

Load Shape Analysis for the 2012 IRM Study

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Rensselaer, NY

June 29, 2011

Load Shape Analysis Overview

- ◆ Recommend a load shape for the 2012 IRM Study
- ◆ Evaluation and Review of:
 - *Comparison of NYCA peak days to neighboring systems*
 - *Review NYCA Coincidence Factors for Zones J & K*
 - *Compare Frequency Distributions of Weather Indexes*
 - *Cooling Degree Days (CDD)*
 - *Cumulative Temperature Humidity Index (CTHI)*
 - *Compare Load Duration Curves (LDC) for NYCA, Zone J & Zone K*
- ◆ Study Assumptions
 - *Compare 2002 & 2010, June 1 to August 31*
 - *Baseline years selected from the period 1993 to 2010.*
 - *Exclude 1996, 2000 & 2004 because they were much cooler than typical*
 - *Restore impacts of Demand Response to actual hourly loads*

2010 System Peak Days

- ◆ **NYISO Peak 33,454 MW – July 6, 16:00 to 17:00**
- ◆ **PJM Peak 136,465 MW – July 6, 16:00 to 17:00**

<http://ftp.pjm.com/documents/.../20110513-2010-operations-year-in-review-kormos.ashx>

- ◆ **ISO-NE Peak 27,102 MW – July 6 14:00 to 15:00**

http://www.iso-ne.com/trans/celt/fsct_detail/2011/peak_data_summary.xls

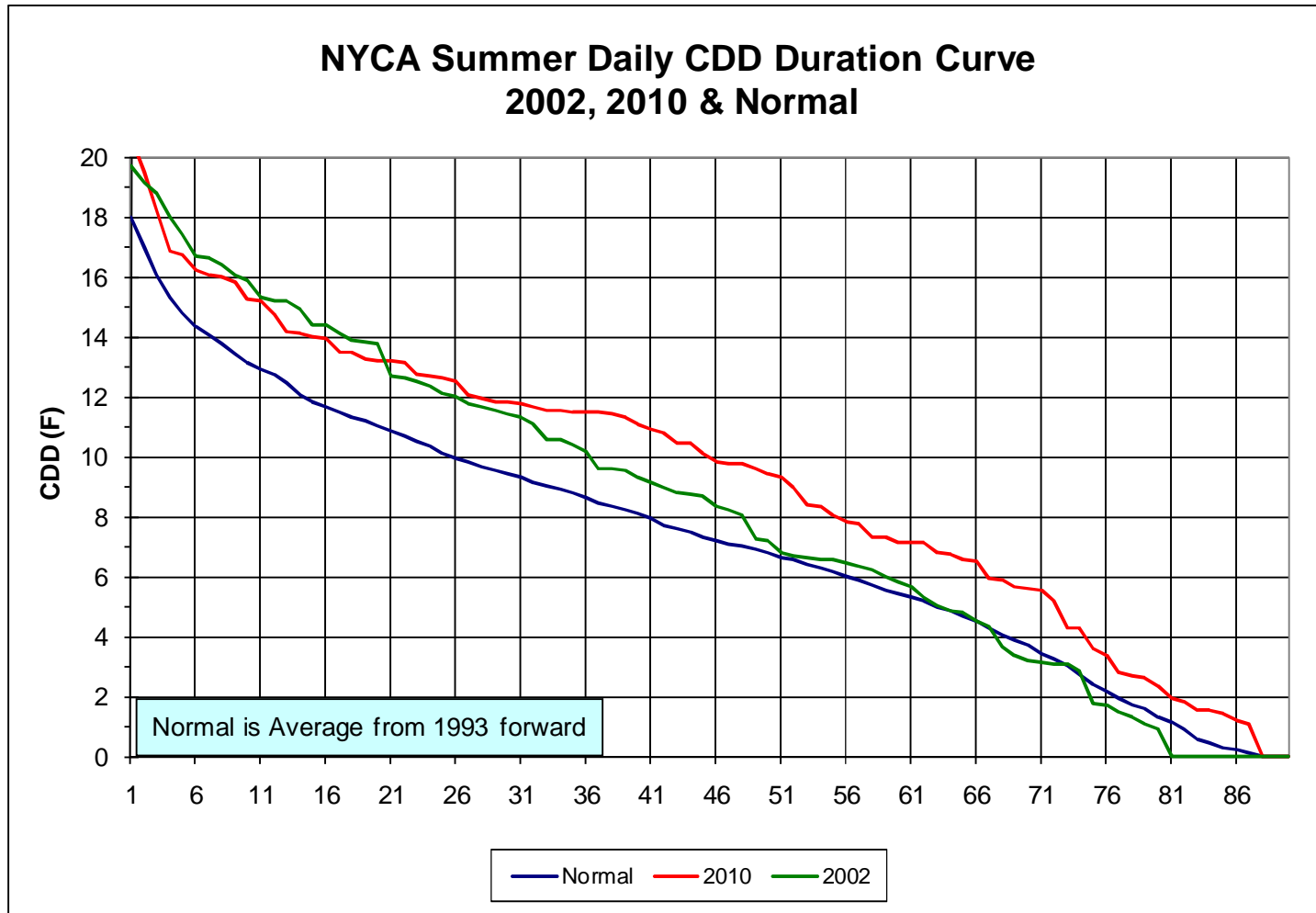
Historic Peak Dates & Zones J & K Coincidence Factors

Year	NYCA DT/HR	Zone J DT/HR	C. F.	Zone K DT/HR	C. F.
1993	7/8 - HR 15	7/8 - HR 15	100.0%	7/10 - HR 13	98.1%
1994	7/21 - HR 15	7/21 - HR 15	100.0%	7/13 - HR 17	97.0%
1995	8/4 - HR 16	8/3 - HR 16	99.8%	8/4 - HR 16	100.0%
1996	7/18 - HR 17	8/23 - HR 16	95.5%	8/23 - HR 17	92.9%
1997	7/15 - HR 15	7/15 - HR 16	99.2%	7/15 - HR 17	98.4%
1998	7/22 - HR 17	7/22 - HR 16	99.9%	7/22 - HR 17	100.0%
1999	7/6 - HR 14	7/6 - HR 13	99.9%	7/6 - HR 15	99.5%
2000	6/26 - HR 17	6/27 - HR 15	99.6%	8/7 - HR 17	94.2%
2001	8/9 - HR 15	8/9 - HR 15	100.0%	8/8 - HR 17	100.0%
2002	8/14 - HR 15	7/23 - HR 16	99.5%	7/29 - HR 18	96.6%
2003	6/26 - HR 17	6/26 - HR 17	100.0%	6/26 - HR 17	100.0%
2004	6/9 - HR 17	6/17 - HR 16	99.7%	8/20 - HR 16	93.5%
2005	7/26 - HR 17	7/27 - HR 17	95.1%	8/5 - HR 15	98.9%
2006	8/2 - HR 15	8/2 - HR 17	99.5%	8/3 - HR 17	98.5%
2007	8/8 - HR 17	8/8 - HR 17	100.0%	8/8 - HR 18	99.6%
2008	6/9 - HR 17	6/10 - HR 17	97.5%	6/10 - HR 17	99.1%
2009	8/17 - HR 16	8/21 - HR 15	97.2%	8/21 - HR 16	97.5%
2010	7/6 - HR 17	7/6 - HR 17	100.0%	7/6 - HR 17	100.0%

•Historic SCR & EDRP figures added back in.

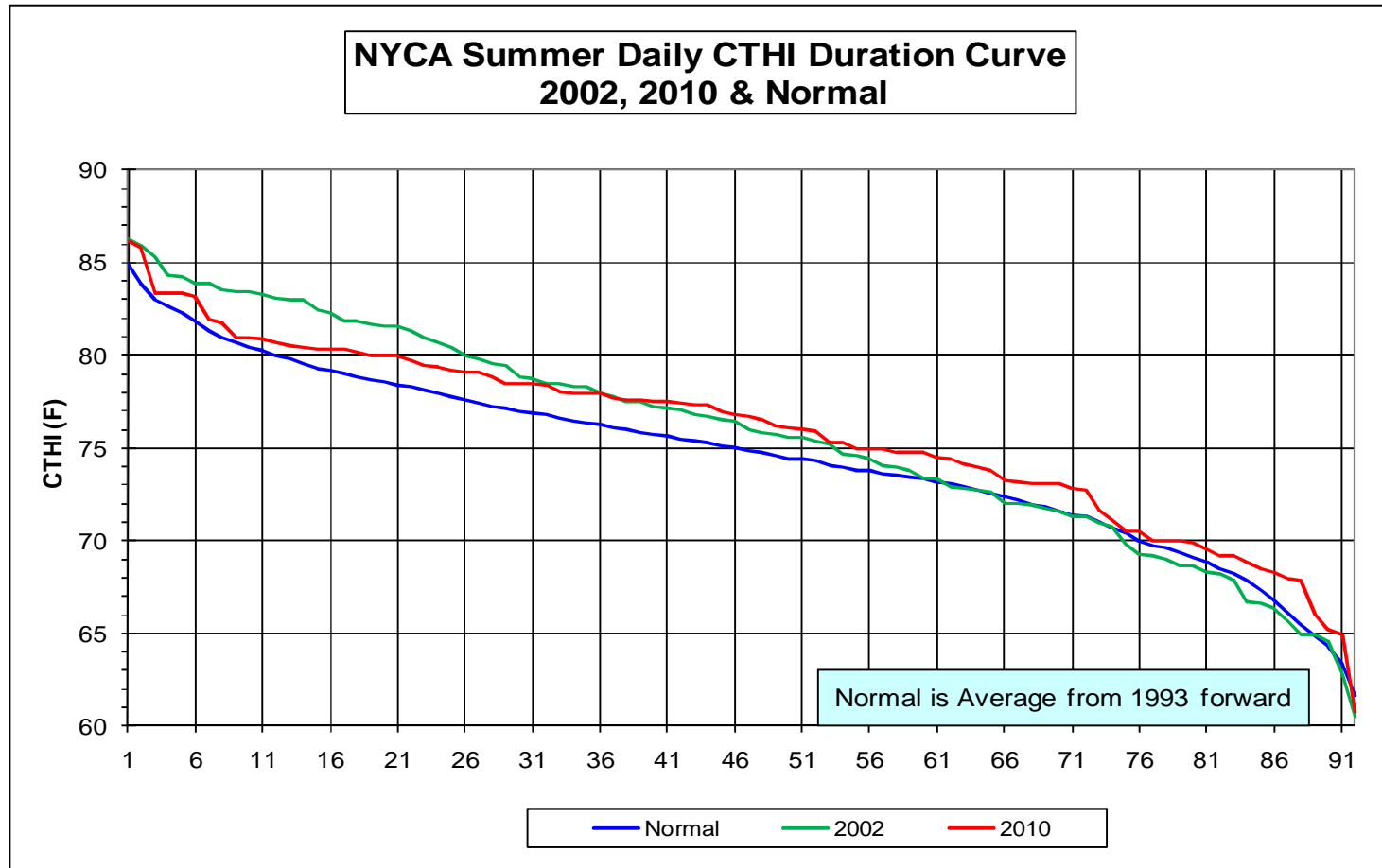
•Coincidence Factor (C. F.) = Coincident Peak MW / Non-coincident Peak MW

Comparison of Cooling Degree Days



On average, 2010 was warmer than 2002

Comparison of Temperature-Humidity Indexes



On average, 2002 & 2010 are at par and were the same on the highest day. 2002 had higher CTHI's for the next 30 days.

Historic EDRP/SCR Events & MWs Added Back to Reconstitute Load

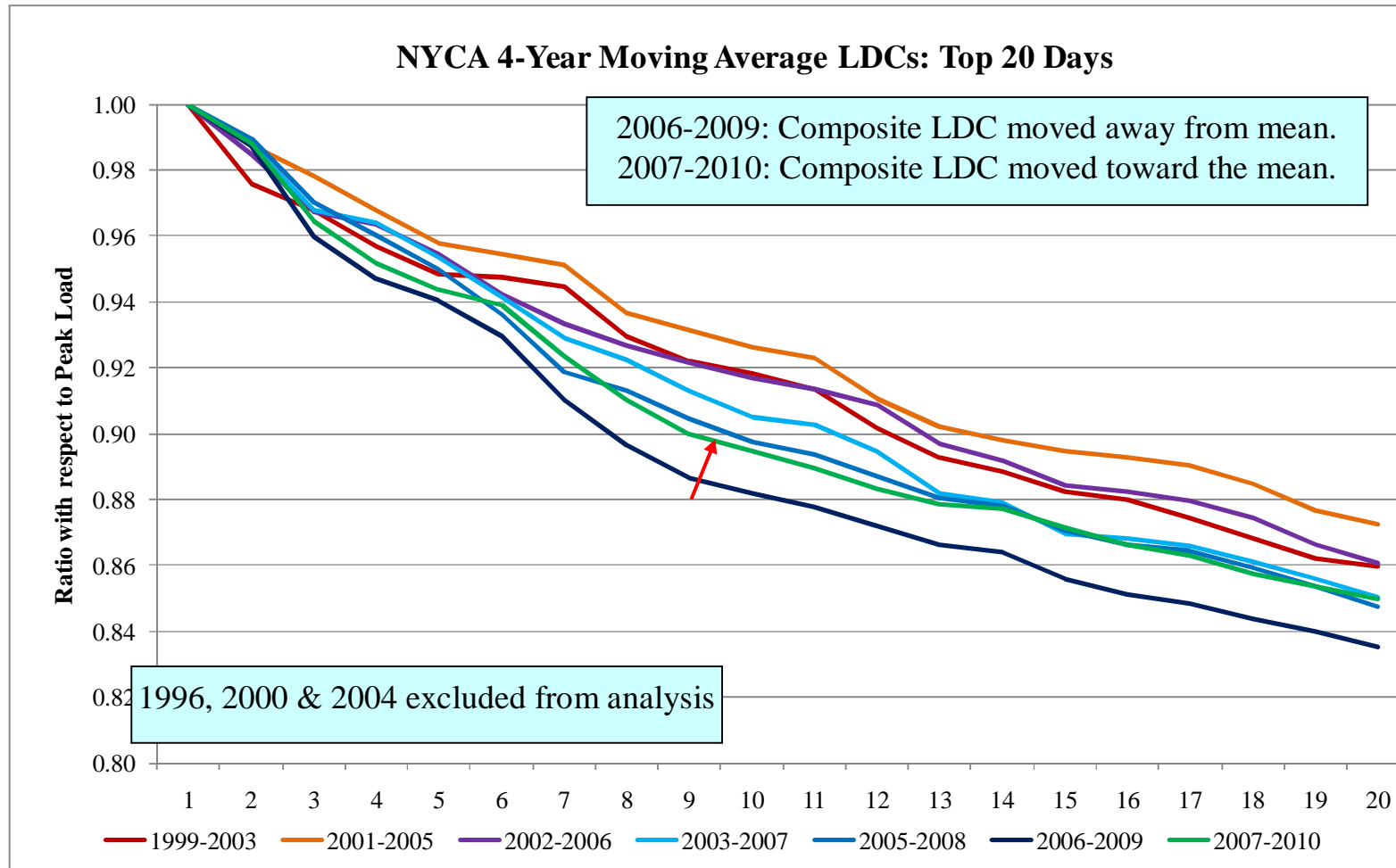
Summary of EDRP/SCR Events				Average MWh/h performance during the event											
Date	From	To	# Hours	A	B	C	D	E	F	G	H	I	J	K	Total
8/7/2001	1500	1900	5	210.0	20.0	36.0	0.0	11.0	62.0	10.0	1.0	7.0	33.0	6.0	396.0
8/8/2001	1300	1900	7	252.0	10.0	38.0	0.0	13.0	61.0	9.0	1.0	8.0	37.0	6.0	435.0
8/9/2001	1100	1900	9	228.0	10.0	38.0	1.0	17.0	69.0	10.0	2.0	8.0	35.0	6.0	424.0
8/10/2001	1330	1800	5.5						57.0	11.0	2.0	8.0	35.0	6.0	119.0
4/17/2002	1200	1800	7							2.6	0.8	4.4	25.8	4.8	38.4
4/18/2002	1200	1800	7							2.4	1.5	5.5	31.9	8.6	49.9
7/30/2002	1300	1800	6	311.3	43.3	39.7	2.5	15.3	61.4	17.6	4.1	7.6	90.6	71.1	664.5
8/14/2002	1300	1800	6	275.3	20.4	27.2	47.6	15.6	58.0	17.9	4.6	9.1	81.2	79.2	636.2
8/15/2003	900	2300	15	292.4	32.9	61.3	13.1	33.8	84.4	26.0	4.6	13.1	173.5	70.1	805.2
8/16/2003	1200	2000	9	251.4	28.2	41.5	6.5	9.6	61.6	13.6	0.9	1.8	43.6	12.3	471.0
7/27/2005	1400	1800	5							15.9	2.7	13.2	201.9	111.3	345.0
7/18/2006	1300	2200	10								1.7	14.9	350.4	118.0	485.0
7/19/2006	1045	1900	9.25										326.9		326.9
8/1/2006	1400	1900	6										220.0	93.7	313.7
8/2/2006	1300	1900	7										309.9	136.2	446.1
8/2/2006	1400	1900	6	330.9	75.7	95.6									502.2
8/3/2006	1300	1900	7										296.1	102.0	398.1
7/6/2010	1300	1800	6										458.7		458.7
7/7/2010	1300	1800	6										480.7		480.7

Avg. hours per call: 7.3
 Std. Dev.: 2.4
 Avg. hours per year: 13.9

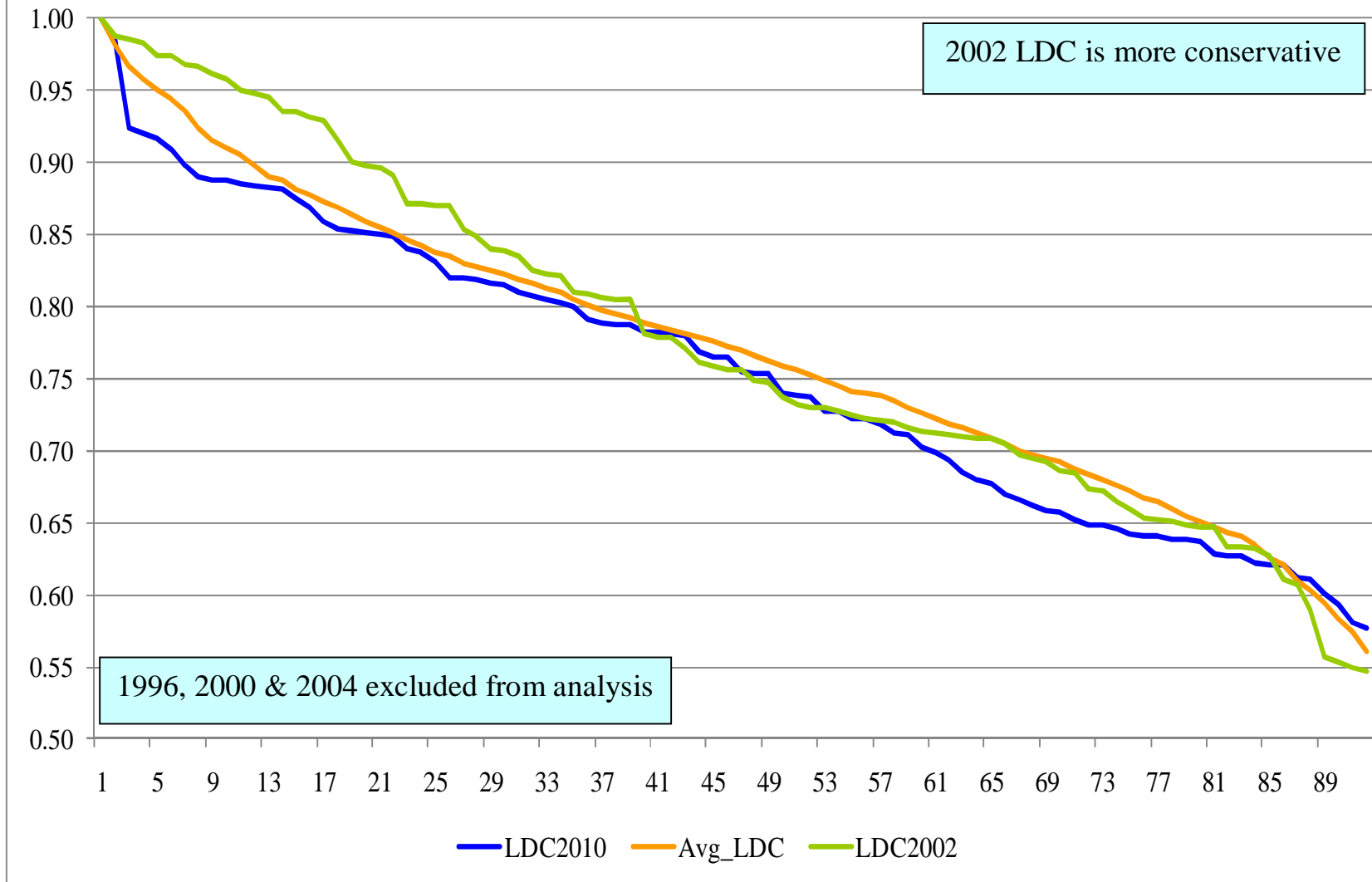
* The 2010 figures reflect a 50 MW addition to the EDRP/SCR activation to capture the impacts of public appeals and utility-specific programs.

Review of Historic LDCs

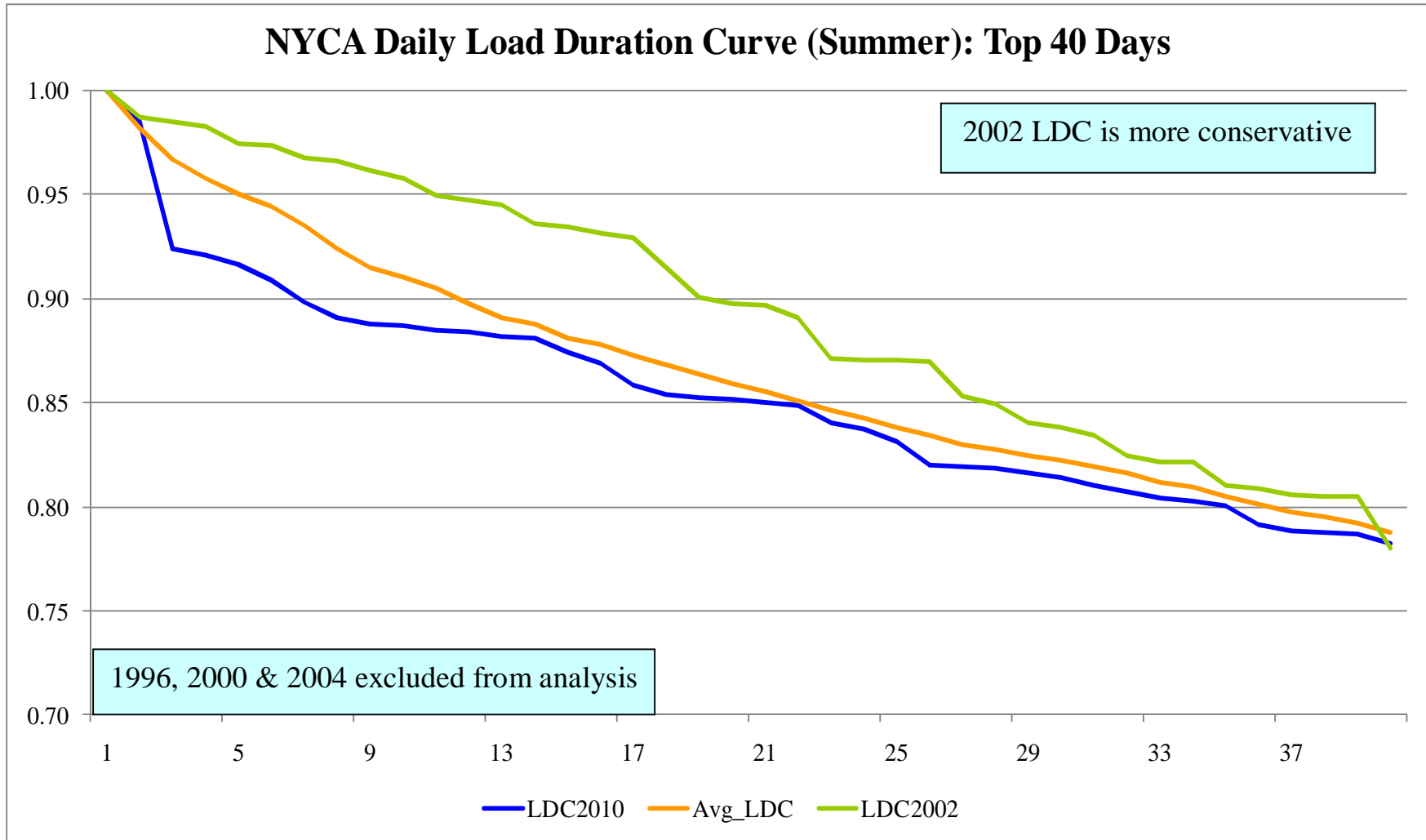
Has the Daily Peak LDC Changed Over Time?



NYCA Daily Load Duration Curve (Summer)

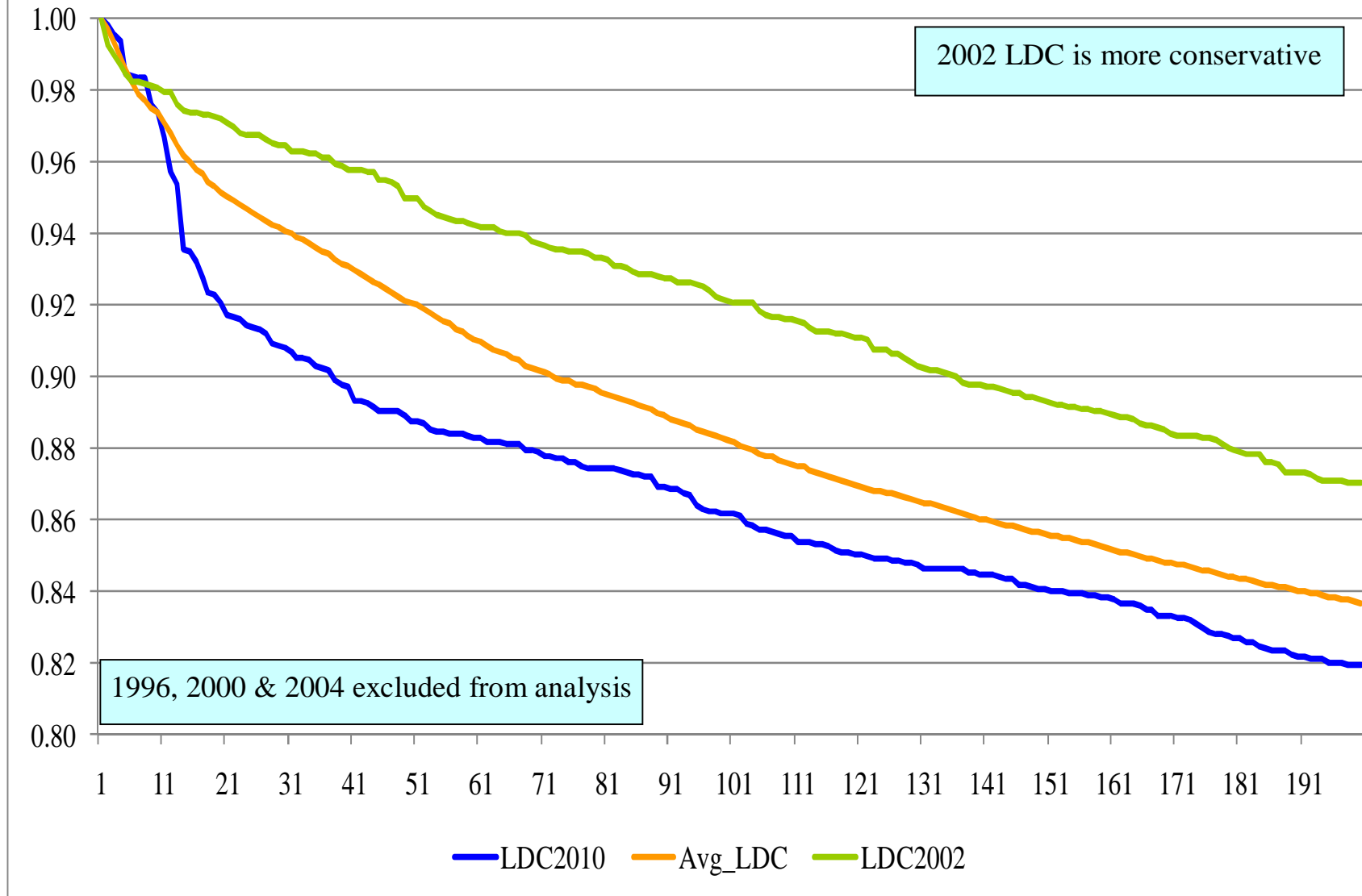


NYCA Daily Load Duration Curve (Summer): Top 40 Days

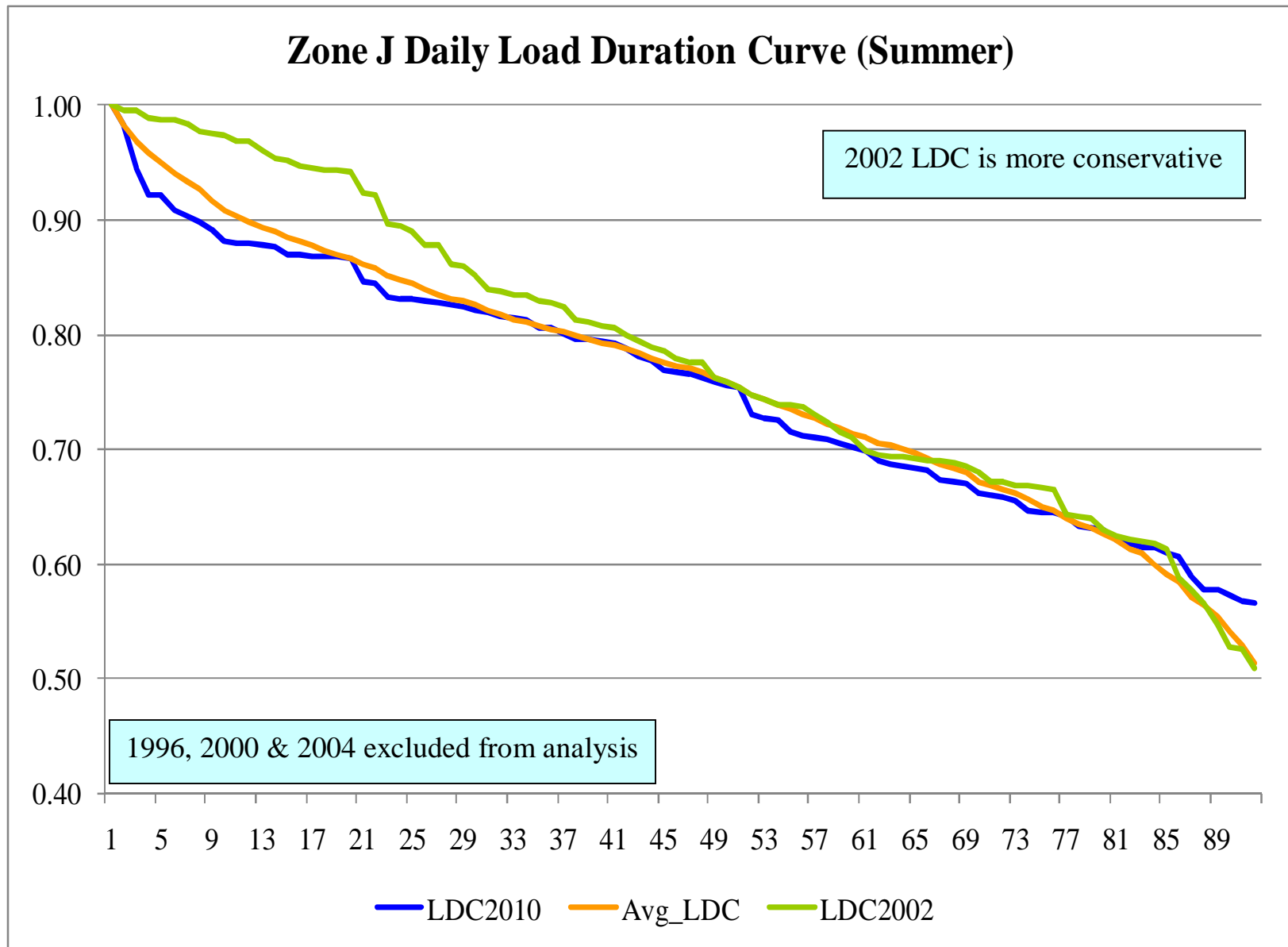


	<u>AVG</u>	<u>2002</u>	<u>2010</u>
Number of days above 90%:	11	19	6
Number of days above 95%:	5	10	2

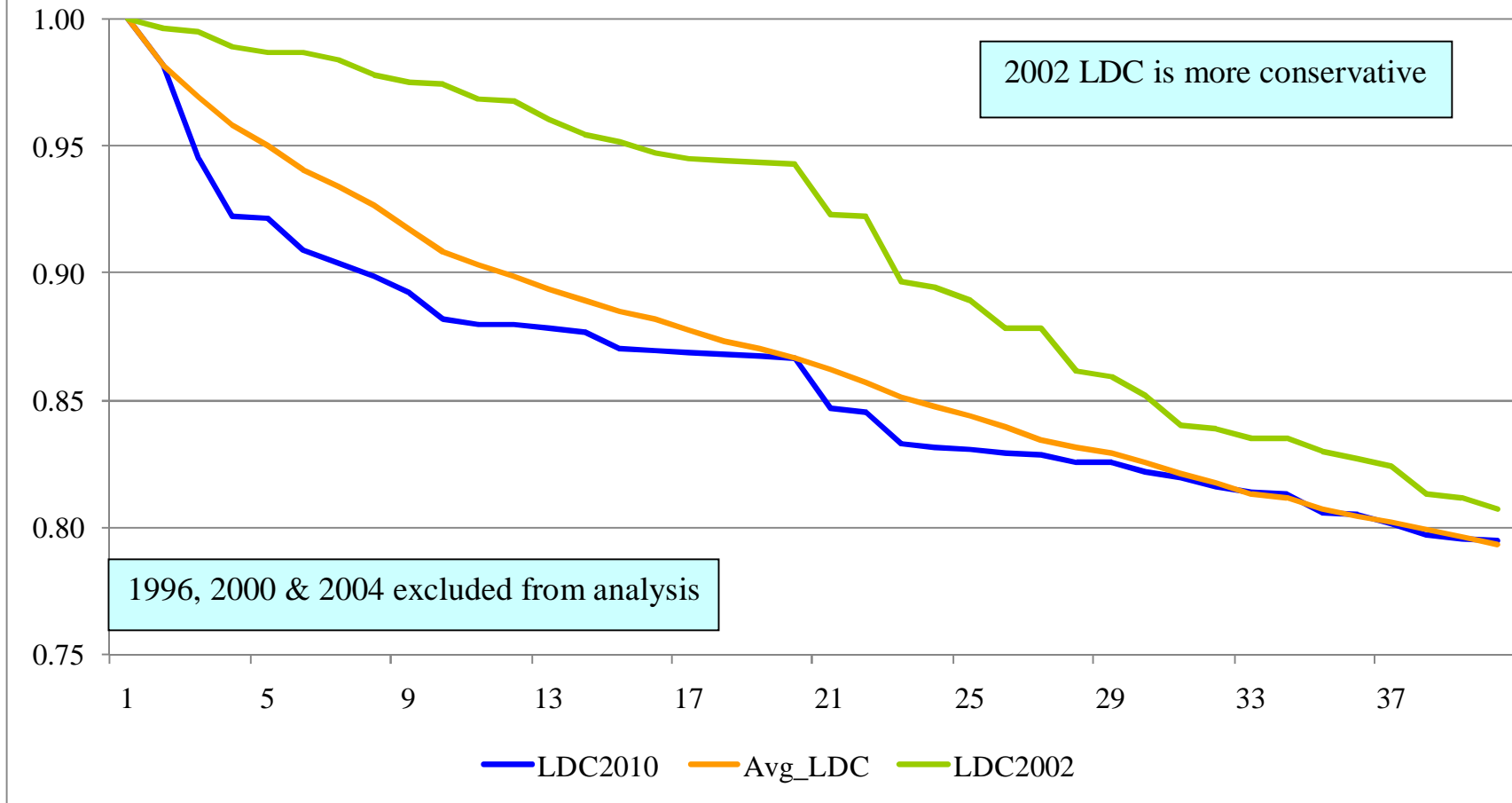
NYCA Hourly Load Duration Curves: Top 200 Hours



Zone J Daily Load Duration Curve (Summer)

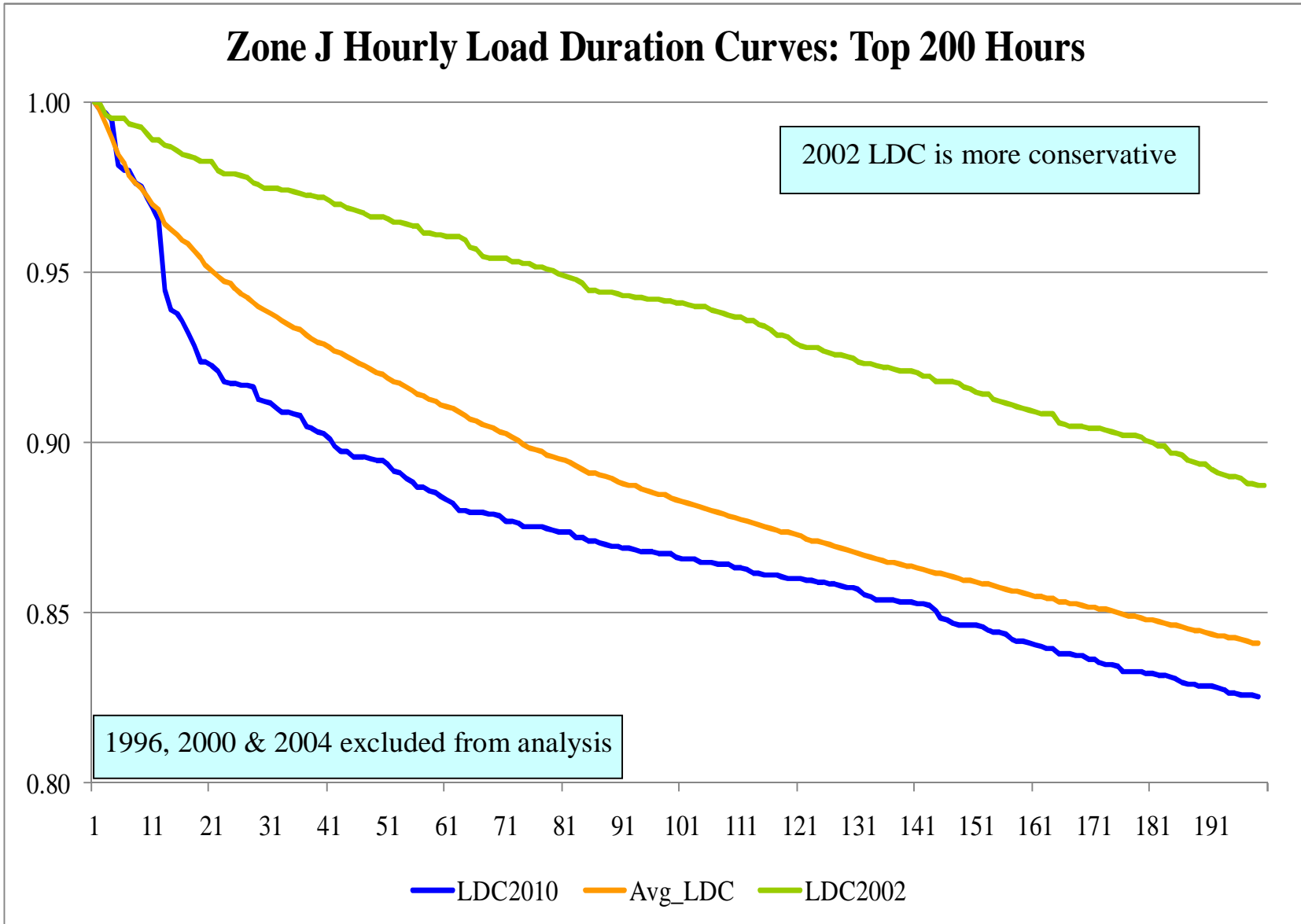


Zone J Daily Load Duration Curve (Summer): Top 40 Days

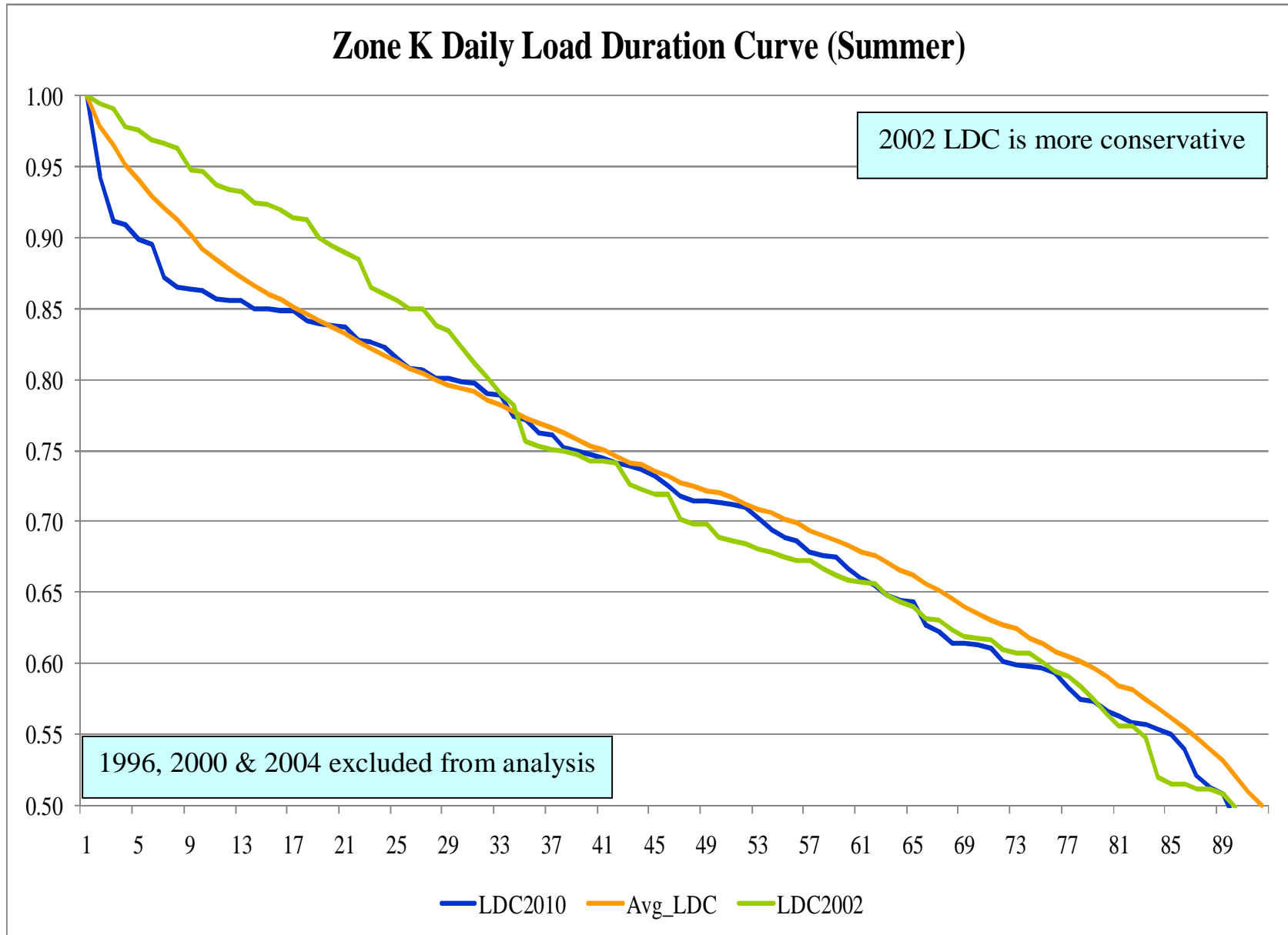


	<u>AVG</u>	<u>2002</u>	<u>2010</u>
Number of days above 90%:	12	22	7
Number of days above 95%:	5	15	5

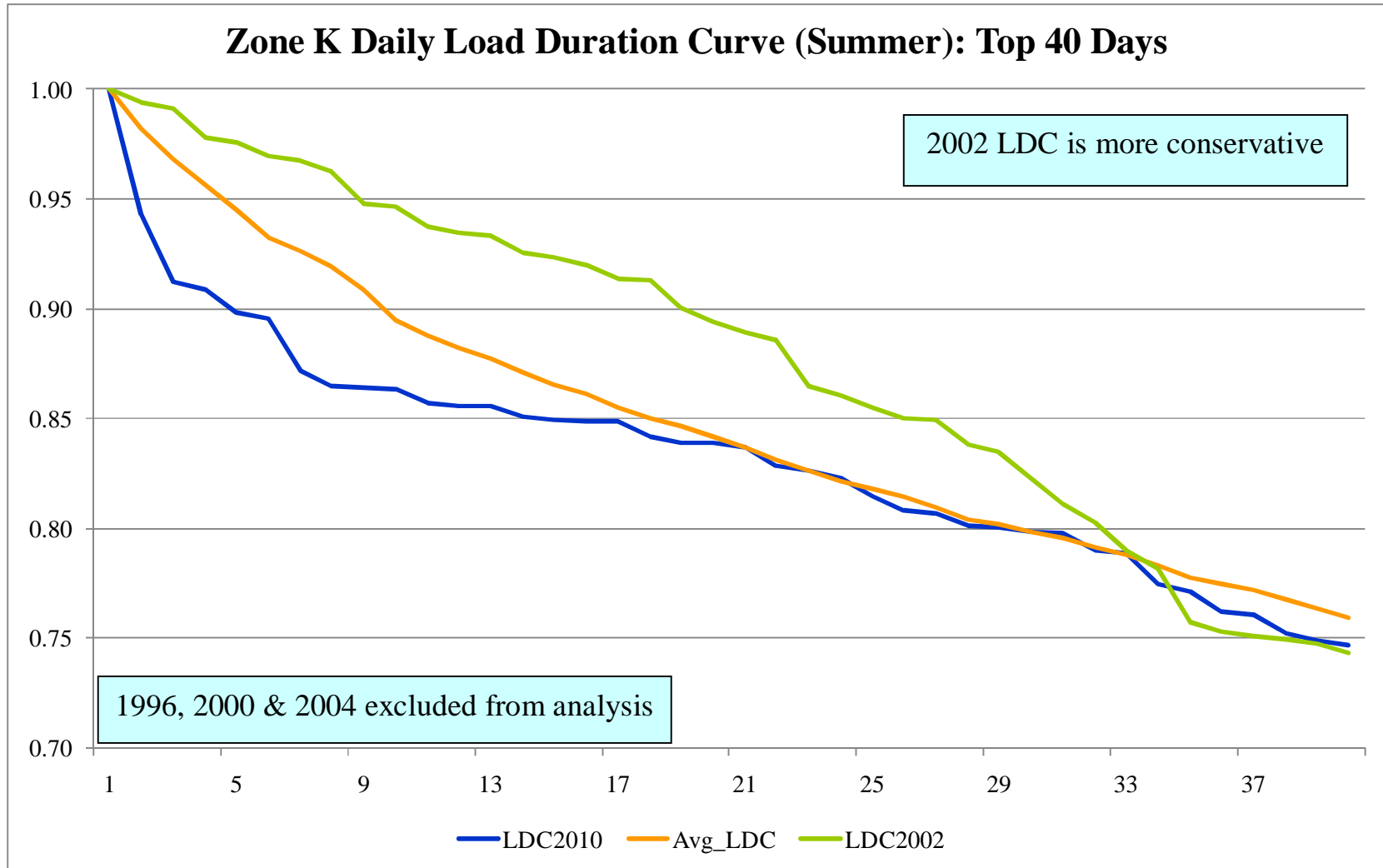
Zone J Hourly Load Duration Curves: Top 200 Hours



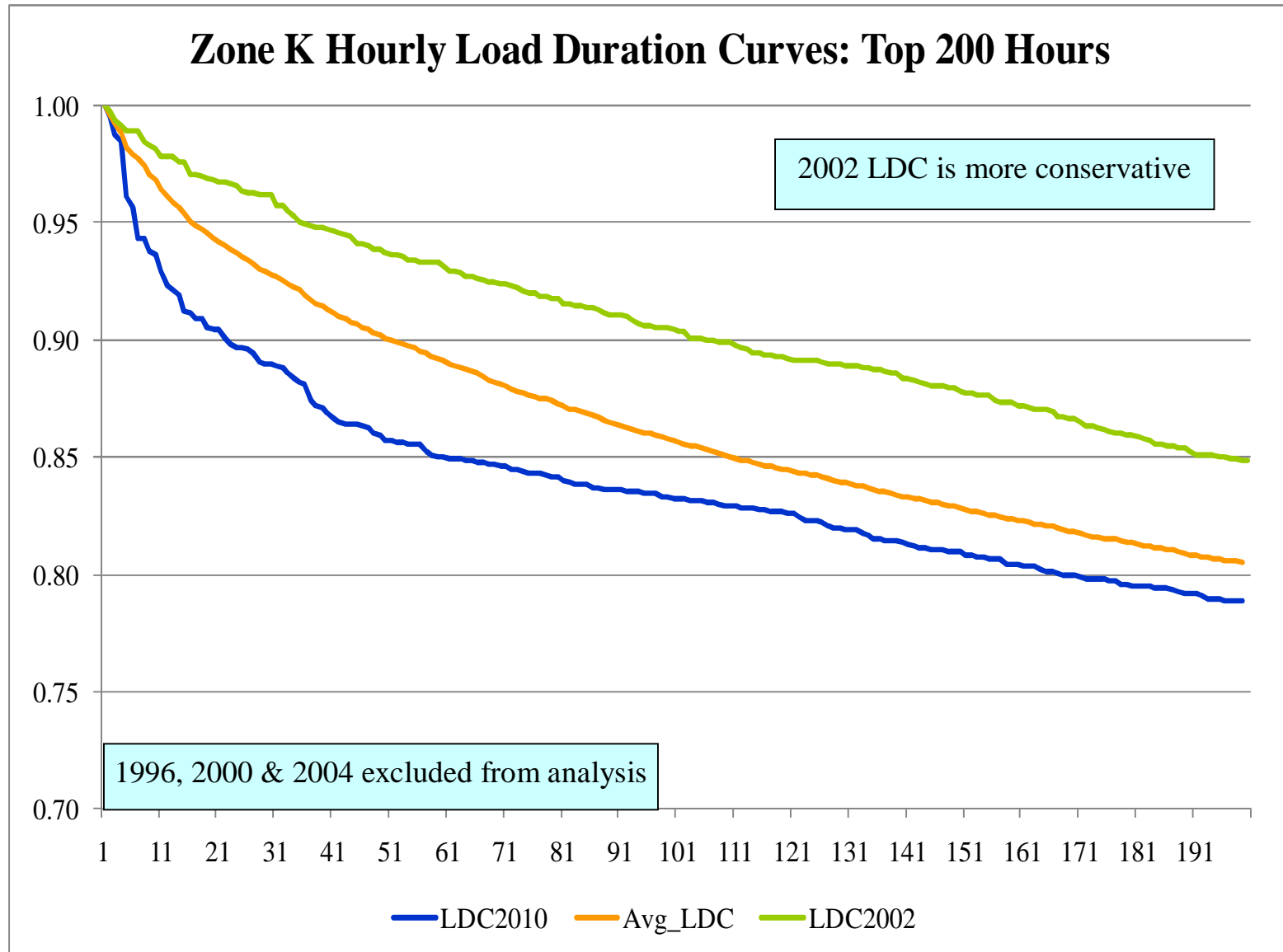
Zone K Daily Load Duration Curve (Summer)



Zone K Daily Load Duration Curve (Summer): Top 40 Days



	<u>AVG</u>	<u>2002</u>	<u>2010</u>
Number of days above 90%:	9	19	4
Number of days above 95%:	4	8	1



Comparison of 2002 & 2010 *Number of Days above a Reference Level*

	CTHI		CDD		NYCA Daily MW	
No. of Days Above:	2002	2010	2002	2010	2002	2010
Average LDC	60	86	55	87	57	27
CTHI of 84 F	5	2				
CDD of 14 F			17	14		
90% of LDC					19	6

Daily MW: 2002 has more days above than 2010

CTHI > 84 F: 2002 has more days above than 2010

CDD > 14 F: 2002 has more days above than 2010

LDC > .90: 2002 has more days above than 2010

Comparison of 2002 & 2010

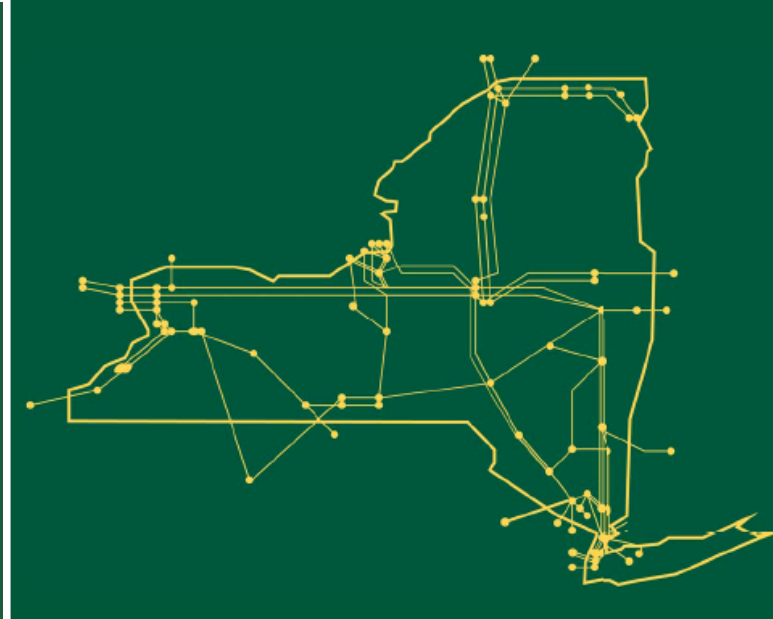
Review of Load Duration Curves

Region	Category	Year 2002	Year 2010	Choice
NYCA	Top 90 Load Days	Above Average	At or below Average	2002
NYCA	Top 40 Load Days	Above Average	At or below Average	2002
NYCA	Top 200 Hours	Same as Avg for top 10 hours; then well above	Same as Avg for top 10 hours; then well below	2002
Zone J	Top 90 Load Days	Above Average	At or below Average	2002
Zone J	Top 40 Load Days	Above Average	At or below Average	2002
Zone J	Top 200 Hours	Far above Avg except 1st couple of hours	At average for 1st 10 hours, then well below	2002
Zone K	Top 90 Load Days	Above Avg until day 33; then about the same as 2010	Almost always below average	2002
Zone K	Top 40 Load Days	Above avg until day 33	At or below Average	2002
Zone K	Top 200 Hours	Same as Avg for top 10 hours; then well above	Same as Avg for top 10 hours; then well below	2002

Recommendation – Use 2002

- ◆ **Based on all analyses of CDD, CTHI, Daily LDC and Hourly LDC over the last 18 years, we conclude that 2002 has a greater number of extreme days and hours for the NYCA, Zone J and Zone K.**
- ◆ **NYISO recommends the use of the 2002 load shape for the 2012 Installed Reserve Margin Study.**

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