,814	4,848
Con-Ed_GDP	$ Millions	624,962	652,709	657,488	693,914	683,445	707,137	715,909	723,849	739,012	754,930	767,362
Con-Ed_Households	1,000	3,374	3,394	3,450	3,482	3,523	3,552	3,578	3,601	3,620	3,658	3,691
Con-Ed_Income-Real	$ Millions	452,660	461,267	487,874	514,500	519,210	541,663	560,448	572,197	582,228	588,871	594,755
Con-Ed_Population	1,000	8,884	8,945	9,049	9,127	9,194	9,243	9,293	9,310	9,348	9,395	9,438
LIPA_Employment	1,000	1,223	1,229	1,245	1,262	1,283	1,293	1,309	1,330	1,349	1,357	1,365
LIPA_GDP	$ Millions	150,370	155,665	153,946	159,101	158,308	159,626	161,700	161,126	164,727	168,216	170,805
LIPA_Households	1,000	945	951	959	959	965	968	969	975	977	985	991
LIPA_Income-Real	$ Millions	155,447	159,865	162,062	172,513	167,685	173,034	178,674	180,593	182,664	184,763	186,248
LIPA_Population	1,000	2,820	2,838	2,848	2,850	2,855	2,858	2,858	2,854	2,855	2,856	2,858
N-Grid_Employment	1,000	1,710	1,707	1,712	1,729	1,740	1,744	1,752	1,770	1,783	1,796	1,806
N-Grid_GDP	$ Millions	194,633	201,658	197,758	202,134	200,696	203,086	204,782	204,576	207,950	211,730	214,462
N-Grid_Households	1,000	1,556	1,559	1,572	1,577	1,587	1,592	1,594	1,599	1,600	1,609	1,618
N-Grid_Income-Real	$ Millions	143,151	145,663	147,449	150,754	149,846	151,916	157,909	159,066	160,680	162,067	163,248
N-Grid_Population	1,000	3,863	3,868	3,868	3,869	3,868	3,861	3,849	3,834	3,828	3,824	3,820

Source: Moody's Analytics, August 2017

Summary of Economic Data (2 of 2)

Variable & TD	Unit	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
NYPA_Employment	1,000	34	33	33	33	34	33	34	34	34	35	35
NYPA_GDP	$ Millions	4,232	4,000	3,645	3,574	3,595	3,560	3,560	3,602	3,659	3,725	3,756
NYPA_Households	1,000	32	32	32	32	32	33	33	33	33	33	33
NYPA_Income-Real	$ Millions	2,826	2,818	2,798	2,828	2,831	2,917	3,010	3,044	3,096	3,141	3,180
NYPA_Population	1,000	82	82	82	82	82	81	81	81	81	81	81
NYSEG_Employment	1,000	719	719	722	724	728	729	729	737	745	750	754
NYSEG_GDP	$ Millions	82,366	85,812	84,065	85,532	84,630	85,060	85,273	85,198	86,544	88,164	89,326
NYSEG_Households	1,000	664	665	670	671	674	676	677	677	678	683	686
NYSEG_Income-Real	$ Millions	66,964	67,671	68,597	71,432	70,358	71,577	74,051	74,361	75,365	75,894	76,352
NYSEG_Population	1,000	1,680	1,683	1,684	1,683	1,682	1,679	1,672	1,665	1,663	1,661	1,658
OR_Employment	1,000	217	217	219	219	221	225	228	231	234	236	237
OR_GDP	$ Millions	24,929	25,430	24,899	25,096	25,221	25,241	25,518	25,622	26,067	26,692	27,155
OR_Households	1,000	218	218	220	220	221	221	222	223	224	226	227
OR_Income-Real	$ Millions	25,652	25,787	26,245	27,340	26,637	27,166	28,248	28,541	28,933	29,367	29,770
OR_Population	1,000	619	622	624	623	624	625	625	626	627	627	628
RGE_Employment	1,000	359	361	366	368	370	372	374	379	378	382	385
RGE_GDP	$ Millions	42,611	44,015	43,121	43,972	43,468	43,597	44,226	44,378	45,253	46,417	47,295
RGE_Households	1,000	305	306	309	310	312	314	314	316	316	319	321
RGE_Income-Real	$ Millions	29,309	29,820	30,450	31,482	30,660	30,882	32,431	32,508	32,713	33,069	33,323
RGE_Population	1,000	766	768	769	770	770	769	768	766	766	766	766
Employment_NYCA	1,000	8,544	8,583	8,715	8,842	8,978	9,146	9,310	9,453	9,570	9,650	9,712
GDP_NYCA	$ Millions	1,153,744	1,199,529	1,194,530	1,243,166	1,229,353	1,257,322	1,271,310	1,278,814	1,304,204	1,331,609	1,352,445
Households_NYCA	1,000	7,353	7,384	7,474	7,512	7,576	7,619	7,650	7,689	7,714	7,781	7,837
Income_NYCA	$ Millions	906,482	923,525	956,652	1,003,324	998,869	1,031,423	1,068,323	1,084,209	1,100,043	1,112,052	1,122,234
Population_NYCA	1,000	19,450	19,545	19,666	19,745	19,817	19,859	19,889	19,880	19,913	19,956	19,996

Source: Moody's Analytics, August 2017

The Mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefits 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 policy makers, stakeholders and investors in the power system

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