NYISO Presentation of CRP Results and Solutions

Draft 6/07/2006 – V2
For Discussion Purposes Only

Presentation Overview

- Update of the Reliability Needs Assessment
- Transmission Security and Adequacy
  - Resource Adequacy
    - Transfer Limit Analysis
    - MARS Topology & Limits
- Assessment of Responsible Transmission Owner Updated Plans and Solutions
- Assessment of Market Solutions
- LOLE Benefit of Increased Transmission Capability

Presentation Overview Continued

- Assessment of Alternative Regulated Generation Solution
- Overall Conclusion, Findings and Lessons Learned

The Reliability Needs Assessment
An Update

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6/06/2006

The RNA

- Needs Identified Over The Study Period – 10yrs
- Study period is divided into two separate five year periods.
- The first five years is identified in the Tariff as the Five Year Base Case and is a defined term.
- The second five year period is not a defined term and not identified as a base case.
- The RNA detailed results focused primarily on the first five years.

Updated RNA Needs

- The RNA was assessed to determine the impact of the operating reserve database error on the needs identified in the RNA.
- The error was discovered after the RNA was concluded.
- Initial year of need did not change.
- Correction of operating reserve error reduced LOLE from 2.429 days/yr to 2.166 days per/yr for 2010.
  - *This result was with the calculated voltage constrained transfer capability for I-J at 2,200 MW and UPNY-CE at 4000 MW*

Updated RNA Needs Continued

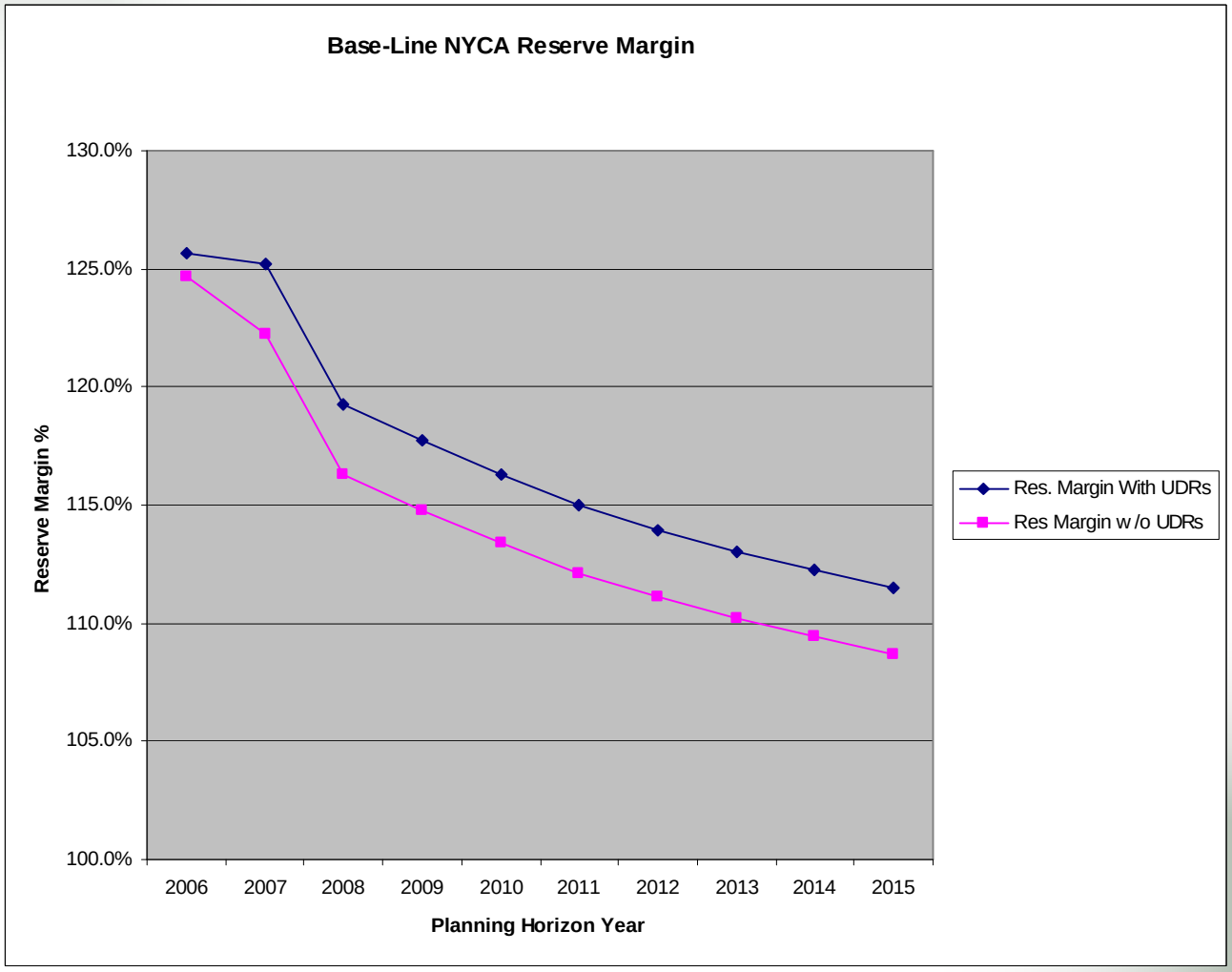
- Identified need for compensatory MW in 2010 was in the range of 1500 to 1700 MW for voltage constrained transfer limits and 1250 MW for the thermal limit sensitivity (I-J at 3475 MW)
- Update resulted in an approximately 10% reduction the needs identified in the RNA

Base-line Load and Resource Table Update First Five Year Base Case

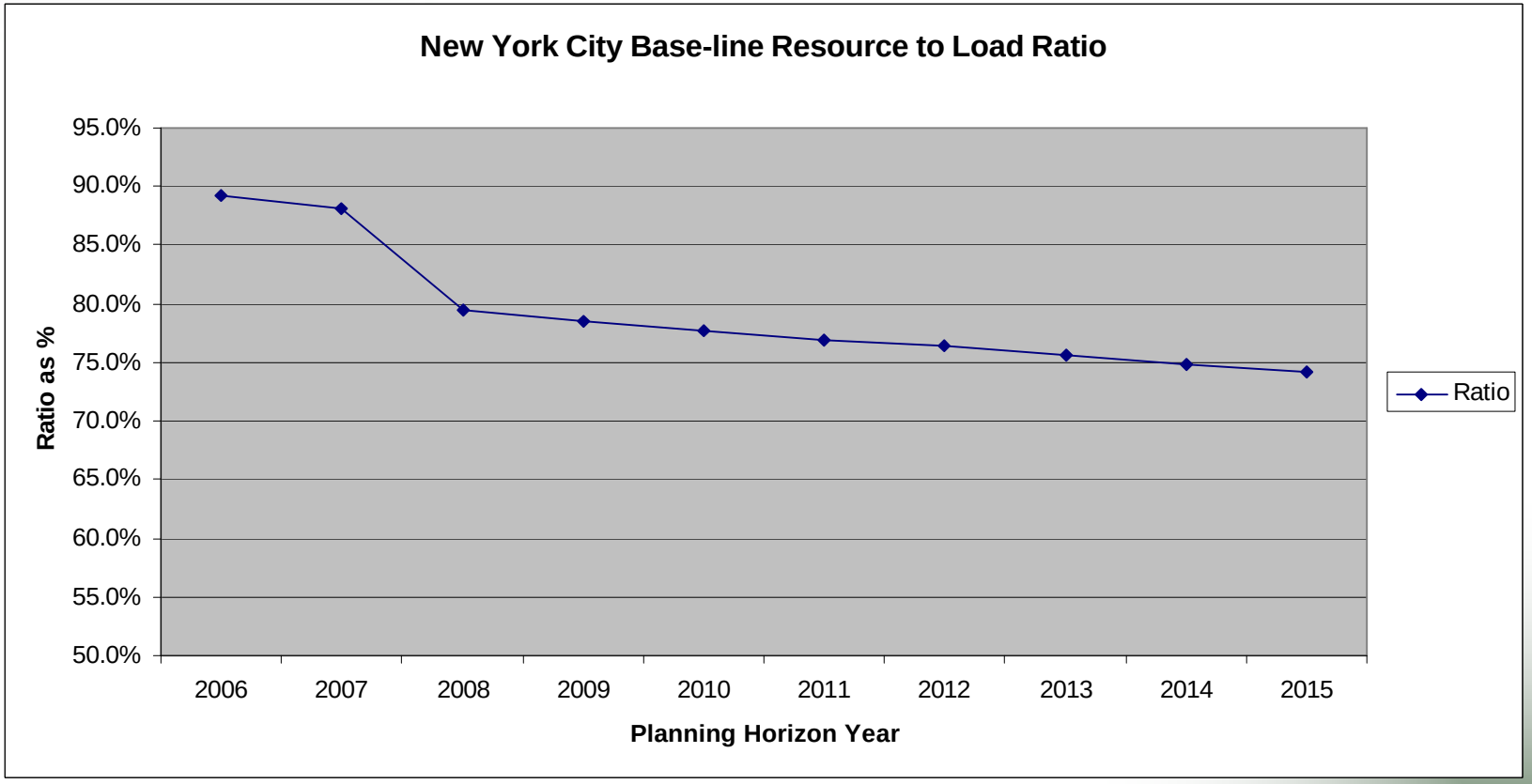
RNA Baseline Load and Resource Table

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Peak Load										
NYCA	32,400	32,840	33,330	33,770	34,200	34,580	34,900	35,180	35,420	35,670
Zone J	11,505	11,660	11,805	11,965	12,090	12,217	12,294	12,426	12,559	12,648
Zone k	5,320	5,410	5,500	5,580	5,680	5,779	5,879	5,981	6,085	6,112
Resources										
NYCA										
"-Capacity"	39,420	39,160	37,794	37,794	37,801	37,801	37,801	37,801	37,801	37,801
"-SCR"	975	975	975	975	975	975	975	975	975	975
"-UDR"	330	990	990	990	990	990	990	990	990	990
Total	40,725	41,125	39,759	39,759	39,766	39,766	39,766	39,766	39,766	39,766
Zone J										
"-Capacity"	10,102	10,102	9,217	9,217	9,217	9,217	9,217	9,217	9,217	9,217
"-SCR"	172	172	172	172	172	172	172	172	172	172
"-UDR"	0	0	0	0	0	0	0	0	0	0
Total	10,274	10,274	9,389	9,389	9,389	9,389	9,389	9,389	9,389	9,389
Zone K										
"-Capacity"	5,340	5,340	5,340	5,340	5,340	5,340	5,340	5,340	5,340	5,340
"-SCR"	98	98	98	98	98	98	98	98	98	98
"-UDR"	330	990	990	990	990	990	990	990	990	990
Total	5,768	6,428	6,428	6,428	6,428	6,428	6,428	6,428	6,428	6,428
NYCA Res. Margin %	125.7%	125.2%	119.3%	117.7%	116.3%	115.0%	113.9%	113.0%	112.3%	111.5%
Zons J Res/Load/ Ratio	89.3%	88.1%	79.5%	78.5%	77.7%	76.9%	76.4%	75.6%	74.8%	74.2%
Zons K Res/Load Ratio	108.4%	118.8%	116.9%	115.2%	113.2%	111.2%	109.3%	107.5%	105.6%	105.2%
NYCA LOLE	0.002	0.002	0.318	0.692	2.166					
In-State Capacity Res. Margin	121.7%	119.2%	113.4%	111.9%	110.5%	109.3%	108.3%	107.5%	106.7%	106.0%

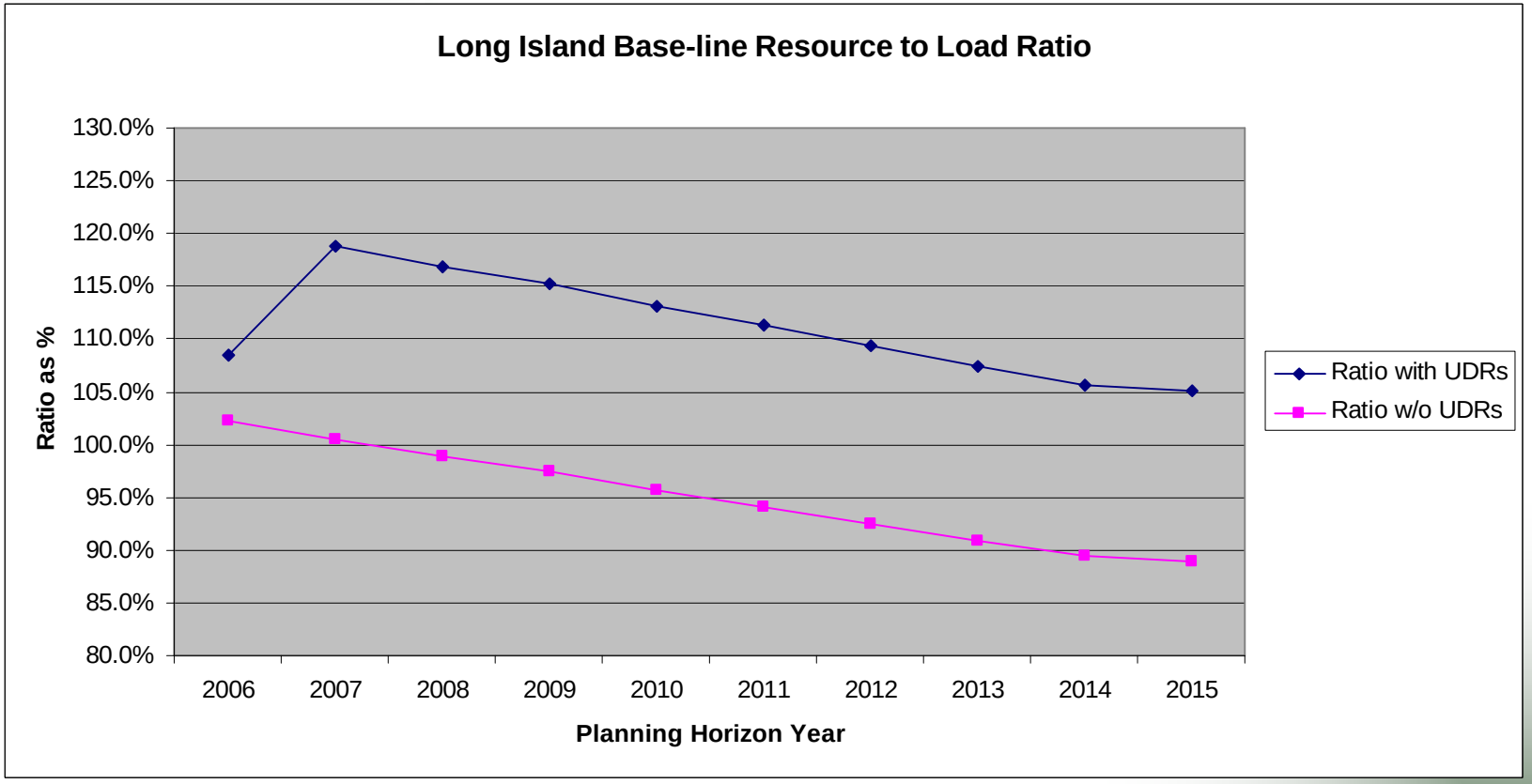
Base-line Load and Resource Continued



Base-line Load and Resource Continued



Base-line Load and Resource Continued



CRP Responsible Transmission Owner Solutions Assessment

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Reliability Needs Assessment

First "Five Year Base Case"

- Needs Identified Over The Study Period – 10yrs
- Study period is divided into two separate five year periods.
- The first five years is identified in the Tariff as the Five Year Base Case and is a defined term.
- The second five year period is not a defined term and not identified as a base case.
- The Responsible Transmission Owners have provided updated plans and a regulated backstop proposal for the First Five Year Base Case.

Reliability Needs Assessment "second five years"

- Criteria for including new facilities limits facilities that are included in the base line for the 10 year planning horizon.
- It is difficult for a facility to meet the criteria for inclusion so far in advance of the second five year period.
- The second five year needs would be met or significantly reduced as additional market solutions come forward to meet all or a portion of the stated future needs.
- Given lead time consideration and reasonable expectation that market solutions will move forward, the second five year needs are identified as Transmission Owner generic solutions.
- Transmission Owners will monitor generic needs and provide specific solutions, if and when, they are identified as needs in the First Five Year Base Case.

Transmission Owner Solutions

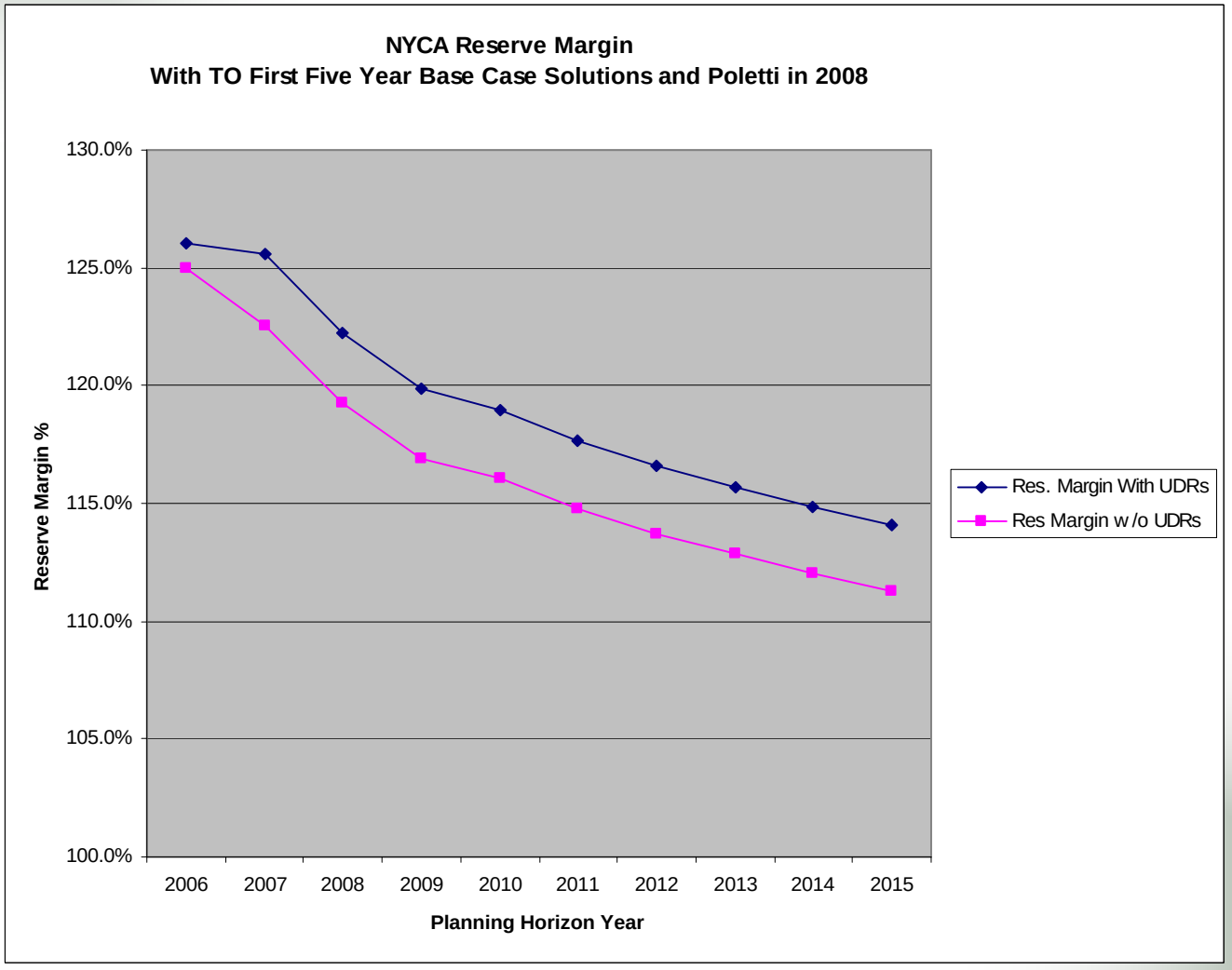
Accepted for the First "Five Year Base Case" Evaluation

Updated Plans	Regulated Backstop
• DSM &SCRs o 340 MW In Zone J by 2010 ▪ Peak reduction 75 MW ▪ Balance is SCRs o LIPA Edge Program 109 MW	• Cap Banks o 100 MVARS o CH 115 kV
• Transmission o Sprainbrook to Sherman Creek ▪ M29 Project o Neptune and CSC Modeled as UDRs	
• Generation (Zone K 2009) o Caithness 326 MW o Off-Shore Wind 140 MW	
• Cap Banks o LIPA 746 MVARS o O&R 180 MVARS	

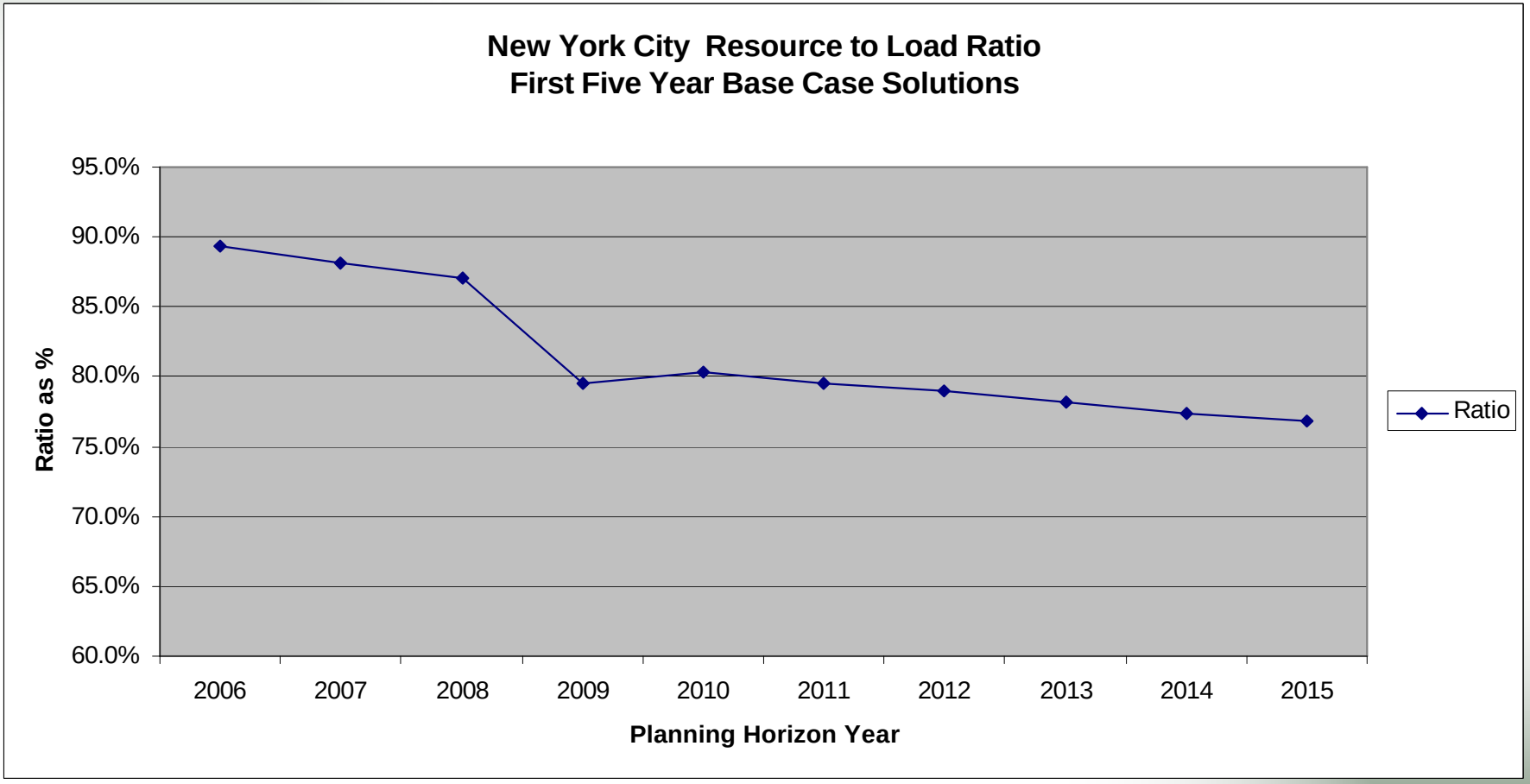
TO Solution L&R Table
First Five Year Base Case Solutions

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Peak Load										
NYCA	32,400	32,840	33,330	33,740	34,125	34,505	34,825	35,105	35,345	35,595
Zone J	11,505	11,660	11,805	11,935	12,015	12,142	12,219	12,351	12,484	12,573
Zone k	5,320	5,410	5,500	5,580	5,680	5,779	5,879	5,981	6,085	6,112
Resources										
NYCA										
"-Capacity"	39,420	39,160	38,679	38,260	38,260	38,260	38,260	38,260	38,260	38,260
"-SCR"	1084	1084	1084	1189	1349	1349	1349	1349	1349	1349
"-UDR"	330	990	990	990	990	990	990	990	990	990
Total	40,834	41,234	40,753	40,439	40,599	40,599	40,599	40,599	40,599	40,599
Zone J										
"-Capacity"	10,102	10,102	10,102	9,217	9,217	9,217	9,217	9,217	9,217	9,217
"-SCR"	172	172	172	277	437	437	437	437	437	437
"-UDR"	0	0	0	0	0	0	0	0	0	0
Total	10,274	10,274	10,274	9,494	9,654	9,654	9,654	9,654	9,654	9,654
Zone K										
"-Capacity"	5,340	5,340	5,340	5,806	5,806	5,806	5,806	5,806	5,806	5,806
"-SCR"	207	207	207	207	207	207	207	207	207	207
"-UDR"	330	990	990	990	990	990	990	990	990	990
Total	5,877	6,537	6,537	7,003	7,003	7,003	7,003	7,003	7,003	7,003
NYCA Res. Margin %	126.0%	125.6%	122.3%	119.9%	119.0%	117.7%	116.6%	115.7%	114.9%	114.1%
Zons J Res/Load/ Ratio	89.3%	88.1%	87.0%	79.5%	80.3%	79.5%	79.0%	78.2%	77.3%	76.8%
Zons K Res/Load Ratio	110.5%	120.8%	118.9%	125.5%	123.3%	121.2%	119.1%	117.1%	115.1%	114.6%
NYCA LOLE					0.099					1.549
In-State Capacity Res. Margin	121.7%	119.2%	116.0%	113.4%	112.1%	110.9%	109.9%	109.0%	108.2%	107.5%

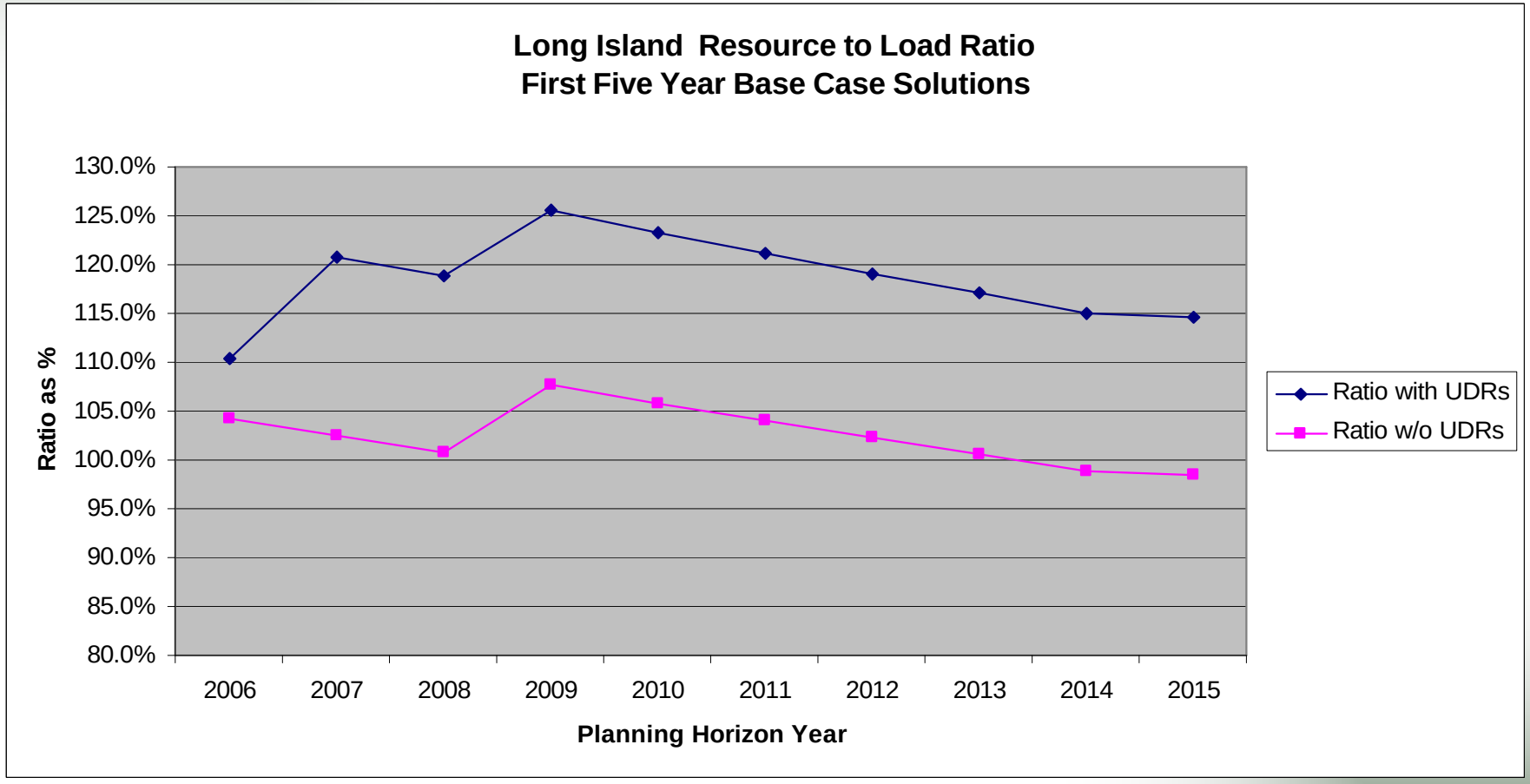
Transmission Owner Solutions
First Five Year Base Case Continued



Transmission Owner Solutions
First Five Year Base Case Continued



Transmission Owner Solutions
First Five Year Base Case Continued



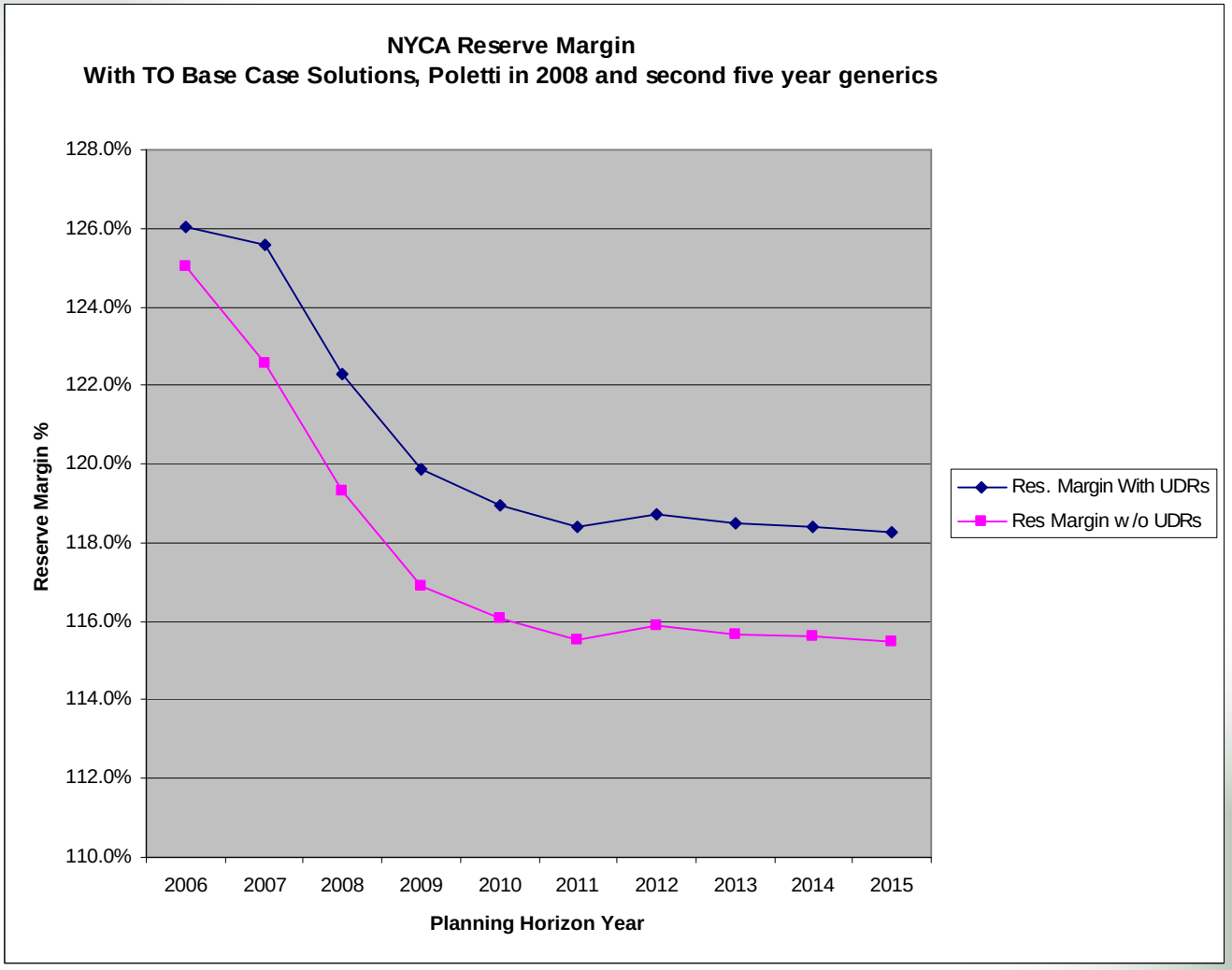
Transmission Owner Generic Solutions second five years

- Required Cumulative Generic Solutions
  - 250 MW in 2011
  - 750 MW in 2012
  - 1000 MW in 2013
  - 1250 MW in 2014
  - 1500 MW in 2015

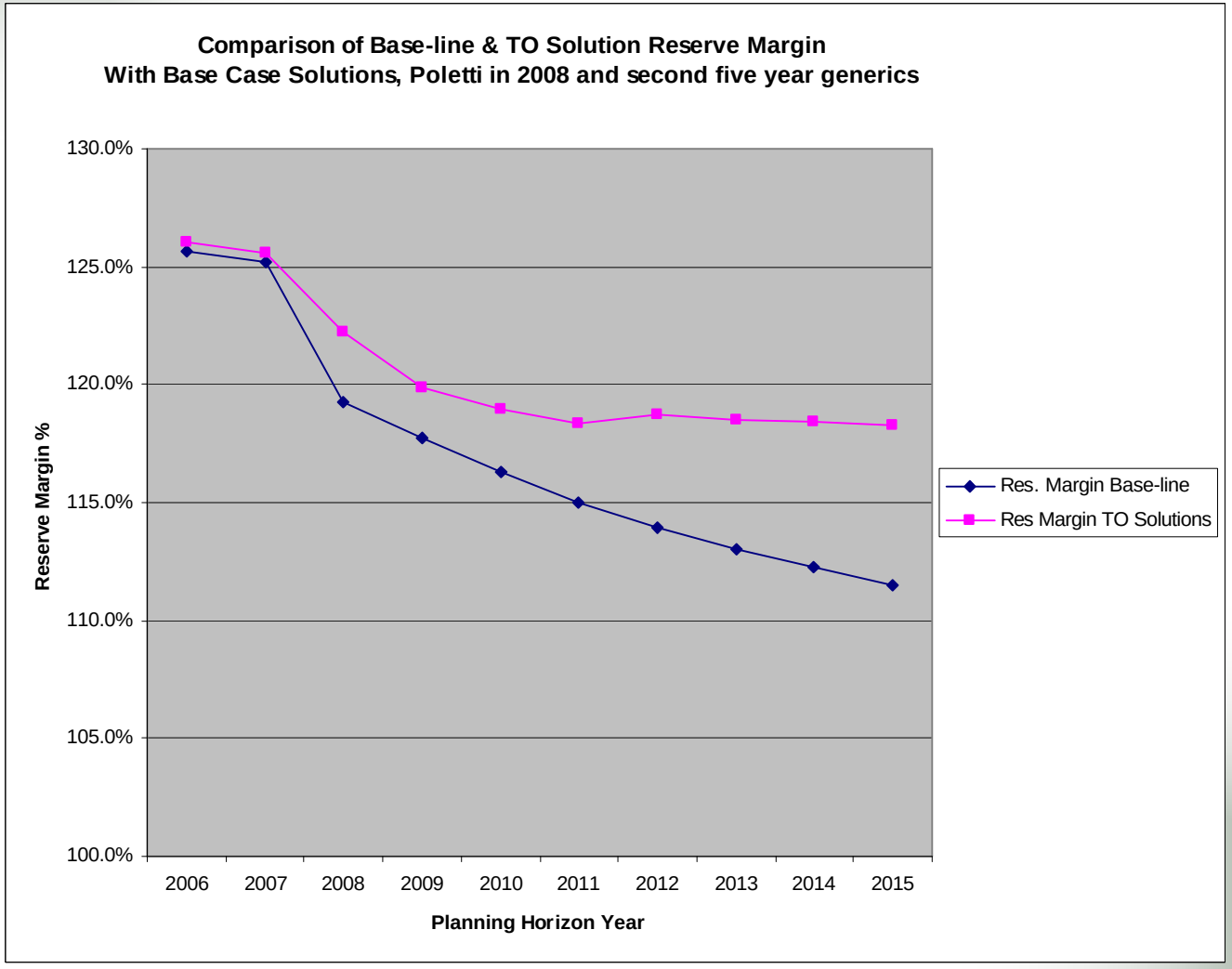
TO Solution L&R Table second five years with generics

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Peak Load										
NYCA	32,400	32,840	33,330	33,740	34,125	34,505	34,825	35,105	35,345	35,595
Zone J	11,505	11,660	11,805	11,935	12,015	12,142	12,219	12,351	12,484	12,573
Zone k	5,320	5,410	5,500	5,580	5,680	5,779	5,879	5,981	6,085	6,112
Resources										
NYCA										
"-Capacity"	39,420	39,160	38,679	38,260	38,260	38,260	38,260	38,260	38,260	38,260
"-SCR"	1084	1084	1084	1189	1349	1349	1349	1349	1349	1349
"-UDR"	330	990	990	990	990	990	990	990	990	990
Total	40,834	41,234	40,753	40,439	40,599	40,849	41,349	41,599	41,849	42,099
Zone J										
"-Capacity"	10,102	10,102	10,102	9,217	9,217	9,217	9,217	9,217	9,217	9,217
"-SCR"	172	172	172	277	437	437	437	437	437	437
"-UDR"	0	0	0	0	0	0	0	0	0	0
Total	10,274	10,274	10,274	9,494	9,654	9,654	9,654	9,654	9,654	9,654
Zone K										
"-Capacity"	5,340	5,340	5,340	5,806	5,806	5,806	5,806	5,806	5,806	5,806
"-SCR"	207	207	207	207	207	207	207	207	207	207
"-UDR"	330	990	990	990	990	990	990	990	990	990
Total	5,877	6,537	6,537	7,003	7,003	7,003	7,003	7,003	7,003	7,003
NYCA Res. Margin %	126.0%	125.6%	122.3%	119.9%	119.0%	118.4%	118.7%	118.5%	118.4%	118.3%
NYCA LOLE					0.099	0.103	0.087	0.102	0.095	0.109

Transmission Owner Solutions second five years with generics continued



Comparison of Base-line and TO Solutions
With Solutions for the Base Case & second five years



Summary of Findings & Conclusions

- Resource additions, generic solutions and resultant improvement in transfer limits as calculated in the RNA, particularly in the Lower Hudson Valley, results in LOLE criteria being satisfied
- The planned resource mix results in an increasing proportion of demand response and external generation resources to meet LOLE criteria.
- In addition, local or non-bulk reliability concern was identified in the LHV in the analysis.

Summary of Findings & Conclusions Continued

- Increasing reliance on external generating resources increases the importance of the Northeast Coordinated System Planning Process

Assessment of the CRP Proposed Market Solutions

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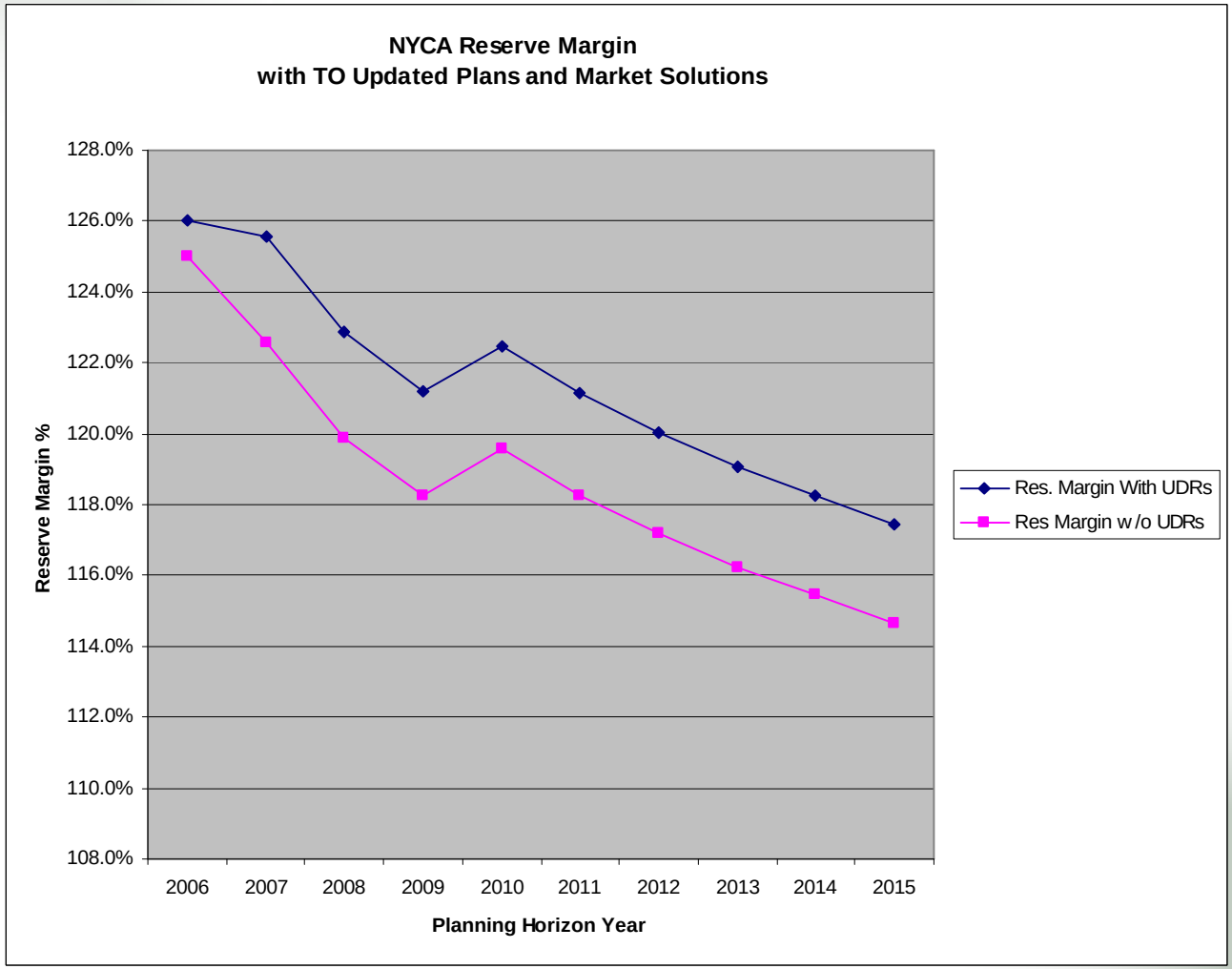
Proposed Market Solutions

- All Generation Projects In Zone J and K
- Zone J
  - 200 MW in 2008
  - 200 MW in 2010
  - 550 MW in 2010
- Zone K
  - 250 MW in 2009
- Market Solutions Were Evaluated In Conjunction with Updated TO plans

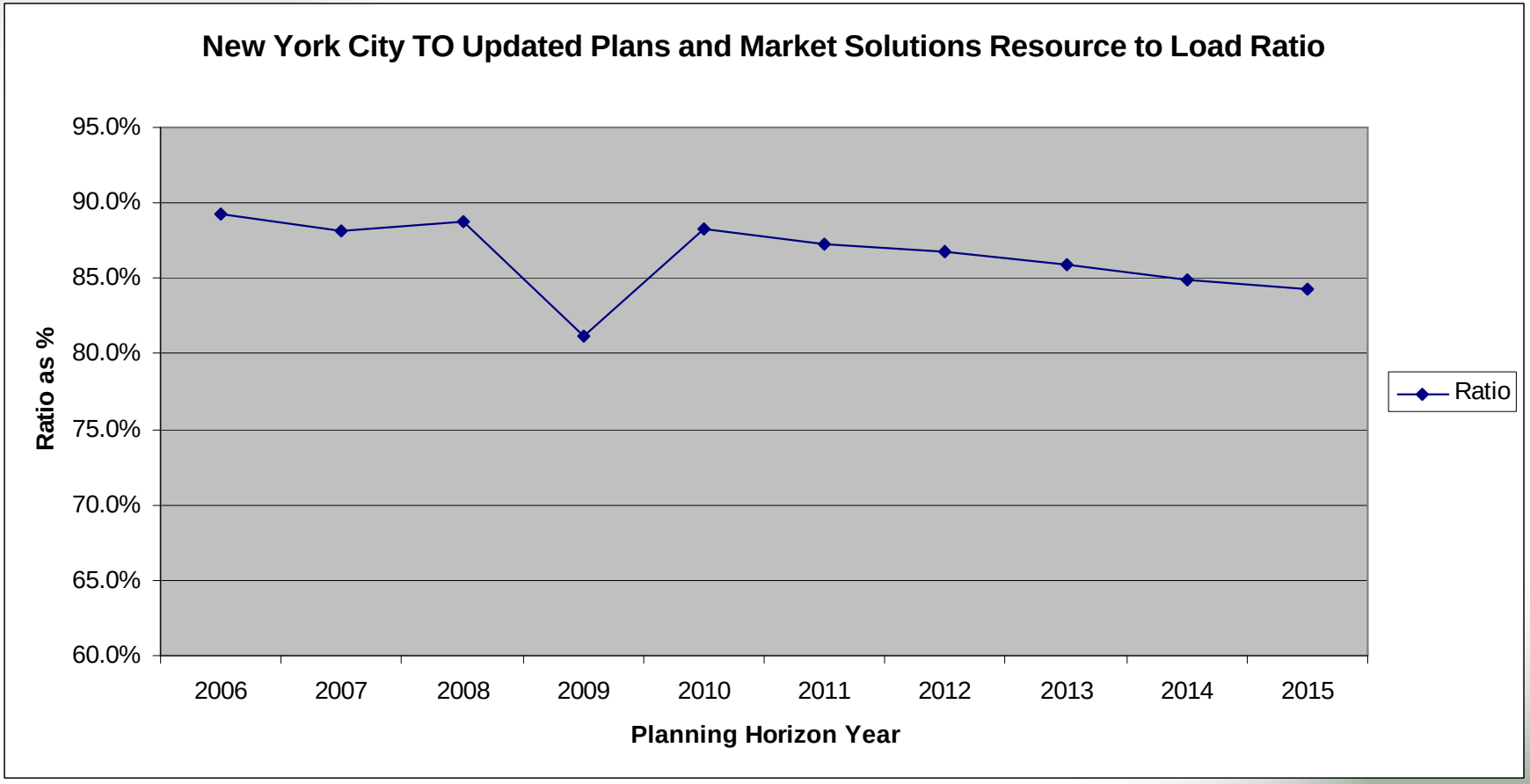
Market Solutions L&R Table

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Peak Load										
NYCA	32,400	32,840	33,330	33,740	34,125	34,505	34,825	35,105	35,345	35,595
Zone J	11,505	11,660	11,805	11,935	12,015	12,142	12,219	12,351	12,484	12,573
Zone k	5,320	5,410	5,500	5,580	5,680	5,779	5,879	5,981	6,085	6,112
Resources										
NYCA										
"-Capacity"	39,420	39,160	38,879	38,710	39,460	39,460	39,460	39,460	39,460	39,460
"-SCR"	1084	1084	1084	1189	1349	1349	1349	1349	1349	1349
"-UDR"	330	990	990	990	990	990	990	990	990	990
Total	40,834	41,234	40,953	40,889	41,799	41,799	41,799	41,799	41,799	41,799
Zone J										
"-Capacity"	10,102	10,102	10,302	9,417	10,167	10,167	10,167	10,167	10,167	10,167
"-SCR"	172	172	172	277	437	437	437	437	437	437
"-UDR"	0	0	0	0	0	0	0	0	0	0
Total	10,274	10,274	10,474	9,694	10,604	10,604	10,604	10,604	10,604	10,604
Zone K										
"-Capacity"	5,340	5,340	5,590	6,056	6,056	6,056	6,056	6,056	6,056	6,056
"-SCR"	207	207	207	207	207	207	207	207	207	207
"-UDR"	330	990	990	990	990	990	990	990	990	990
Total	5,877	6,537	6,787	7,253	7,253	7,253	7,253	7,253	7,253	7,253
NYCA Res. Margin %	126.0%	125.6%	122.9%	121.2%	122.5%	121.1%	120.0%	119.1%	118.3%	117.4%
Zons J Res/Load/ Ratio	89.3%	88.1%	88.7%	81.2%	88.3%	87.3%	86.8%	85.9%	84.9%	84.3%
Zons K Res/Load Ratio	110.5%	120.8%	123.4%	130.0%	127.7%	125.5%	123.4%	121.3%	119.2%	118.7%
NYCA LOLE										
In-State Capacity Res. Margin	121.7%	119.2%	116.6%	114.7%	115.6%	114.4%	113.3%	112.4%	111.6%	110.9%

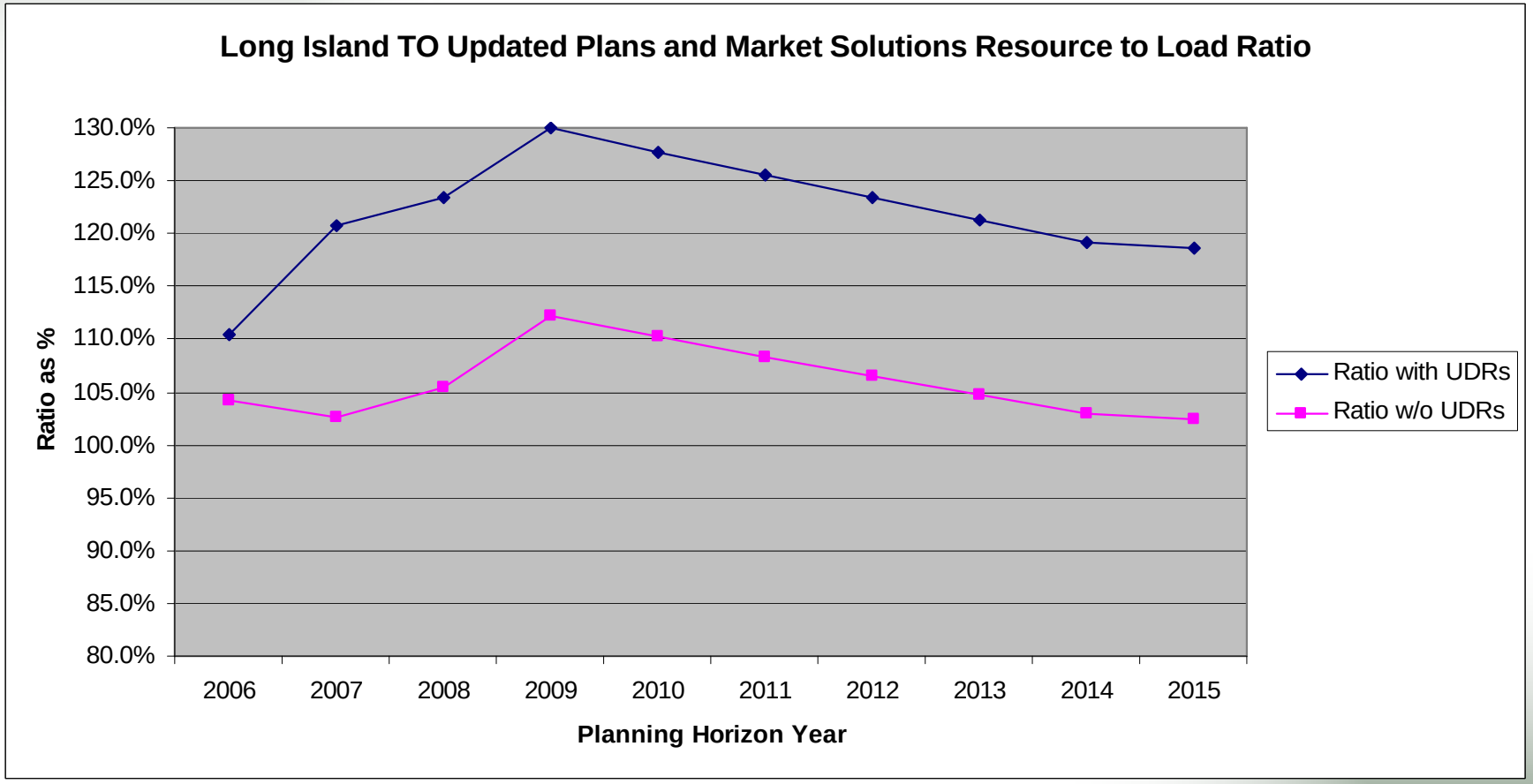
Market Solutions Continued



Market Solutions Continued



Market Solutions Continued



Conclusion

Increased Transmission Capability
LOLE Benefits

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Proposed Transmission Solutions

- Three transmission proposal submitted as alternative regulated solutions:
  - Back-to-back DC from PJM to Zone J
  - HVDC from Western NY to Zone G
  - An AC proposal consisting of two parts:
    - *Zone F to Zone H*
    - *Zone I to Zone J*

Increased Transfer Capability Continued

- Two of the proposals have the potential to increase the transfer capability into Zone G by 1000 MW from the west.
- Two of the proposals has the potential to increase transfer capability into NYC.
- The HVDC proposal not only increase transfer capability into zone G but could positively impact transfers in the lower Hudson Valley because of the reactive support proposed as part of the project.

Increased Transfer Capability Continued

- Without solutions beyond 2010, the updated TO plans result in an LOLE of 1.5 days/yr by 2015.
- Increasing transfer capability from Zone E or F to G by 1000 MW reduces the LOLE to 0.8 day/yr by 2015.
- Increasing transfer capability from Upstate NY to New York City by a 1000 MW would reduce the LOLE to 0.3 days/yr by 2015
- Even with an increase in transfer capability, there is a need for additional generation by 2015.

Increased Transfer Capability Continued Conclusion

- These alternatives would need to be studied in detail before a definitive determination of their benefits could be made.
- It should be noted that the capacity to displace capacity downstream would most likely need to come from resources external to NY or additional resources in Western NY.

Assessment of Alternative Regulated Generation Solution

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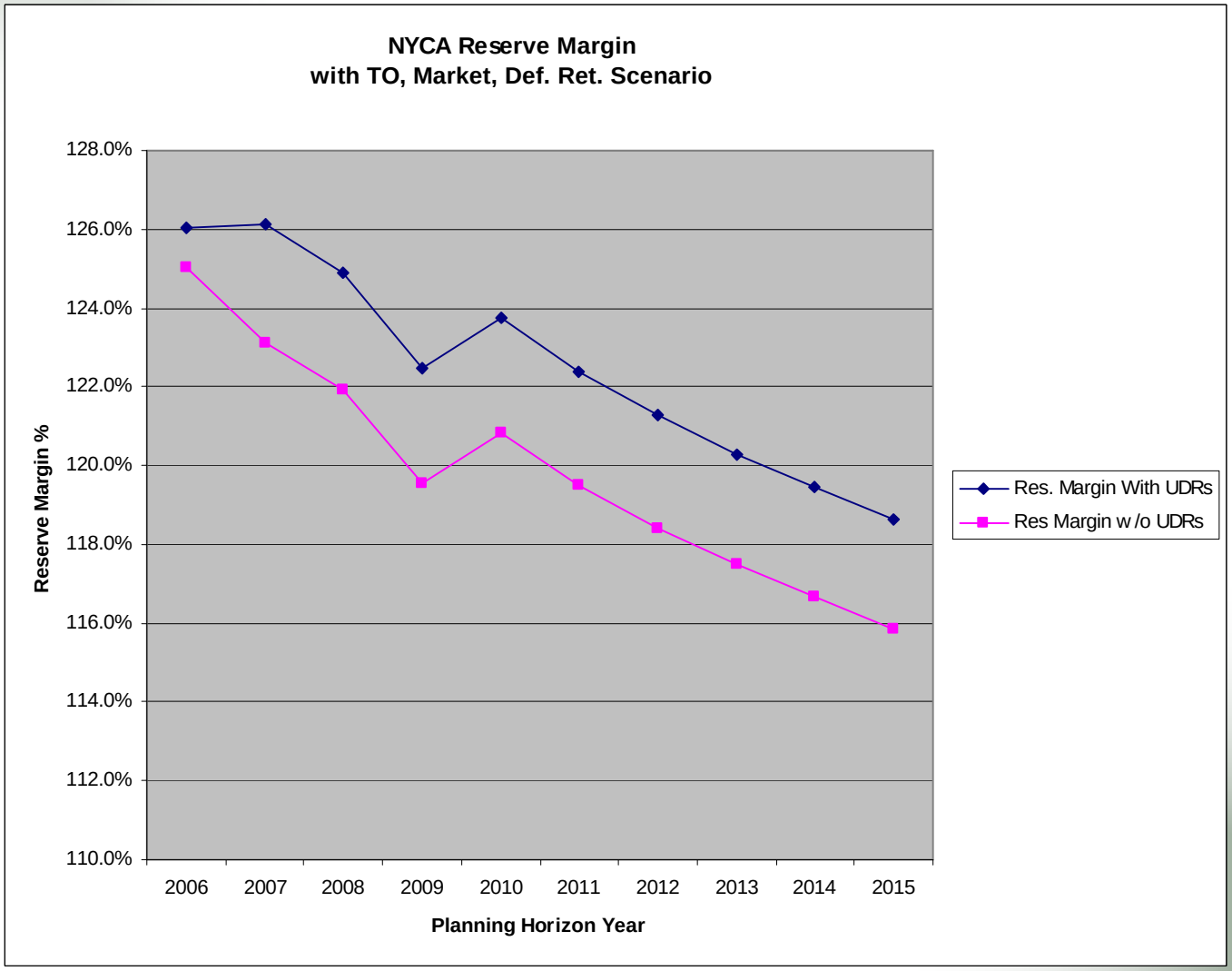
Alternative Regulated Backstop Generation Solution

- A proposal for 400 MW plus of generation in Zone G was submitted as an alternative regulated solution.
- This proposal was combined with the TO updated Base Case plans and market solutions for evaluation.
- This alternative is referred to as the deferred retirement solution.

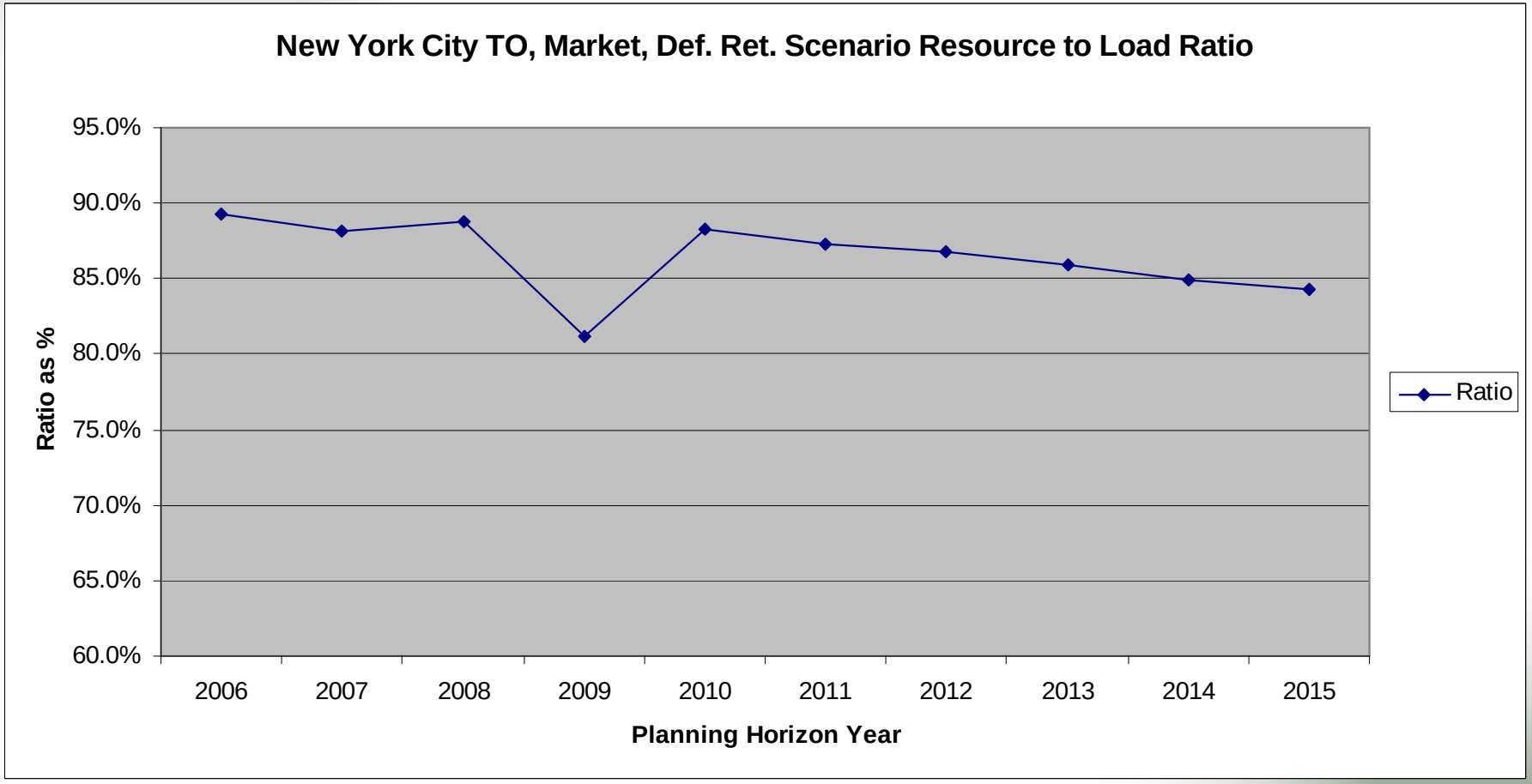
TO, Market, Def. Ret. Scenario L&R Table

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Peak Load										
NYCA	32,400	32,840	33,330	33,740	34,125	34,505	34,825	35,105	35,345	35,595
Zone J	11,505	11,660	11,805	11,935	12,015	12,142	12,219	12,351	12,484	12,573
Zone k	5,320	5,410	5,500	5,580	5,680	5,779	5,879	5,981	6,085	6,112
Resources										
NYCA										
"-Capacity"	39,420	39,348	39,560	39,141	39,891	39,891	39,891	39,891	39,891	39,891
"-SCR"	1084	1084	1084	1189	1349	1349	1349	1349	1349	1349
"-UDR"	330	990	990	990	990	990	990	990	990	990
Total	40,834	41,422	41,634	41,320	42,230	42,230	42,230	42,230	42,230	42,230
Zone J										
"-Capacity"	10,102	10,102	10,302	9,417	10,167	10,167	10,167	10,167	10,167	10,167
"-SCR"	172	172	172	277	437	437	437	437	437	437
"-UDR"	0	0	0	0	0	0	0	0	0	0
Total	10,274	10,274	10,474	9,694	10,604	10,604	10,604	10,604	10,604	10,604
Zone K										
"-Capacity"	5,340	5,340	5,590	6,056	6,056	6,056	6,056	6,056	6,056	6,056
"-SCR"	207	207	207	207	207	207	207	207	207	207
"-UDR"	330	990	990	990	990	990	990	990	990	990
Total	5,877	6,537	6,787	7,253	7,253	7,253	7,253	7,253	7,253	7,253
NYCA Res. Margin %	126.0%	126.1%	124.9%	122.5%	123.8%	122.4%	121.3%	120.3%	119.5%	118.6%
Zons J Res/Load/ Ratio	89.3%	88.1%	88.7%	81.2%	88.3%	87.3%	86.8%	85.9%	84.9%	84.3%
Zons K Res/Load Ratio	110.5%	120.8%	123.4%	130.0%	127.7%	125.5%	123.4%	121.3%	119.2%	118.7%
NYCA LOLE										0.068
In-State Capacity Res. Margin	121.7%	119.8%	118.7%	116.0%	116.9%	115.6%	114.5%	113.6%	112.9%	112.1%

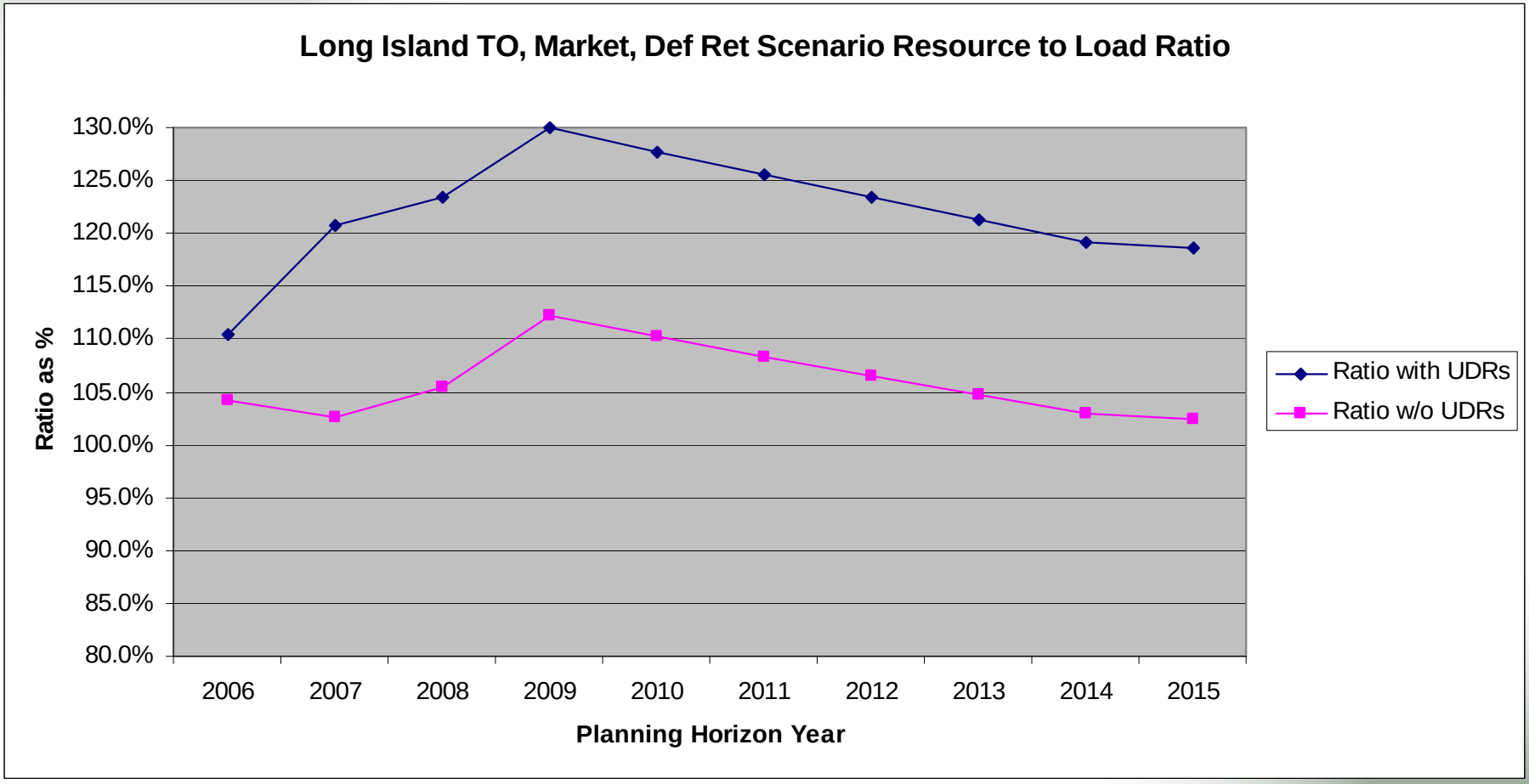
TO, Market, Def. Ret. Scenario - Cont



TO, Market, Def. Ret. Scenario - Cont



TO, Market, Def. Ret. Scenario - Cont



Conclusion

Overall Conclusion, Findings and Lessons Learned