Annual Update for 2020-2021 ICAP Demand Curves

Nicholas S. Whitney

Manager, ICAP Market Operations

ICAPWG

November 5, 2019, 10 Krey Boulevard

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

Background

Background

- 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

Process Overview

Annual Update Process Overview

- **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 (Net 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**

Annual Update Process Overview

- **The 2020-2021 Capability Year (CY) ICAP Demand Curves will use data from September 1, 2016 – August 31, 2019 for updating the WSR and Net EAS revenue offset**
  - Year 1: September 1, 2016 – August 31, 2017
  - Year 2: September 1, 2017 – August 31, 2018
  - Year 3: September 1, 2018 – August 31, 2019
  - *Rolled Off: September 1, 2015 – August 31, 2016*

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 annual update information is posted in the "Installed Capacity Market (ICAP)" section of the NYISO public website under "Reference Documents" > "Demand Curve Reset Annual Updates" > "2020"

Winter-to-Summer Ratio

2020-2021 WSR Values

Three-year WSR	2020-2021 CY Update	2019-2020 CY Update
NYCA	1.040	1.039
GHIJ	1.058	1.059
NYC	1.078	1.081
LI	1.076	1.078

One-year WSR	2018-2019 (Year 3)	2017-2018 (Year 2)	2016-2017 (Year 1)	2015-2016 Rolled Off
NYCA	1.046	1.040	1.034	1.042
GHIJ	1.059	1.059	1.055	1.062
NYC	1.080	1.075	1.079	1.089
LI	1.069	1.074	1.084	1.076

Adjustments for Qualifying Generators

- The annual update process requires adjustments for certain qualifying resource entry and exit circumstances
- Entry adjustments for Year 3 WSR:
  - Gilboa 1
  - Arthur Kill Cogen
- Exit Adjustments for Year 3 WSR:
  - Hudson Ave GT 4

Gross CONE Composite Escalation Factor

Gross CONE Escalation Factor Process

- **Update escalation factor indices in the demand curve model**
  - Materials, Labor, and Turbine costs
    - Source: Bureau of Labor Statistics
  - General/non-EPC cost index
    - Source: Bureau of Economic Analysis
  - Use most recently available data published as of October 1st
    - Preliminary values and 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

Martial Cost Index

Materials 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	248.1	249	249.4	249.2	249.6	249.6	249.1	249.7
2019	250.7	251.5	251.2	251.9								
2020												
2021												

Construction Labor Cost Index

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	105,039
2019	
2020	
2021	

Turbine Cost Index

Gas and Steam Turbine 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	221.0	221.0	219.4	219.7	219.8	221.4	221.0	224.4	225.9	228.8
2019	229.4	231.0	231.1	231.6								
2020												
2021												

General/Non-EPC Cost Index

Non-EPC Cost Index

Source:	Bureau of Economic Analysis: Gross Domestic Product Implic
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#

	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	102.937	103.512	103.957	104.123
2015	104.09	104.675	105.048	105.049
2016	104.941	105.657	106.043	106.551
2017	107.058	107.411	107.973	108.713
2018	109.355	110.281	110.767	111.256
2019	111.473	112.188		
2020				
2021				

2020-2021 Composite Escalation Factor

		Construction Labor Cost	Materials Cost	Gas and Steam Turbine Cost	GDP Deflator
Year 1	[A]	101,108	244	219	110.3
Year 2	[B]	105,039	252	231	112.2
Growth Rate	[B]/[A]-1	3.89%	3.24%	5.57%	1.73%
Weights (By Technology)		28%	37%	20%	15%
Escalation Factor:		28%*3.89% + 37%*3.24% + 20%*5.57% + 15%*1.73% = **3.67%**			

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

2020-2021 Gross CONE Values

	2019-2020 Gross CONE ($/kW-year)	2020-2021 Escalation Factor	2020-2021 Gross CONE ($/kW-year)
NYCA	$130.63	x3.67%	$135.43
G-J	$180.08		$186.69
NYC	$215.44		$223.35
LI	$200.86		$208.24

Net Energy and Ancillary Services Revenue Offset

Net EAS Revenue Offset Update Process

- **Collect data from September 1, 2018 – August 31, 2019**
  - 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, 2016 – Aug 31, 2019)
  - Detailed results available in the Appendix of this presentation

2020–2021 Raw Net EAS Revenue Values

- **Decrease in Net EAS revenue in all localities can primarily be attributed to higher gas prices that were not entirely off-set by higher LBMPs**
  - Values include $1.43/kW-year adder for voltage support service

	2020-2021 Raw Net EAS Revenues ($/kW-year)	2019-2020 Raw Net EAS Revenues ($/kW-year)
NYCA	$29.27	$31.48
G-J	$28.71	$31.81
NYC	$30.39	$35.31
LI	$56.23	$65.20

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 2020-2021 revenues, the value is 1.73%
  - Applied twice to move from 2018 to 2020

	2020-2021 Raw Net EAS Revenues ($/kW-year)	2020-2021 GDP Deflator	2020-2021 Escalated Net EAS Revenues ($/kW-year)	2019-2020 Escalated Net EAS Revenues ($/kW-year)
NYCA	$29.27	1.73% (applied twice)	$30.29	$33.07
G-J	$28.71		$29.71	$33.42
NYC	$30.39		$31.45	$37.10
LI	$56.23		$58.19	$68.50

2020-2021 ICAP Demand Curve Reference Points

2020–2021 ICAP Demand Curve Reference Points

- **NYCA increase**
  - Lower net EAS revenues due to lower spark spread
- **G-J increase**
  - Lower net EAS revenues due to lower spark spread
- **NYC increase**
  - Lower net EAS revenues due to lower spark spread
- **LI increase**
  - Lower net EAS revenues due to lower spark spread, collar was binding

	2020-2021 Raw ICAP Ref. Point ($/kW-month)	2020-2021 Final ICAP Ref. Point ($/kW-month)	2019-2020 Final ICAP Ref. Point ($/kW-month)
NYCA	$10.65	$10.65	$9.83
G-J	$17.67	$17.67	$16.59
NYC	$23.31	$23.31	$21.95
LI	$21.13	$17.88	$15.96

	Current Year (2020-2021)				
	Source	F - Capital	G - Hudson Valley (Dutchess)	J - New York City	K - Long Island
Gross Cost of New Entry ($/kW-Year)	[1]	$135.43	$186.69	$223.35	$208.24
Net EAS Revenue ($/kW-Year)	[2]	$30.29	$29.71	$31.45	$58.19
Annual ICAP Reference Value ($/kW-Year)	[3] = [1] - [2]	$105.14	$156.98	$191.90	$150.05
ICAP DMNC (MW)	[4]	217.0	218.0	217.6	219.1
Total Annual Reference Value	**[5] = [3] * [4]**	**$22,813,551**	**$34,215,662**	**$41,751,592**	**$32,878,815**
Level of Excess (%)	[6]	100.6%	101.5%	102.3%	103.9%
Ratio of Summer to Winter DMNCs	[7]	1.040	1.058	1.078	1.076
Summer DMNC (MW)	[8]	224.6	226.8	226.9	224.9
Winter DMNC (MW)	[9]	230.3	230.3	228.7	230.3
Assumed Capacity Prices at Tariff Prescribed Level of Excess Conditions					
Summer ($/kW-Month)	[10]	$10.16	$15.92	$20.34	$16.55
Winter ($/kW-Month)	[11]	$6.61	$9.09	$10.24	$7.63
Monthly Revenue (Summer)	[12] = [10]*[8]	$2,280,738	$3,610,070	$4,615,844	$3,723,122
Monthly Revenue (Winter)	[13] = [11]*[9]	$1,521,539	$2,092,536	$2,342,749	$1,756,676
Seasonal Revenue (Summer)	[14] = 6 * [12]	$13,684,427	$21,660,422	$27,695,063	$22,338,729
Seasonal Revenue (Winter)	[15] = 6 * [13]	$9,129,233	$12,555,217	$14,056,494	$10,540,054
Total Annual Reference Value	**[16] = [14]+[15]**	**$22,813,660**	**$34,215,639**	**$41,751,557**	**$32,878,784**
Raw ICAP Demand Curve Parameters					
ICAP Monthly Reference Point Price ($/kW-Month)		*$10.65*	*$17.67*	*$23.31*	*$21.13*
ICAP Max Clearing Price ($/kW-Month)		*$16.93*	*$23.34*	*$27.92*	*$26.03*
Demand Curve Length		*112%*	*115%*	*118%*	*118%*
Final ICAP Demand Curve Parameters					
ICAP Monthly Reference Point Price ($/kW-Month)		**$10.65**	**$17.67**	**$23.31**	**$17.88**
ICAP Max Clearing Price ($/kW-Month)		$16.93	$23.34	$27.92	$26.03
Demand Curve Length		112%	115%	118%	118%

NEW YORK INDEPENDENT SYSTEM OPERATOR

Next Steps

Next Steps

- **Updated ICAP reference point values become effective for the 2020-2021 Capability Year (beginning May 1, 2020)**
- **Data and results posted on the NYISO website**
  - Available on the Installed Capacity Market (ICAP)" section of the NYISO public website at:
    - https://www.nyiso.com/installed-capacity-market
    - "Reference Documents" > "Demand Curve Reset Annual Updates" > "2020"

Feedback/Questions?

- Email: nwhitney@nyiso.com

Our mission, in collaboration with our stakeholders, is to serve the public interest and provide benefit 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 policymakers, stakeholders and investors in the power system

Appendix

- Detailed Net EAS Revenue Results

Net EAS Revenue Update Summary

	Load Zone	Annual Average Net EAS Revenues ($/kW-year)	Annual Average Run Hours
F	Capital	$29.27	739
G	Hudson Valley (Dutchess)	$28.71	805
J	New York City	$30.39	1,922
K	Long Island	$56.23	3,324

	Load Zone	Annual Average Unit Starts	Annual Average Hours per Start
F	Capital	111	6.7
G	Hudson Valley (Dutchess)	116	7.0
J	New York City	164	11.7
K	Long Island	219	15.2

Fuel Type by Year

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	$45.05	$0.00	$45.05

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

September 2018 - August 2019							
		Run-Time Hours			Net Energy Revenues ($/kW-year)		
Load Zone		Gas	Oil	Total	Gas	Oil	Total
F	Capital	503	0	503	$13.00	$0.00	$13.00
G	Hudson Valley (Dutchess)	536	0	536	$12.77	$0.00	$12.77
J	New York City	1,527	0	1,527	$17.35	$0.00	$17.35
K	Long Island	3,359	0	3,359	$45.57	$0.00	$45.57

Run Hours by Year

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

Run Hours September 2018 - August 2019														
Day-Ahead Commitment		Energy				Reserve				None				Total
Real-Time Dispatch		Energy	Reserve	Buyout	Limited	Energy	Reserve	Buyout	Limited	Energy	Reserve	None	Limited	
F	Capital	209	0	190	0	258	16	5,660	0	36	0	2,391	0	8,760
G	Hudson Valley (Dutchess)	250	12	157	0	253	10	5,663	0	33	0	2,382	0	8,760
J	NYC	1,356	0	324	0	25	0	346	0	146	1	6,562	0	8,760
K	Long Island	3,180	0	352	170	0	0	1	0	179	0	4,864	14	8,760

Updated Net EAS Results by Year

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	$40.32	$0.00	$5.79	$0.05	$0.43	$0.00	$0.39	$0.02	$4.30	$0.00	$0.00	$0.00	$51.30

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

Net EAS Revenues September 2018 - August 2019														
Day-Ahead Commitment		Energy				Reserve				None				Total
Real-Time Dispatch		Energy	Reserve	Buyout	Limited	Energy	Reserve	Buyout	Limited	Energy	Reserve	None	Limited	
F	Capital	$4.02	$0.00	$3.10	$0.00	$8.21	$0.04	$7.03	$0.00	$0.78	$0.00	$0.00	$0.00	$23.18
G	Hudson Valley (Dutchess)	$4.32	$0.10	$2.02	$0.00	$7.63	$0.03	$7.27	$0.00	$0.83	$0.00	$0.00	$0.00	$22.19
J	NYC	$13.81	$0.00	$4.49	$0.00	$0.22	$0.00	$0.16	$0.00	$3.32	$0.00	$0.00	$0.00	$22.00
K	Long Island	$42.01	$0.00	$3.56	$0.00	$0.00	$0.00	$0.00	$0.00	$3.57	$0.00	$0.00	$0.00	$49.13