UCAP Clearing Examples ICAP WG 4/30/2013

CASE 1: All localities purchase exactly at their requirement

This is an example where LSEs in each Locality purchases the exact requirements (there is no excess purchased in any Locality).

<u>Assumptions</u>

	Load Forecast		
Load Zone	(MW)	LCR/IRM	EFORd
LI	5,500	0.99	0.05
NYC	11,500	0.83	0.05
GHIJ	12,500	0.88	0.05
NYCA	33,000	1.16	0.05

	LI		NYC	}	GHI.	J	NYC	CA C
ICAP Reference Points (\$/kW								
month)	\$	10.00	\$	19.00	\$	14.00	\$	9.00
Slope (\$/MW)		(0.0115)		(0.0130)		(0.0120)		(0.0025)

How the Auction Solves (in UCAP MW)

	K Lc	cality	J Lo	cality	GH	IJ Locality	NY	CA
	Req	uirement	Rec	Juirement	Red	quirement	Red	quirement
Requirement (MW)		5,172.75		9,067.75		10,450.00		36,366.00
Amount to be purchased in								
the locality (MW)		5,172.75		9,067.75		1,382.25		20,743.25
Clearing Price (\$/kW-month)	\$	10.00	\$	19.00	\$	14.00	\$	9.00
Total Cost (price * UCAP MW)								
by Locality (Millions \$/								
Month)	\$	51.73	\$	172.29	\$	19.35	\$	186.69
Total (Millions \$/Month)	\$	430.06						

Balance Sheets for each of the loads

Assume there is a single load in NYC ("NYC Load"), and single load in LI ("LI Load"), a single load in GHI ("GHI Load") and a single load in zones A through F ("ROS Load"). Also assume all capacity is purchased in the spot market.

UCAP Requirements by load

	J Locality	K Locality	GHIJ Locality	NYCA
Load (UCAP MW)	Requirement	Requirement	Requirement	Requirement
LI Load	none	5,172.75	none	6,061.00
NYC Load	9,067.75	none	9,614.00	12,673.00
GHI Load	none	none	836.00	1,102.00
ROS Load	none	none	none	16,530.00
Totals:	9,067.75	5,172.75	10,450.00	36,366.00

LI Load's Purchases Explained:

Li Load's Purchases Expl	<u>lained:</u>					
		How much				
		already			Price	Total = Purchased *
	Requirement	satisfied?	Remaining	Purchased	(\$/kW-	Price (in Millions of
Locality/NYCA	(MW)	(MW)	(MW)	(MW)	month)	\$)
K	5,172.75	0	5,173	5,173	\$ 10.00	\$ 51.73
J	none					
GHIJ	none					
NYCA	6,061	5,173	888	888	\$ 9.00	\$ 7.99
						\$ 59.72

NYC Load's Purchases Explained:

NYC Load's Purchases Ex	<u>piained:</u>					
		How much				
		already			Price	Total = Purchased *
	Requirement	satisfied?	Remaining	Purchased	(\$/kW-	Price (in Millions of
Locality/NYCA	(MW)	(MW)	(MW)	(MW)	month)	\$)
K	none					
J	9,068	0	9,068	9,068	\$ 19.00	\$ 172.29
GHIJ	9,614	9,068	546	546	\$ 14.00	\$ 7.65
NYCA	12,673	9,614	3,059	3,059	\$ 9.00	\$ 27.53
	•	•		•	•	\$ 207.47

GHI Load's Purchases Explained:

GHI LOAU S PUICHASES E.	xpiairieu.					
		How much already			Price	Total = Purchased *
	Requirement	,	Remaining			Price (in Millions of
Locality/NYCA	(MW)	(MW)	(MW)	(MW)	month)	\$)
K	none					
J	none					
GHIJ	836	-	836	836	\$ 14.00	\$ 11.70
NYCA	1,102	836	266	266	\$ 9.00	\$ 2.39
			-			\$ 14.10

ROS Load's Purchases Explained:

1100 Lodd 5 T di Cildoco Explained	<u>.</u>					
		How much already satisfied?	Remaining		Price (\$/kW-	Total = Purchased * Price (in Millions of
Locality/NYCA	(MW)	(MW)	(MW)	(MW)	month)	\$)
K	n/a	n/a	n/a	n/a		n/a
J	n/a	n/a	n/a	n/a		n/a
GHIJ	n/a	n/a	n/a	n/a		n/a
NYCA	16,530	-	16,530	16,530	\$ 9.00	\$ 148.77
	•		•		•	\$ 148.77

	<u>Total MW</u>		al Paid By d (in
Summary	<u>purchased</u>	Mill	ions)
K Load	6,061	\$	59.72
J Load	12,673	\$	207.47
GHI Load	1,102	\$	14.10
ROS Load	16,530	\$	148.77
	36,366	\$	430.06

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UCAP Clearing Examples

CASE 2: NYC Purchases 3% more than requirement

In this example the LSEs in Zone J purchase 3% more than the Zone J requirement. The excess over the Zone J requirement offsets the G-J Locality requirement for the Zone J LSE (for simplicity, we assume as single LSE in Zone J). Note that since Zone J clears more MW than the requirement, the clearing price is lower than in Case 1 (based on the slope of the Demand Curve). Changes from Case 1 are shown highlighted in blue.

<u>Assumptions</u>

1	Load Forecast	1 CD (1D14	FFOR!
Load Zone	(MW)	LCR/IRM	EFORd
LI	5,500	0.99	0.05
NYC	11,500	0.83	0.05
GHIJ	12,500	0.88	0.05
NYCA	33,000	1.16	0.05

	LI		NYC	:	GH	IJ	NY	CA
ICAP Reference Points (\$/kW								
month)	\$	10.00	\$	19.00	\$	14.00	\$	9.00
Slope (\$/MW)	\$	(0.0115)	\$	(0.0130)	\$	(0.0120)	\$	(0.0025)

How the Auction Solves (in UCAP MW)

	K Lo	K Locality J		cality	GHIJ Locality		NYCA	
	Req	uirement	Rec	quirement	Red	quirement	Red	quirement
Requirement (MW)		5,172.75		9,067.75		10,450.00		36,366.00
Amount to be purchased in								
the locality (MW)		5,172.75		9,339.78		1,110.22		20,743.25
Clearing Price (\$/kW-month)	\$	10.00	\$	15.46	\$	14.00	\$	9.00
Total Cost (price * UCAP MW)								
by Locality (Millions \$/								
Month)	\$	51.73	\$	144.43	\$	15.54	\$	186.69
Total (Millions \$/Month)	\$	398.39		•		•		•

Balance Sheets for each of the loads

Assume there is a single load in NYC ("NYC Load"), and single load in LI ("LI Load"), a single load in GHI ("GHI Load") and a single load in zones A through F ("ROS Load"). Also assume all capacity is purchased in the spot market.

UCAP Requirements by load

	J Locality	Locality K Locality		NYCA
Load (UCAP MW)	Requirement Requirement Requ		Requirement	Requirement
LI Load	none	5,172.75	none	6,061.00
NYC Load	9,067.75	none	9,614.00	12,673.00
GHI Load	none	none	836.00	1,102.00
ROS Load	none	none	none	16,530.00
Totals:	9,067.75	5,172.75	10,450.00	36,366.00

LI Load's Purchases Explained:

		How much				
		already			Price	Total = Purchased *
	Requirement	satisfied?	Remaining	Purchased	(\$/kW-	Price (in Millions of
Locality/NYCA	(MW)	(MW)	(MW)	(MW)	month)	\$)
K	5,172.75	0	5,173	5,173	\$ 10.00	\$ 51.73
J	none					
GHIJ	none					
NYCA	6,061	5,172.75	888.25	888.25	\$ 9.00	\$ 7.99
						\$ 59.72

NYC Load's Purchases Explained:

INTO LOGO 3 T UTCHOSES EXPIGITIES	<u></u>					
		How much				
		already			Price	Total = Purchased *
	Requirement	satisfied?	Remaining	Purchased	(\$/kW-	Price (in Millions of
Locality/NYCA	(MW)	(MW)	(MW)	(MW)	month)	\$)
K	none					
J	9,068	0.00	9067.75	9339.78	\$ 15.46	\$ 144.43
GHIJ	9,614	9339.78	274.22	274.22	\$ 14.00	\$ 3.84
NYCA	12,673	9614.00	3059.00	3059.00	\$ 9.00	\$ 27.53
						\$ 175.80

GHI Load's Purchases Explained:

Locality/NYCA	Requirement (MW)	How much already satisfied?	Remaining (MW)		Price (\$/kW- month)	Total = Purchased * Price (in Millions of \$)
K	none	,	,	,	,	
J	none					
GHIJ	836	-	836.00	836.00	\$ 14.00	\$ 11.70
NYCA	1,102	836.00	266.00	266.00	\$ 9.00	\$ 2.39
						\$ 14.10

ROS Load's Purchases Explained:

		How much				
		already			Price	Total = Purchased *
	Requirement	satisfied?	Remaining	Purchased	(\$/kW-	Price (in Millions of
Locality/NYCA	(MW)	(MW)	(MW)	(MW)	month)	\$)
K	none					
J	none					
GHIJ	none					
NYCA	16,530	-	16,530.00	16,530.00	\$ 9.00	\$ 148.77
						\$ 148.77

	Tatal BANA		Total Paid By		
Summary	<u>Total MW</u> purchased	Load (in Millions)			
K Load	6,061	\$	59.72		
J Load	12,673	\$	175.80		
GHI Load	1,102	\$	14.10		
ROS Load	16,530	\$	148.77		
	36,366	\$	398.39		

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CASE 3: NYC Purchases 7% more than requirement

In this example the LSEs in Zone J purchase 7% more than the requirement for Zone J. The excess over the Zone J requirement exceeds the G-J Locality requirement for the Zone J. That amount supplements the UCAP available for the G-J Locality requirement and in the cost allocation is identified in the example as a "STAR" (Spot Transfer Above Requirement) credit for the Zone J load. Note that since Zone J clears lower down the Demand Curve than in Case 2, the price is lower than in Case 2. Changes from Case 1 are shown highlighted in dark blue.

<u>Assumptions</u>

Load Zone	Load Forecast (MW)	LCR/IRM	EFORd
LI	5,500	0.99	0.05
NYC	11,500	0.83	0.05
GHIJ	12,500	0.88	0.05
NYCA	33,000	1.16	0.05

	LI		NYC	:	GH	IJ	NΥ	CA
ICAP Reference Points (\$/kW								
month)	\$	10.00	\$	19.00	\$	14.00	\$	9.00
Slope (\$/MW)	\$	(0.0115)	\$	(0.0130)	\$	(0.0120)	\$	(0.0025)

How the Auction Solves (in UCAP MW)

	K Lo	cality	J Lo	cality	GH	IJ Locality	NY	CA
	Req	uirement	Rec	uirement	Re	quirement	Red	quirement
Requirement (MW)		5,172.75		9,067.75		10,450.00		36,366.00
Amount to be purchased in								
the locality (MW)		5,172.75		9,702.49		747.51		20,743.25
Clearing Price (\$/kW-month)	\$	10.00	\$	14.00	\$	14.00	\$	9.00
Total Cost (price * UCAP MW)								
by Locality (Millions \$/								
Month)	\$	51.73	\$	135.83	\$	10.47	\$	186.69
Total (Millions \$/Month)	\$	384.72						

^{**}Note that J would have cleared lower than \$14 if it had not been part of GHIJ

Balance Sheets for each of the loads

Assume there is a single load in NYC ("NYC Load"), and single load in LI ("LI Load"), a single load in GHI ("GHI Load") and a single load in zones A through F ("ROS Load"). Also assume all capacity is purchased in the spot market.

UCAP Requirements by load

	K Locality	J Locality	GHIJ Locality	NYCA
Load (UCAP MW)	Requirement	Requirement	Requirement	Requirement
LI Load	5,172.75	none	none	6,061.00
NYC Load	none	9,067.75	9,614.00	12,673.00
GHI Load	none	none	836.00	1,102.00
ROS Load	none	none	none	16,530.00
Totals:	5,172.75	9,067.75	10,450.00	36,366.00

LI Load's Purchases Explained:

		How much				
		already				Total = Purchased *
	Requirement	satisfied?	Remaining	Purchased	Price (\$/kW-	Price (in Millions of
Locality/NYCA	(MW)	(MW)	(MW)	(MW)	month)	\$)
K	5,172.75	0.00	5172.75	5172.75	\$ 10.00	\$ 51.73
J	none					
GHIJ	none					
NYCA	6,061	5172.75	888.25	888.25	\$ 9.00	\$ 7.99
						\$ 59.72

NYC Load's Purchases Explained:

		How much			Spot Transfer			
		already			Above		Total = Pu	urchased *
	Requirement	satisfied?	Remaining	Purchased	Requirement		Price (in N	Millions of
Locality/NYCA	(MW)	(MW)	(MW)	(MW)	("STAR")	Price (\$/kW-month)	\$)	
K	none							
J	9,068	0	9,067.75	9,702.49		\$ 14.00	\$	135.83
GHIJ	9,614	9,614	none	none	88.49	\$ 14.00	\$	(1.24)
NYCA	12,673	9,614	3,059.00	3,059.00		\$ 9.00	\$	27.53
		_					\$	162.13

GHI Load's Purchases Explained

gni Lodu's Purchases Explained.								
		How much						
		already				Total = Purchased *		
	Requirement	satisfied?	Remaining	Purchased	Price (\$/kW-	Price (in Millions of		
Locality/NYCA	(MW)	(MW)	(MW)	(MW)	month)	\$)		
K	none							
J	none							
GHIJ	836	-	836.00	836.00	\$ 14.00	\$ 11.70		
NYCA	1,102	836.00	266.00	266.00	\$ 9.00	\$ 2.39		
						\$ 14.10		

ROS Load's Purchases Explained:

INOS LOGO S FOR CHASES L	-xpiairica.					
		How much				
		already				Total = Purchased
	Requirement	satisfied?	Remaining	Purchased	Price (\$/kW-	Price (in Millions
Locality/NYCA	(MW)	(MW)	(MW)	(MW)	month)	\$)
K	none					n/a
J	none					n/a
GHIJ	none					n/a
NYCA	16,530	-	16,530.00	16,530.00	\$ 9.00	\$ 148.
	<u> </u>	•	•	•	•	\$ 148.

		Total Paid By		
	<u>Total MW</u>	Load (in Millions)		
Summary	<u>purchased</u>			
K Load	6,061	\$	59.72	
J Load	12,673	\$	162.13	
GHI Load	1,102	\$	14.10	
ROS Load	16,530	\$	148.77	
	36,366	\$	384.72	

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