Annual Update for 2019-2020 ICAP Demand Curves

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ICAPWG

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Agenda

- Background
- Process Overview
- Winter-to-Summer Ratio Values
- Gross CONE Composite Escalation Factor Value
- Net Energy and Ancillary Services Revenue Offset Values
- ICAP Reference Point Values

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Background

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Annual Updates

- As part of the 2016 ICAP Demand Curve reset process a new annual update procedure was developed to update the ICAP Demand Curves formulaically for each of the remaining three years of the reset period

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Process Overview

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Annual Update Process

- **Three components of the ICAP Demand Curve input parameters will be updated**
  - *Winter-to-summer ratio (WSR)*
  - *Gross cost of new entry (CONE) for peaking plants using a composite escalation factor*
  - *Net Energy and Ancillary Services (EAS) revenue offset*
- **For the annual updates regarding the 2018-2019, 2019-2020 and 2020-2021 Capability Years, the reference point for each ICAP Demand Curve is not permitted to increase more than 12% or decrease more than 8% from one year to the next**

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Annual Update Process (Continued)

- 2019-2020 ICAP Demand Curves will use data from September 1, 2015 – August 31, 2018 for updating the WSR and net EAS revenue offset
  - Year 1: September 1, 2015 – August 31, 2016
  - Year 2: September 1, 2016 – August 31, 2017
  - Year 3: September 1, 2017 – August 31, 2018
  - *September 1, 2014 – August 31, 2015 (Rolled Off)*

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Annual Update Process Timeline

- September – Updated WSR values (posted to website)
- November – Updated Gross CONE values
- November – Updated net EAS revenue offset values
- November – ICAP Demand Curve reference point values

All 2019-2020 annual update information is posted in the ICAP section of the NYISO public website under “Reference Documents” > “Demand Curve Reset Annual Update” > “2019”

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Winter-to-Summer Ratio

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2019-2020 WSR Values

- **GHIJ 3-Year WSR**
  - Rolled off a low ratio
- **NYC Year 3 WSR**
  - Multiple temp-sensitive resources entered IIFO in 2017-2018
- **LI Year 2 WSR**
  - Smaller sample size: ~60 MW equates to +/- 0.010 WSR delta

Three-year WSR	2019-2020 CY Update	2018-2019 CY Update
NYCA	1.039	1.038
GHIJ	1.059	1.054
NYC	1.081	1.082
LI	1.078	1.079

One-year WSR	2017-2018 (Year 3)	2016-2017 (Year 2)	2015-2016 (Year 1)	2014-2015 Rolled Off
NYCA	1.040	1.034	1.042	1.038
GHIJ	1.059	1.055	1.062	1.046
NYC	1.075	1.079	1.089	1.078
LI	1.074	1.084	1.076	1.078

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Adjustments for Qualifying Generators

- The annual update process requires adjustments for certain qualifying resource entry and exit circumstances
- Entry Adjustments for Year 3 WSR
  - Bayonne Energy Center CTG9 & CTG10
  - CPV Valley CC1 & CC2
- Exit Adjustments for Year 3 WSR
  - Cayuga 2 - IIFO
  - Binghamton Cogen - Retired
  - Lyonsdale - IIFO
  - Ravenswood 2-1, 2-2, 2-3, 2-4, 3-1, 3-2, 3-4 - IIFO
  - Ravenswood 9 - IIFO

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Gross CONE Composite Escalation Factor

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Process

- **Update Escalation Factor indices in Demand Curve Model**
  - Materials Cost, Construction Labor Cost, Turbine Cost
    - Source: Bureau of Labor Statistics
  - General/non-EPC Cost Index
    - Updated GDP Deflator index from 2009 to 2012*
    - Source: Bureau of Economic Analysis
  - Use most recently available data published as of October 1st
    - Preliminary values and any missing data are not used
    - May include revisions by the index publisher to a prior year's data values that are re-used in the current calculation

**BEA started publishing real measures with base year 2012 in July 2018 upon the release of their latest Comprehensive Update (CU). BEA rebases real measures with each CU it releases, generally every 4-5 years.*

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Material Cost Index

Source:	BLS Producer Price Index - Commodities
Seasonal:	Not Seasonally Adjusted
Series Id:	WPUID612
Group:	(ID6) Intermediate demand by commodity type
Item:	(12) Materials and components for construction
Base Date:	198200
Years:	2005 to 2017
Access:	http://data.bls.gov/cgi-bin/dsrv?wp

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2005	173.1	174.7	175.1	175.4	175.0	175.5	175.7	175.4	177.0	179.2	180.8	181.7
2006	184.2	185.0	185.5	186.7	188.2	189.2	190.2	190.7	191.0	190.4	189.6	189.6
2007	190.3	190.6	191.2	192.1	192.8	193.1	193.5	193.5	193.2	193.2	193.2	193.4
2008	194.4	195.7	197.3	200.2	203.3	206.5	209.8	212.9	214.0	212.2	210.2	207.9
2009	207.0	204.8	204.2	203.2	202.8	202.0	201.9	201.5	202.0	201.9	201.7	202.0
2010	202.3	203.5	204.6	206.1	207.4	206.6	206.3	206.2	205.9	205.9	206.3	207.0
2011	208.3	209.5	210.9	212.1	212.8	213.7	214.7	214.6	214.5	214.4	214.2	214.2
2012	215.3	216.9	217.4	218.3	219.1	219.2	218.5	218.7	219.2	219.1	219.5	219.9
2013	221.2	222.2	222.7	223.4	222.9	222.6	222.4	223.0	222.9	222.9	223.0	223.1
2014	224.8	225.8	226.6	226.9	227.4	227.4	227.7	228.2	228.5	228.6	228.5	228.4
2015	229.0	229.1	229.1	229.4	229.1	229.0	228.8	228.0	227.5	227.7	227.6	227.2
2016	227.5	227.5	227.8	228.3	228.7	229.1	229.7	230.3	230	229.7	229.7	230.1
2017	231.5	232.5	233.2	234.4	234.6	234.8	234.7	235.6	236	237	237.5	237.7
2018	239.7	241.2	244.3	245.4	*248.4*	*250*	*249.6*	*249.3*				

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Construction Labor Cost Index

Source:	BLS Quarterly Census of Employment and Wages
Series Id:	ENU360005052371
State:	New York
Area:	New York -- Statewide
Industry:	NAICS 2371 Utility system construction
Owner:	Private
Size	All establishment sizes
Type	Average Annual Pay
Years:	2004 to 2017
Access:	http://data.bls.gov/cgi-bin/dsrv?en

Year	Annual
2004	64,405
2005	63,754
2006	68,838
2007	74,672
2008	82,081
2009	80,447
2010	78,635
2011	79,665
2012	87,406
2013	88,850
2014	92,531
2015	97,529
2016	102,788
2017	101,108
2018	
2019	

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Turbine Cost Index

Source: BLS Producer Price Index - Commodities
Seasonal: Not Seasonally Adjusted
Group: (11) Machinery and Equipment
Item: (97) Turbines and Turbine Generator Sets
Series ID: WPU1197
Base Date: 198706
Years: 2005 to 2017
Access: http://data.bls.gov/cgi-bin/dsrv?wp

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2005	170.5	170.8	170.9	171.8	172.0	171.8	163.5	164.9	164.7	165.2	167.2	168.8
2006	172.6	171.0	170.3	171.1	171.6	173.5	174.4	174.9	175.6	176.2	177.5	178.3
2007	179.6	185.2	185.9	187.6	189.3	180.9	181.0	181.0	181.4	181.5	182.8	183.0
2008	183.8	191.1	198.6	198.6	201.9	201.9	215.9	215.9	215.9	216.0	217.3	217.4
2009	222.7	223.7	224.2	221.2	220.9	223.9	225.2	225.5	228.4	223.2	224.0	220.6
2010	222.9	221.2	220.2	220.5	221.6	221.5	221.8	222.1	221.9	223.0	223.0	223.8
2011	225.5	224.9	224.5	225.7	227.7	228.8	225.9	224.2	226.0	223.7	221.7	223.5
2012	218.9	220.0	222.1	222.3	224.3	225.2	225.4	224.4	222.9	225.1	226.2	225.7
2013	225.4	225.4	226.3	226.4	227.2	226.6	228.8	227.8	229.1	229.0	232.0	231.7
2014	230.8	231.2	232.7	232.2	231.7	232.2	231.6	233.6	236.1	237.2	237.5	238.5
2015	229.7	230.9	234.4	230.9	231.7	227.9	233.5	230.0	232.9	232.8	232.4	233.1
2016	231.9	232.2	232.5	231.2	231.4	233.2	233.5	232.7	232.5			
2017		224.3	223.9	223.4	223.5	227.7	225.6	225.8	225.8	224.5	217.5	211.6
2018	210.1	215.1	221	221	*223.5*	*222.7*	*223*	*222.9*				

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General/Non-EPC Cost Index

Source: Bureau of Economic Analysis: Gross Domestic Product Implicit Price Deflator, Index 2012 = 100. Choose most recent four quarters available.
Seasonal: Seasonally Adjusted
Timing: Quarterly
Table: 1.1.9
Table Location: Line 1
Access: https://www.bea.gov/iTable/iTable.cfm?reqid=19&step=2#reqid=19&step=3&isuri=1&1921=survey&1903=13

	Quarter			
Year	I	II	III	IV
2005	86.391	86.996	87.783	88.489
2006	89.107	89.852	90.481	90.815
2007	91.708	92.301	92.776	93.145
2008	93.489	93.99	94.69	94.986
2009	94.976	94.838	94.938	95.259
2010	95.499	95.943	96.222	96.763
2011	97.283	97.922	98.553	98.703
2012	99.32	99.713	100.225	100.737
2013	101.139	101.431	101.918	102.517
2014	102.895	103.539	104.029	104.233
2015	104.148	104.738	105.117	105.145
2016	105.055	105.778	106.172	106.72
2017	107.275	107.58	108.097	108.824
2018	109.371	110.266		

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2019-2020 Composite Escalation Factor Value

		Construction Labor Cost	Materials Cost	Gas and Steam Turbine Cost	GDP Deflator
Year 1	[A]	102,788	233	224	107.6
Year 2	[B]	101,108	244	219	110.3
Growth Rate	[B]/[A]-1	-1.63%	4.40%	-2.16%	2.50%
Weights (By Technology)		28%	37%	20%	15%
Escalation Factor:		28%*-1.63% + 37%*4.40% + 20%*-2.16% + 15%*2.50% = **1.08%**			

**Values in the table for each index are rounded, while the calculation uses unrounded values*

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2019-2020 Gross CONE Values

	2018-2019 Gross CONE ($/kW-year)	2019-2020 Escalation Factor	2019-2020 Gross CONE ($/kW-year)
NYCA	$129.23	x1.08%	$130.63
G-J	$178.15		$180.08
NYC	$213.13		$215.44
LI	$198.71		$200.86

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Net Energy and Ancillary Service Revenue Offset

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Process

- **Collect data from September 1, 2017 – August 31, 2018**
  - NYISO DAM and RTM LBMPs
  - NYISO DAM and RTM Time-Weighted Ancillary Services prices
  - NYISO Rate Schedule 1 charges
  - Fuel costs
  - Emissions costs
- **Run net EAS model with new data**
  - Model runs for three-year historic period (Sep 1, 2015 – Aug 31, 2018)
  - Detailed results available in the Appendix of this presentation

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2019-2020 Raw Net EAS Revenue Values

- NYCA and G-J increase due to increased reserve revenues
  - Reserve schedule for Year 3 in line with other two years
  - Lower reserve schedule in 2014-2015 rolled off
- LI decrease due to rolling off of prior high winter energy revenues
  - Jan 2015 – Mar 2015 energy prices rolled off

	2019-2020 Raw Net EAS Revenues ($/kW-year)	2018-2019 Raw Net EAS Revenues ($/kW-year)
NYCA	$31.48	$28.13
G-J	$31.81	$28.56
NYC	$35.31	$34.79
LI	$65.20	$71.30

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Net EAS Escalation

- **Net EAS revenues are escalated using the unweighted annual change in the general component (GDP Deflator) from the Gross CONE composite escalation factor**
  - For the 2019-2020 revenues, the value is 2.50%
  - Applied twice to move from 2017 to 2019

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2019-2020 Net EAS Revenue Values

	2019-2020 Raw Net EAS Revenues ($/kW-year)	2019-2020 GDP Deflator	2019-2020 Escalated Net EAS Revenues ($/kW-year)	2018-2019 Escalated Net EAS Revenues ($/kW-year)
NYCA	$31.48	2.5% (applied twice)	$33.07	$29.04
G-J	$31.81		$33.42	$29.48
NYC	$35.31		$37.10	$35.91
LI	$65.20		$68.50	$73.60

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2019-2020 ICAP Demand Curve Reference Points

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2019-2020 ICAP Demand Curve Reference Points

- **NYCA decrease**
  - Higher net EAS revenues due to increased reserves revenue; slightly offset by higher WSR
- **G-J increase**
  - Higher WSR; partially offset by higher net EAS revenues
- **NYC increase**
  - Minimal change compared to 2018-2019 raw value, $21.90; unlike 2018-2019, collar was not binding
- **LI increase**
  - Lower net EAS revenues due to a high winter revenue period rolling off; consistent with 2018-2019, collar was binding

	2019-2020 Raw ICAP Ref. Point ($/kW-month)	2019-2020 Final ICAP Ref. Point ($/kW-month)	2018-2019 Final ICAP Ref. Point ($/kW-month)
NYCA	$9.83	$9.83	$10.04
G-J	$16.59	$16.59	$16.42
NYC	$21.95	$21.95	$20.84
LI	$18.83	$15.96	$14.25

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	Current Year (2019-2020)				
	Source	F - Capital	G - Hudson Valley (Dutchess)	J - New York City	K - Long Island
Gross Cost of New Entry ($/kW-Year)	[1]	$130.63	$180.08	$215.44	$200.86
Net EAS Revenue ($/kW-Year)	[2]	$33.07	$33.42	$37.10	$68.50
Annual ICAP Reference Value ($/kW-Year)	[3] = [1] - [2]	$97.56	$146.66	$178.34	$132.36
ICAP DMNC (MW)	[4]	217.0	218.0	217.6	219.1
Total Annual Reference Value	**[5] = [3] * [4]**	**$21,169,534**	**$31,966,761**	**$38,801,133**	**$29,003,975**
Level of Excess (%)	[6]	100.6%	101.5%	102.3%	103.9%
Ratio of Summer to Winter DMNCs	[7]	1.039	1.059	1.081	1.078
Summer DMNC (MW)	[8]	224.6	226.8	226.9	224.9
Winter DMNC (MW)	[9]	230.3	230.3	228.7	230.3
Assumed Capacity Prices at Tariff Prescribed Level of Excess Conditions					
Summer ($/kW-Month)	[10]	$9.37	$14.94	$19.15	$14.75
Winter ($/kW-Month)	[11]	$6.18	$8.42	$9.28	$6.59
Monthly Revenue (Summer)	[12] = [10]*[8]	$2,105,068	$3,388,909	$4,345,150	$3,317,077
Monthly Revenue (Winter)	[13] = [11]*[9]	$1,423,187	$1,938,895	$2,121,708	$1,516,910
Seasonal Revenue (Summer)	[14] = 6 * [12]	$12,630,410	$20,333,451	$26,070,899	$19,902,462
Seasonal Revenue (Winter)	[15] = 6 * [13]	$8,539,123	$11,633,368	$12,730,249	$9,101,462
Total Annual Reference Value	**[16] = [14]+[15]**	**$21,169,533**	**$31,966,820**	**$38,801,147**	**$29,003,923**
Raw ICAP Demand Curve Parameters					
ICAP Monthly Reference Point Price ($/kW-Month)		*$9.83*	*$16.59*	*$21.95*	*$18.83*
ICAP Max Clearing Price ($/kW-Month)		*$16.33*	*$22.51*	*$26.93*	*$25.11*
Demand Curve Length		*112%*	*115%*	*118%*	*118%*
Final ICAP Demand Curve Parameters					
ICAP Monthly Reference Point Price ($/kW-Month)		**$9.83**	**$16.59**	**$21.95**	**$15.96**
ICAP Max Clearing Price ($/kW-Month)		$16.33	$22.51	$26.93	$25.11
Demand Curve Length		*112%*	*115%*	*118%*	*118%*

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Next Steps

- Updated ICAP reference point values become effective for 2019-2020 Capability Year (starting May 1, 2019)
- Data and results posted on the NYISO website
  - Available on the ICAP Market Data site at http://www.nyiso.com/public/markets_operations/market_data/icap/index.jsp under “Reference Documents” > “Demand Curve Reset Annual Updates” > “2019”

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Feedback/Questions?

- Email: nwhitney@nyiso.com

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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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Appendix

- Detailed Net EAS Revenue Results

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Final Net EAS Revenues Yearly Summary

		Annual Average Net EAS Revenues ($/kW-year)	Annual Average Run Hours
Load Zone		Siemens SGT6-5000F5	Siemens SGT6-5000F5
F	Capital	$31.48	818
G	Hudson Valley (Dutchess)	$31.81	908
J	New York City	$35.32	2,291
K	Long Island	$65.20	3,329

		Annual Average Unit Starts	Annual Average Hours per Start
Load Zone		Siemens SGT6-5000F5	Siemens SGT6-5000F5
F	Capital	118	7.0
G	Hudson Valley (Dutchess)	128	7.1
J	New York City	180	12.7
K	Long Island	199	16.7

Notes:

[1] Current modeling period is September 2015-August 2018. Zone F was modeled without SCR and only able to run on gas. All other zones were modeled with SCR and dual fuel capabilities.

[2] Assumes $1.43/kW-year VSS Revenues for all units, based on Settlement data provided by NYISO.

[3] Run-time limits were applied based on New Source Performance Standards. Siemens SGT6-5000F5 was limited to capacity factor of 38.4%. Siemens SGT6-5000F5 with no SCR (Zone F Only) was limited to a capacity factor of 28.5%.

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Fuel Type by Year

September, 2015 - August, 2016							
		Run-Time Hours			Net Energy Revenues ($/kW-year)		
Load Zone		Gas	Oil	Total	Gas	Oil	Total
F	Capital	740	0	740	$12.54	$0.00	$12.54
G	Hudson Valley (Dutchess)	845	0	845	$14.41	$0.00	$14.41
J	New York City	2,633	0	2,633	$29.46	$0.00	$29.46
K	Long Island	3,373	0	3,373	$65.02	$0.00	$65.02

September, 2016 - August, 2017							
		Run-Time Hours			Net Energy Revenues ($/kW-year)		
Load Zone		Gas	Oil	Total	Gas	Oil	Total
F	Capital	720	0	720	$14.18	$0.00	$14.18
G	Hudson Valley (Dutchess)	663	0	663	$11.85	$0.00	$11.85
J	New York City	2,256	0	2,256	$23.08	$0.00	$23.08
K	Long Island	3,362	0	3,362	$45.38	$0.00	$45.38

September, 2017 - August, 2018							
		Run-Time Hours			Net Energy Revenues ($/kW-year)		
Load Zone		Gas	Oil	Total	Gas	Oil	Total
F	Capital	994	0	994	$25.03	$0.00	$25.03
G	Hudson Valley (Dutchess)	1,130	85	1,215	$22.26	$4.28	$26.55
J	New York City	1,890	93	1,983	$29.76	$4.36	$34.12
K	Long Island	3,155	97	3,252	$52.20	$4.59	$56.80

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Run Hours by Year

Run Hours September, 2015 - August, 2016														
Day-Ahead Commitment		Energy				Reserve				None				Total
Real-Time Dispatch		Energy	Reserve	Buyout	Limited	Energy	Reserve	Buyout	Limited	Energy	Reserve	None	Limited	
F	Capital	340	0	175	0	343	9	5,785	0	57	0	2,075	0	8,784
G	Hudson Valley (Dutchess)	488	0	137	0	315	5	5,840	0	42	0	1,957	0	8,784
J	NYC	2,320	0	354	0	229	0	2,792	0	84	0	3,005	0	8,784
K	Long Island	3,179	0	572	765	62	0	770	25	132	0	3,237	42	8,784

Run Hours September, 2016 - August, 2017														
Day-Ahead Commitment		Energy				Reserve				None				Total
Real-Time Dispatch		Energy	Reserve	Buyout	Limited	Energy	Reserve	Buyout	Limited	Energy	Reserve	None	Limited	
F	Capital	349	30	169	0	274	16	5,721	0	97	0	2,104	0	8,760
G	Hudson Valley (Dutchess)	361	23	151	0	273	5	5,772	0	29	0	2,146	0	8,760
J	NYC	2,020	0	338	0	84	1	1,146	0	152	0	5,019	0	8,760
K	Long Island	3,165	0	554	196	41	1	183	10	156	0	4,430	24	8,760

Run Hours September, 2017 - August, 2018														
Day-Ahead Commitment		Energy				Reserve				None				Total
Real-Time Dispatch		Energy	Reserve	Buyout	Limited	Energy	Reserve	Buyout	Limited	Energy	Reserve	None	Limited	
F	Capital	598	9	237	0	342	6	4,733	0	54	0	2,781	0	8,760
G	Hudson Valley (Dutchess)	829	9	200	0	353	8	4,829	0	33	0	2,499	0	8,760
J	NYC	1,727	0	169	0	35	0	237	0	221	0	6,371	0	8,760
K	Long Island	3,049	0	514	0	20	0	98	0	183	1	4,895	0	8,760

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Net EAS Revenues by Year

Net EAS Revenues September, 2015 - August, 2016														
Day-Ahead Commitment		Energy				Reserve				None				Total
Real-Time Dispatch		Energy	Reserve	Buyout	Limited	Energy	Reserve	Buyout	Limited	Energy	Reserve	None	Limited	
F	Capital	$4.03	$0.00	$2.39	$0.00	$7.47	$0.04	$14.85	$0.00	$1.04	$0.00	$0.00	$0.00	$29.81
G	Hudson Valley (Dutchess)	$6.47	$0.00	$2.42	$0.00	$7.36	$0.02	$14.63	$0.00	$0.57	$0.00	$0.00	$0.00	$31.48
J	NYC	$22.95	$0.00	$3.48	$0.00	$5.17	$0.00	$3.85	$0.00	$1.34	$0.00	$0.00	$0.00	$36.78
K	Long Island	$58.72	$0.00	$9.60	$0.33	$1.24	$0.00	$0.73	$0.04	$5.06	$0.00	$0.00	$0.00	$75.73

Net EAS Revenues September, 2016 - August, 2017														
Day-Ahead Commitment		Energy				Reserve				None				Total
Real-Time Dispatch		Energy	Reserve	Buyout	Limited	Energy	Reserve	Buyout	Limited	Energy	Reserve	None	Limited	
F	Capital	$3.97	$0.55	$2.16	$0.00	$6.93	$0.09	$9.25	$0.00	$3.28	$0.00	$0.00	$0.00	$26.23
G	Hudson Valley (Dutchess)	$3.95	$0.26	$1.72	$0.00	$6.94	$0.02	$9.33	$0.00	$0.95	$0.00	$0.00	$0.00	$23.18
J	NYC	$18.54	$0.00	$2.85	$0.00	$1.12	$0.00	$1.87	$0.00	$3.41	$0.00	$0.00	$0.00	$27.80
K	Long Island	$40.65	$0.00	$5.79	$0.05	$0.43	$0.00	$0.39	$0.02	$4.30	$0.00	$0.00	$0.00	$51.63

Net EAS Revenues September, 2017 - August, 2018														
Day-Ahead Commitment		Energy				Reserve				None				Total
Real-Time Dispatch		Energy	Reserve	Buyout	Limited	Energy	Reserve	Buyout	Limited	Energy	Reserve	None	Limited	
F	Capital	$14.86	$0.06	$2.99	$0.00	$8.49	$0.01	$6.01	$0.00	$1.68	$0.00	$0.00	$0.00	$34.10
G	Hudson Valley (Dutchess)	$16.31	$0.16	$2.85	$0.00	$9.38	$0.02	$6.90	$0.00	$0.86	$0.00	$0.00	$0.00	$36.48
J	NYC	$27.02	$0.00	$2.20	$0.00	$1.20	$0.00	$0.76	$0.00	$5.90	$0.00	$0.00	$0.00	$37.07
K	Long Island	$49.70	$0.00	$6.49	$0.00	$1.14	$0.00	$0.67	$0.00	$5.95	$0.01	$0.00	$0.00	$63.96

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