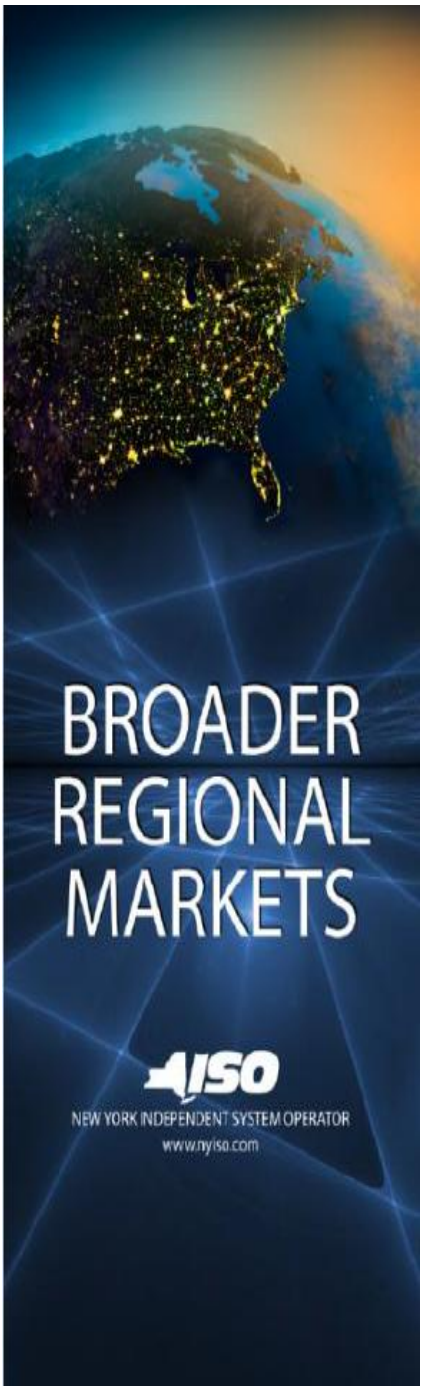


Broader Regional Market Metrics (CTS)

New York Independent System Operator

November 2016

Prepared by NYISO Operations Regional Market Coordination

November 2016 Broader Regional Markets Highlights (CTS)

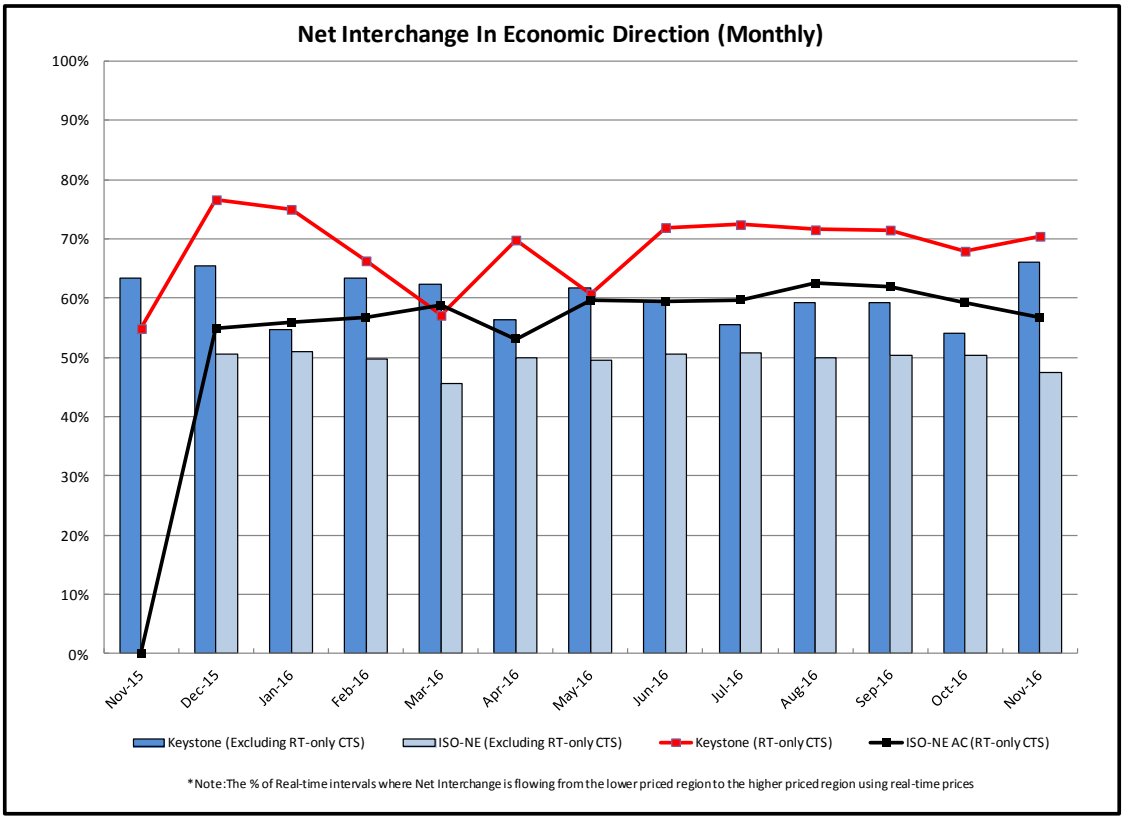
- PJM
  - At PJM Keystone, there was an average of 110 MWs[1] per hour of CTS offers and an average of 25 MWs per hour of CTS schedules.
  - Interchange at PJM Keystone associated with CTS transactions scheduled only in real-time flowed in the economic direction in 70.4% of the real-time intervals, as compared to all other interchange at the interface which flowed in the economic direction in 66.0% of the real-time intervals.

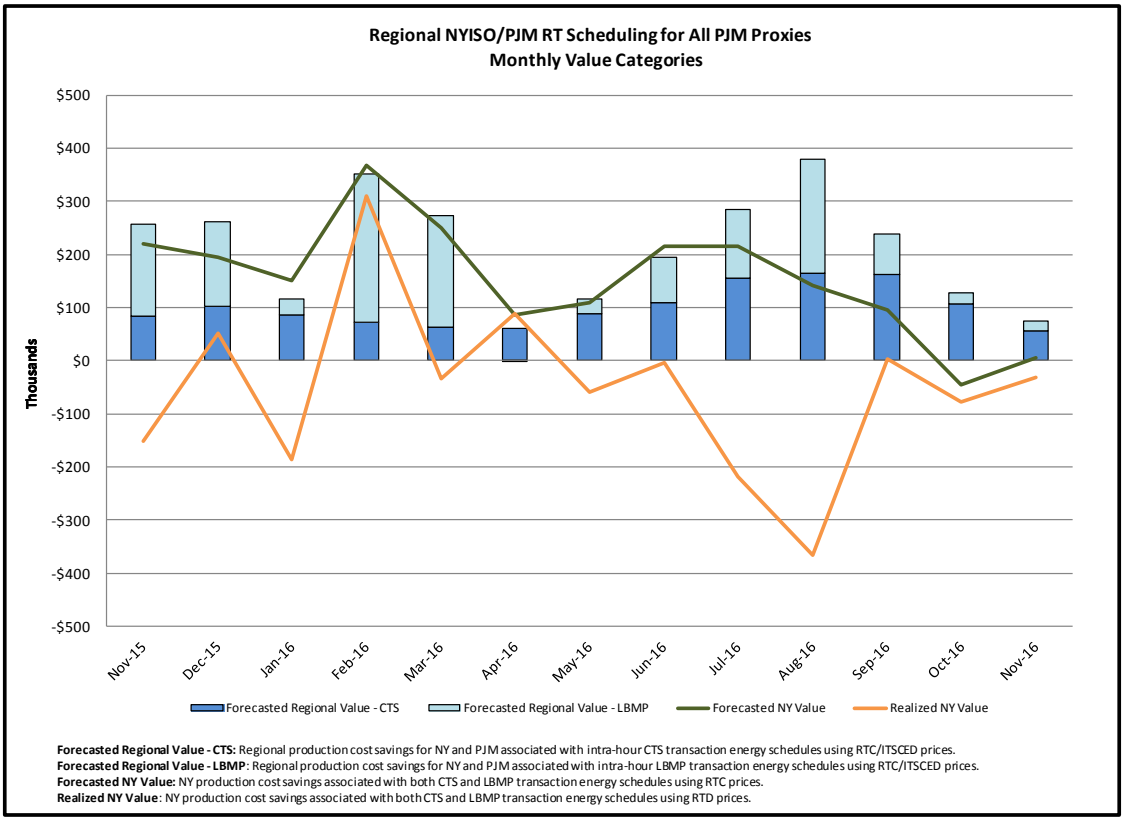
- ISO-NE
  - At NE Sandy Pond, there was an average of 1950 MWs[1] per hour of CTS offers, and an average of 930 MWs per hour of CTS schedules.
  - Interchange at NE Sandy Pond associated with CTS transactions scheduled only in real-time flowed in the economic direction in 56.7% of the real-time intervals, as compared to all other interchange which flowed in the economic direction in 47.4% of the real-time intervals.

Pricing Data[2]

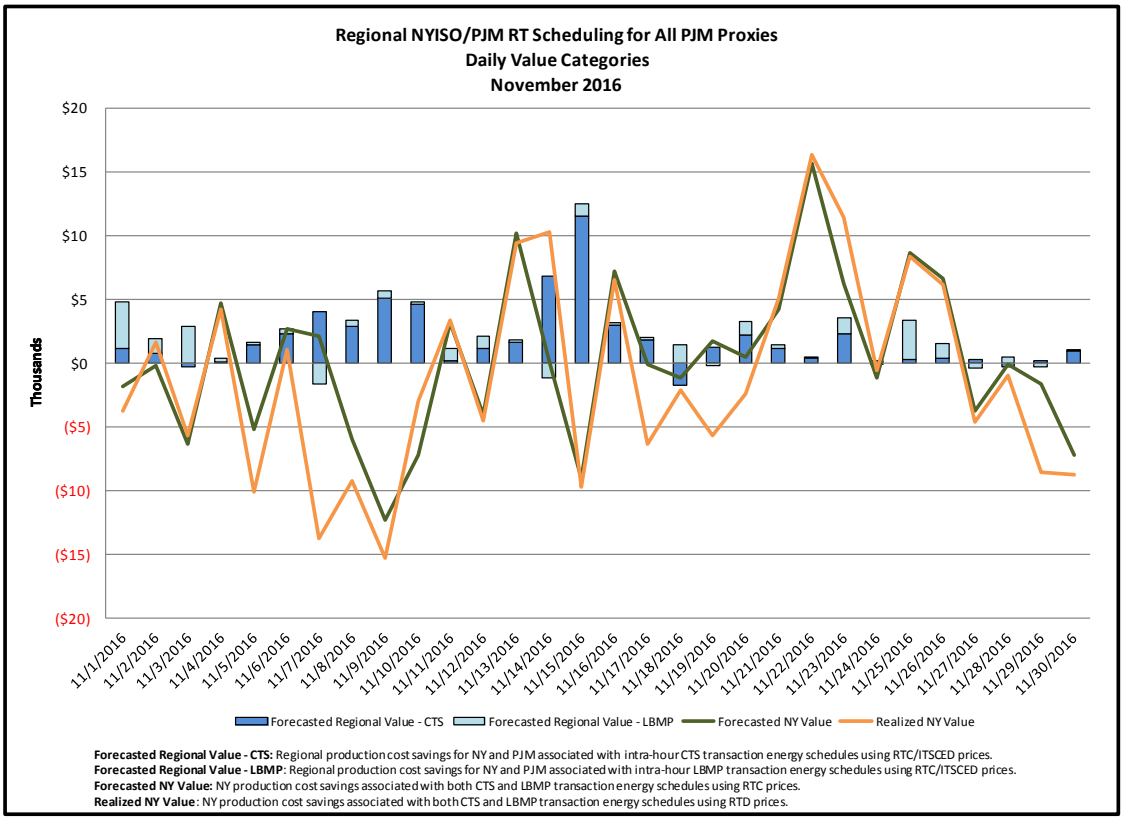
Interface	Max Forecasted Price Spread	Min Forecasted Price Spread	Forecasted Price Spreads minus Real-time Price Spreads					
			< $-20	$-20 to $-10	$-10 to $0	$0 to $10	$10 to $20	> $20
Keystone	$83.81	($136.33)	3.8%	5.8%	48.7%	36.0%	3.7%	2.0%
HTP	$99.94	($136.97)	4.4%	6.6%	47.4%	35.0%	4.5%	2.1%
NEPTUNE	$1,235.59	($134.07)	6.0%	7.0%	45.0%	32.8%	5.6%	3.7%
VFT	$58.17	($133.21)	5.4%	7.1%	49.1%	32.4%	4.1%	1.8%
Sandy Pond	$40.00	($102.46)	9.4%	9.0%	35.5%	37.4%	5.4%	3.3%

1. All MW Values include the absolute sum of both imports + exports. Wheels have been excluded.
2. "Forecasted Prices" refer to NYISO's RTC LBMP and RTO's LMP used in RTC. "Real-time Prices" refer to NYISO's RTD LBMP and RTO's Real-time LMP. Forecasted Prices are used during NYISO's RTC evaluation to schedule transactions. Real-time Prices are used to settle transactions. Price Spreads are always calculated as NYISO's LBMP minus RTO's LMP.

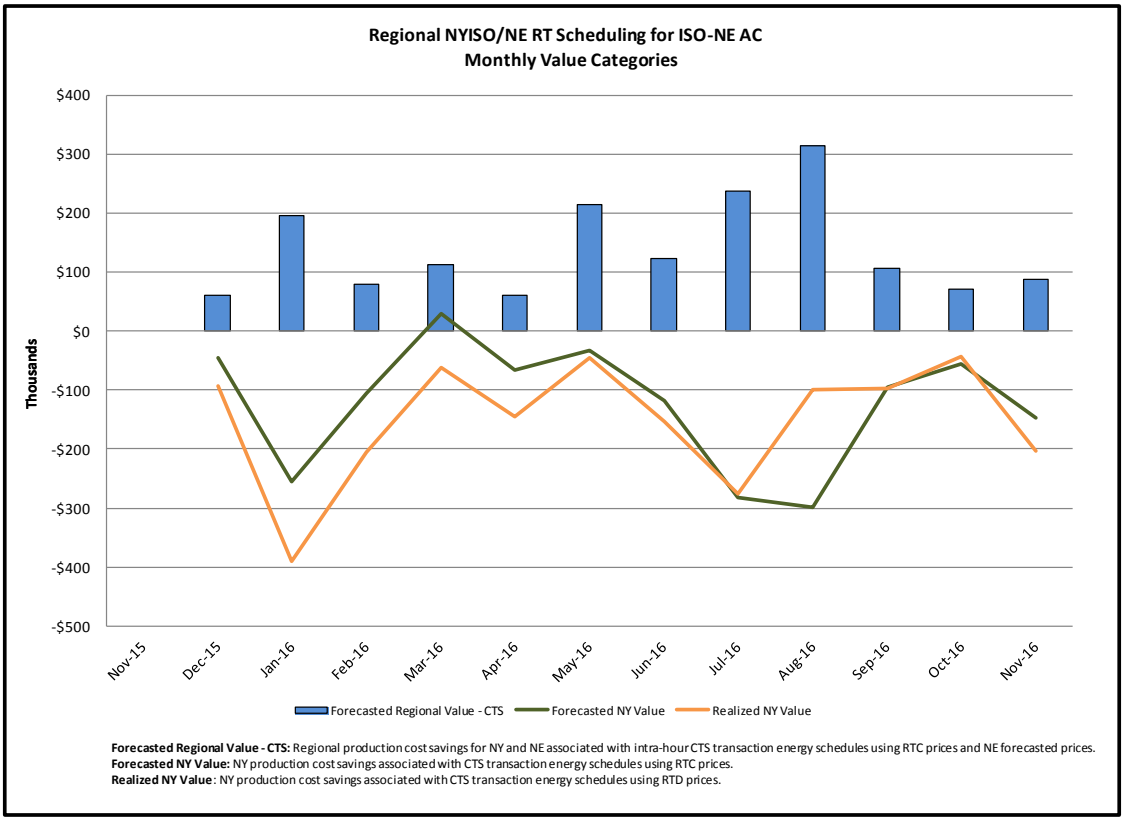

Net Interchange In Economic Direction (Monthly)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Keystone (Excluding RT-only CTS)
ISO-NE (Excluding RT-only CTS)
Keystone (RT-only CTS)
ISO-NE AC (RT-only CTS)
*Note:The % of Real-time intervals where Net Interchange is flowing from the lower priced region to the higher priced region using real-time prices



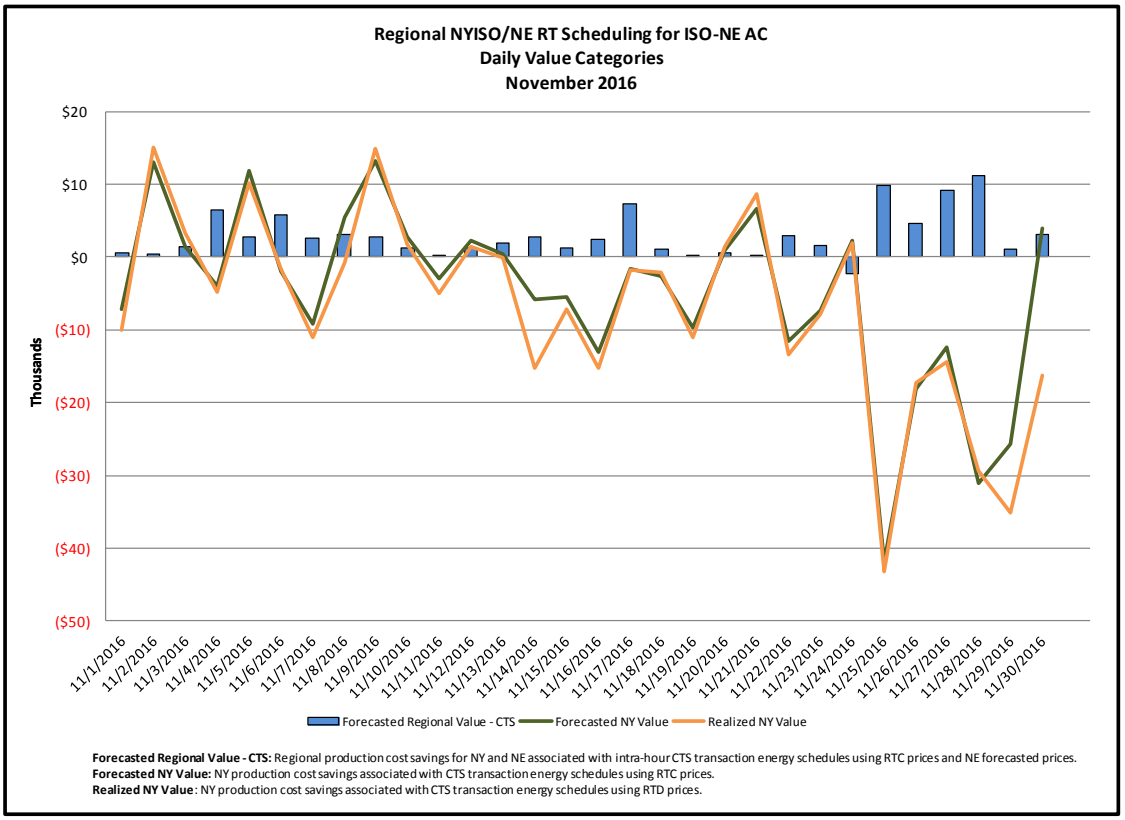
Forecasted Regional Value - CTS: Regional production cost savings for NY and PJM associated with intra-hour CTS transaction energy schedules using RTC/ITSCED prices.
Forecasted Regional Value - LBMP: Regional production cost savings for NY and PJM associated with intra-hour LBMP transaction energy schedules using RTC/ITSCED prices.
Forecasted NY Value: NY production cost savings associated with both CTS and LBMP transaction energy schedules using RTC prices.
Realized NY Value: NY production cost savings associated with both CTS and LBMP transaction energy schedules using RTD prices.



Forecasted Regional Value - CTS: Regional production cost savings for NY and PJM associated with intra-hour CTS transaction energy schedules using RTC/ITSCED prices.
Forecasted Regional Value - LBMP: Regional production cost savings for NY and PJM associated with intra-hour LBMP transaction energy schedules using RTC/ITSCED prices.
Forecasted NY Value: NY production cost savings associated with both CTS and LBMP transaction energy schedules using RTC prices.
Realized NY Value: NY production cost savings associated with both CTS and LBMP transaction energy schedules using RTD prices.



Forecasted Regional Value - CTS: Regional production cost savings for NY and NE associated with intra-hour CTS transaction energy schedules using RTC prices and NE forecasted prices.
Forecasted NY Value: NY production cost savings associated with CTS transaction energy schedules using RTC prices.
Realized NY Value: NY production cost savings associated with CTS transaction energy schedules using RTD prices.

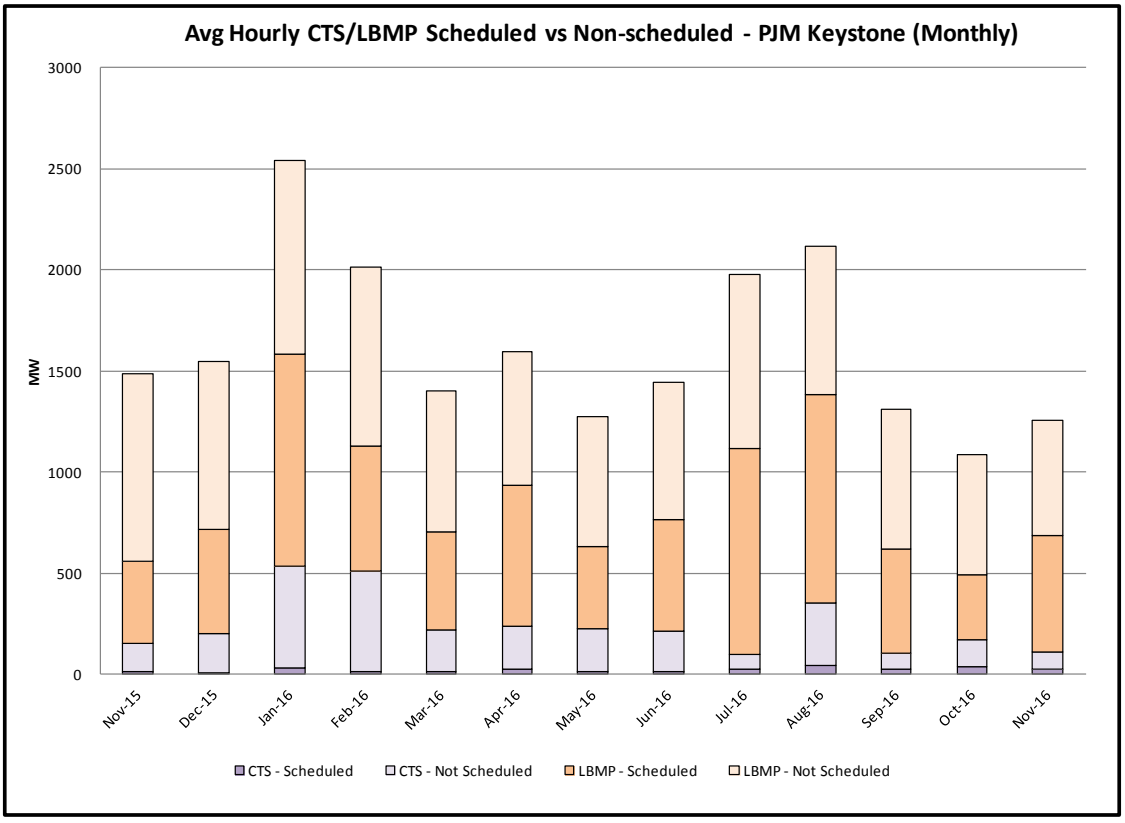


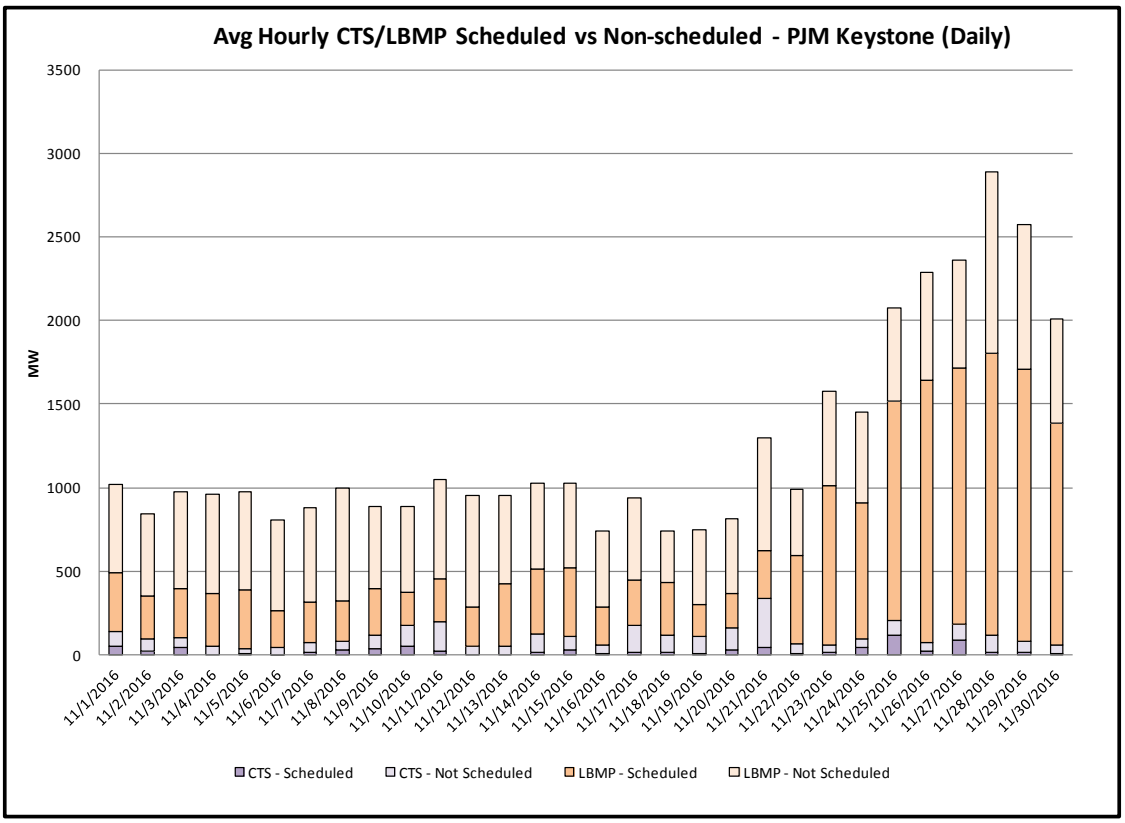
Forecasted Regional Value - CTS: Regional production cost savings for NY and NE associated with intra-hour CTS transaction energy schedules using RTC prices and NE forecasted prices.
Forecasted NY Value: NY production cost savings associated with CTS transaction energy schedules using RTC prices.
Realized NY Value: NY production cost savings associated with CTS transaction energy schedules using RTD prices.

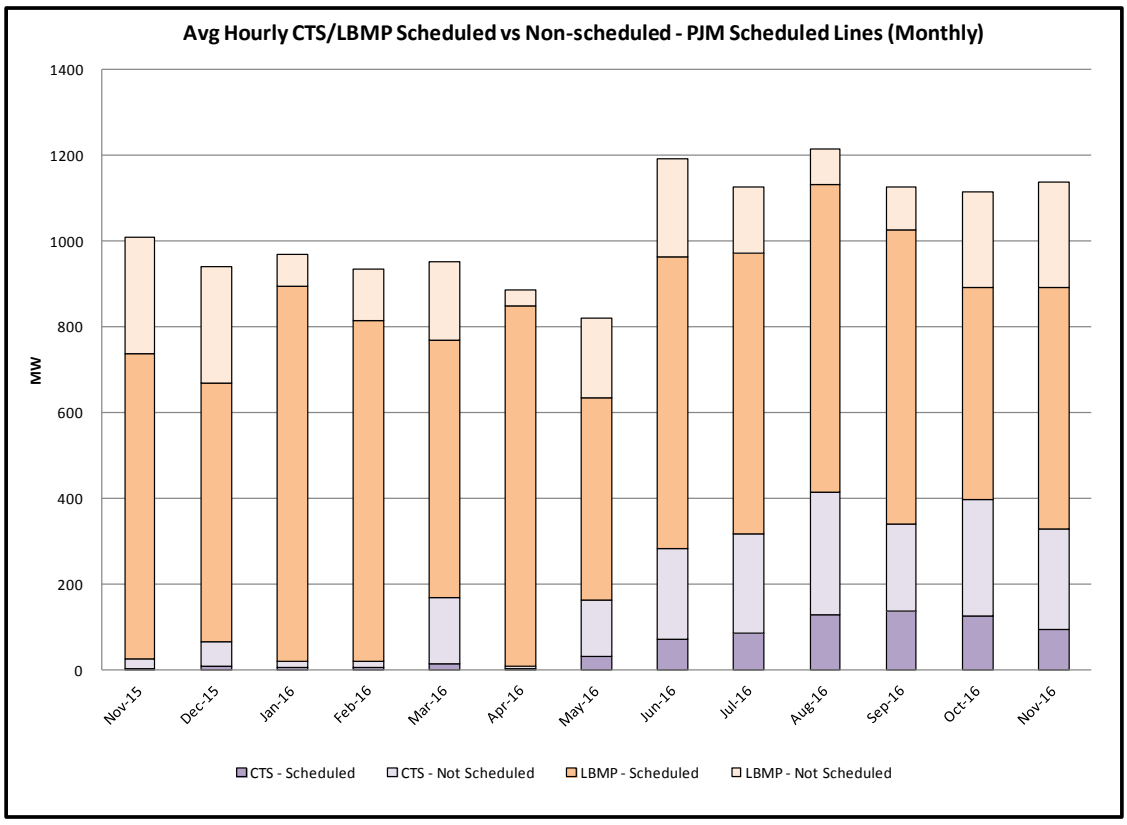
Regional NYISO RT Scheduling

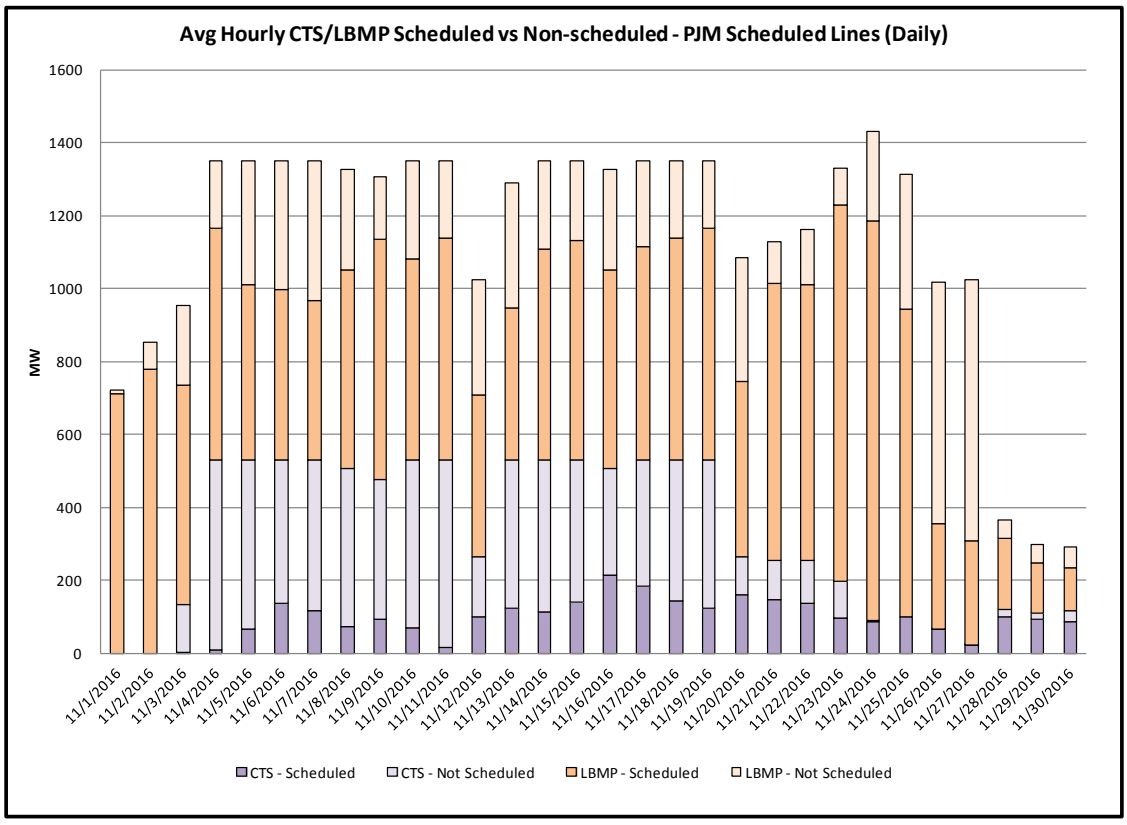
Category	***Description***
Forecasted Regional Value - CTS	Forecasted regional production cost savings from the intra-hour (non-TOH) energy schedule changes[1] on CTS bids (Intra-hour CTS Schedule Changes * [NY RTC LBMP – PJM or ISO-NE's Forecasted LMP]).
Forecasted Regional Value - LBMP	Forecasted regional production cost savings from the intra-hour (non-TOH) energy schedule changes[1] on LBMP bids (Intra-hour LBMP Schedule Changes * [NY RTC LBMP - PJM or ISO-NE's Forecasted LMP]).
Forecasted NY Value	Forecasted NY production cost savings from the intra-hour (non-TOH) energy schedule changes[1] on CTS and LBMP bids (Total Intra-hour CTS & LBMP Schedule Changes * NY RTC LBMP).
Realized NY Value	Realized NY production cost savings from the intra-hour (non-TOH) energy schedule changes[1] on CTS and LBMP bids (Total Intra-hour CTS & LBMP Schedule Changes * NY RTD LBMP).

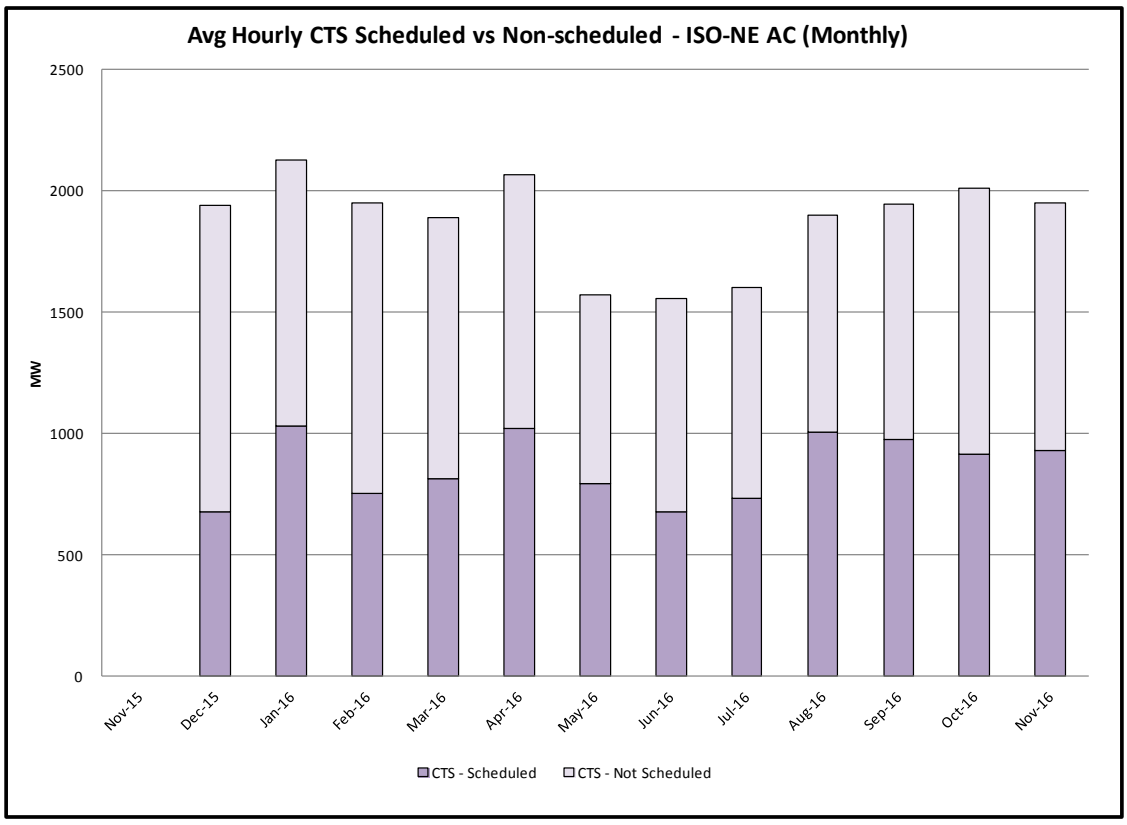
[1] Note: Schedule changes associated with manual Operator actions such as curtailments and/or transaction derates, and that have a significant impact (either positive or negative) to the above metrics, are generally excluded.

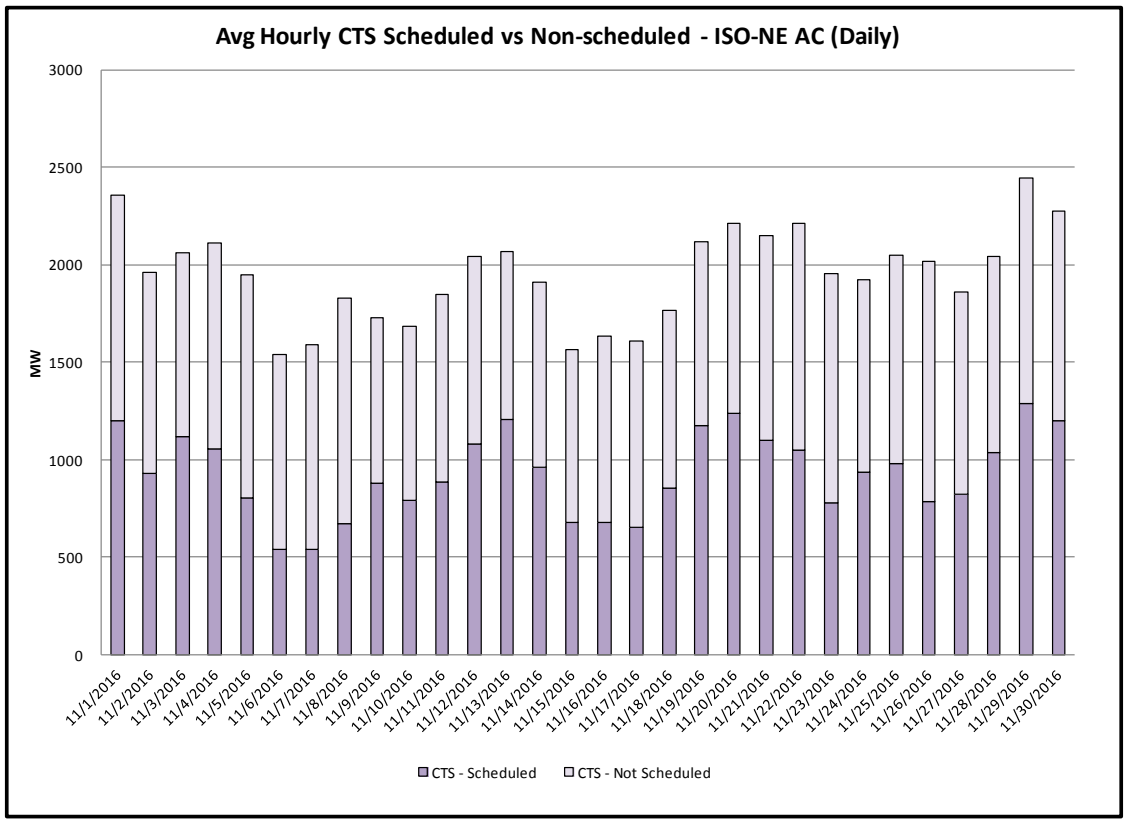

Avg Hourly CTS/LBMP Scheduled vs Non-scheduled - PJM Keystone (Monthly)
MW
3000
2500
2000
1500
1000
500
0
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
CTS - Scheduled
CTS - Not Scheduled
LBMP - Scheduled
LBMP - Not Scheduled

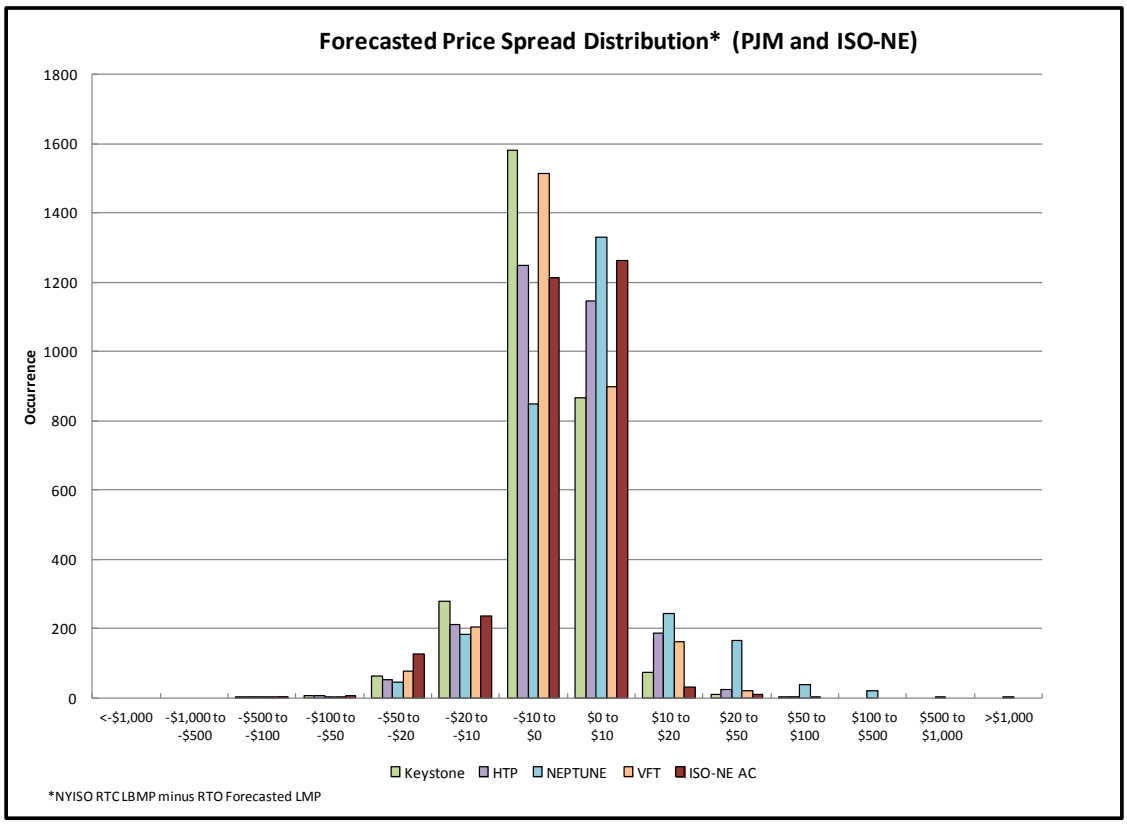

Avg Hourly CTS/LBMP Scheduled vs Non-scheduled - PJM Keystone (Daily)
MW
3500
3000
2500
2000
1500
1000
500
0
11/1/2016
11/2/2016
11/3/2016
11/4/2016
11/5/2016
11/6/2016
11/7/2016
11/8/2016
11/9/2016
11/10/2016
11/11/2016
11/12/2016
11/13/2016
11/14/2016
11/15/2016
11/16/2016
11/17/2016
11/18/2016
11/19/2016
11/20/2016
11/21/2016
11/22/2016
11/23/2016
11/24/2016
11/25/2016
11/26/2016
11/27/2016
11/28/2016
11/29/2016
11/30/2016
CTS - Scheduled
CTS - Not Scheduled
LBMP - Scheduled
LBMP - Not Scheduled

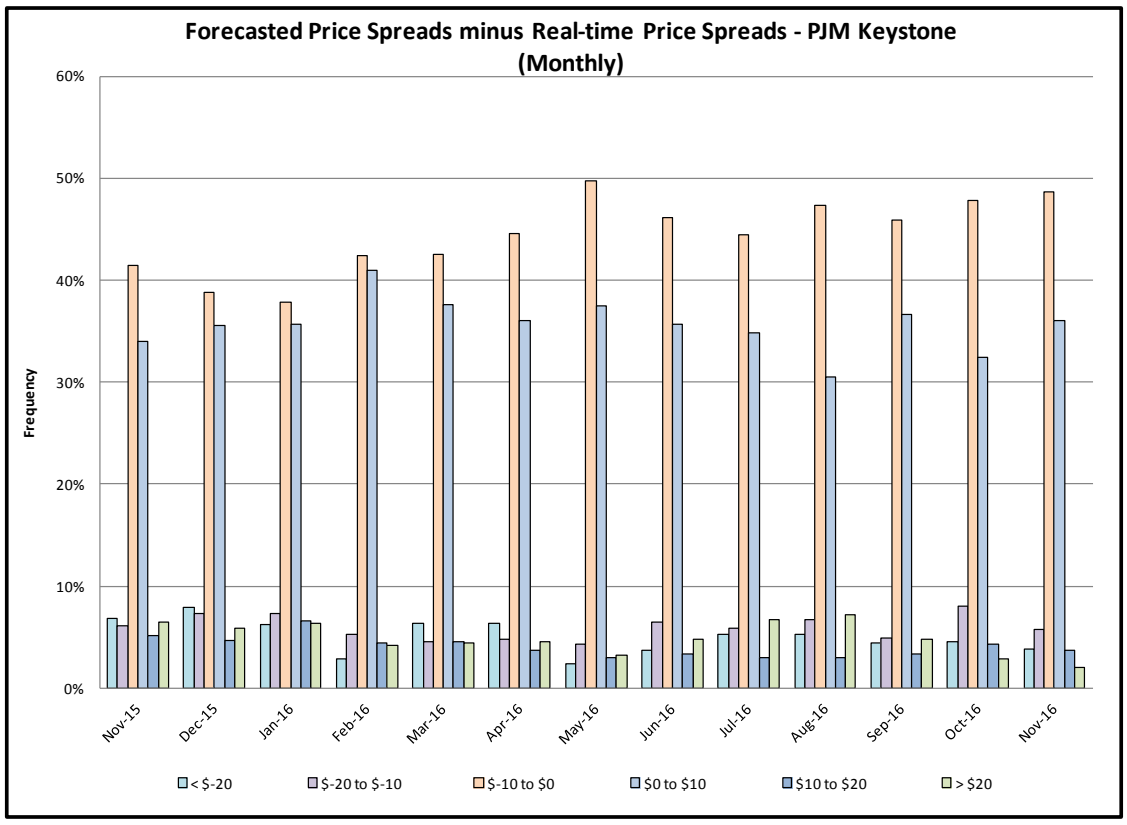

Avg Hourly CTS/LBMP Scheduled vs Non-scheduled - PJM Scheduled Lines (Monthly)
MW
1400
1200
1000
800
600
400
200
0
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
CTS - Scheduled
CTS - Not Scheduled
LBMP - Scheduled
LBMP - Not Scheduled

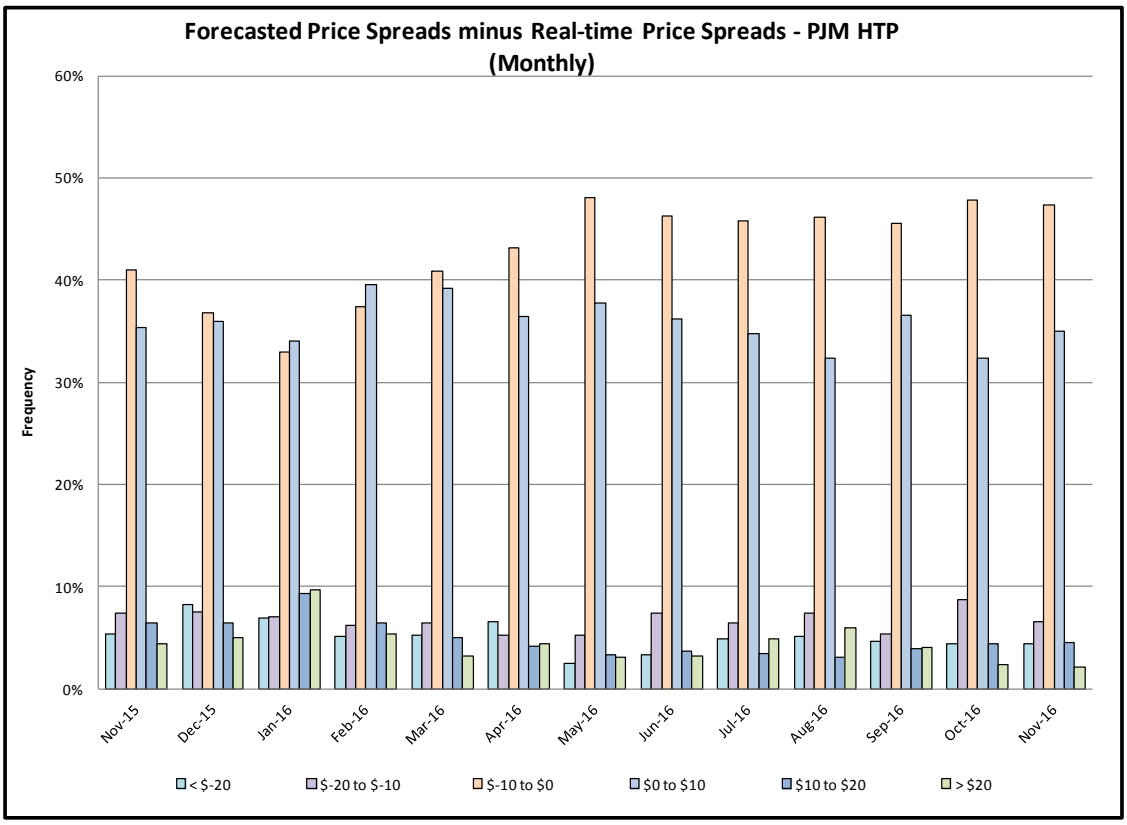

Avg Hourly CTS/LBMP Scheduled vs Non-scheduled - PJM Scheduled Lines (Daily)
MW
1600
1400
1200
1000
800
600
400
200
0
11/1/2016
11/2/2016
11/3/2016
11/4/2016
11/5/2016
11/6/2016
11/7/2016
11/8/2016
11/9/2016
11/10/2016
11/11/2016
11/12/2016
11/13/2016
11/14/2016
11/15/2016
11/16/2016
11/17/2016
11/18/2016
11/19/2016
11/20/2016
11/21/2016
11/22/2016
11/23/2016
11/24/2016
11/25/2016
11/26/2016
11/27/2016
11/28/2016
11/29/2016
11/30/2016
CTS - Scheduled
CTS - Not Scheduled
LBMP - Scheduled
LBMP - Not Scheduled

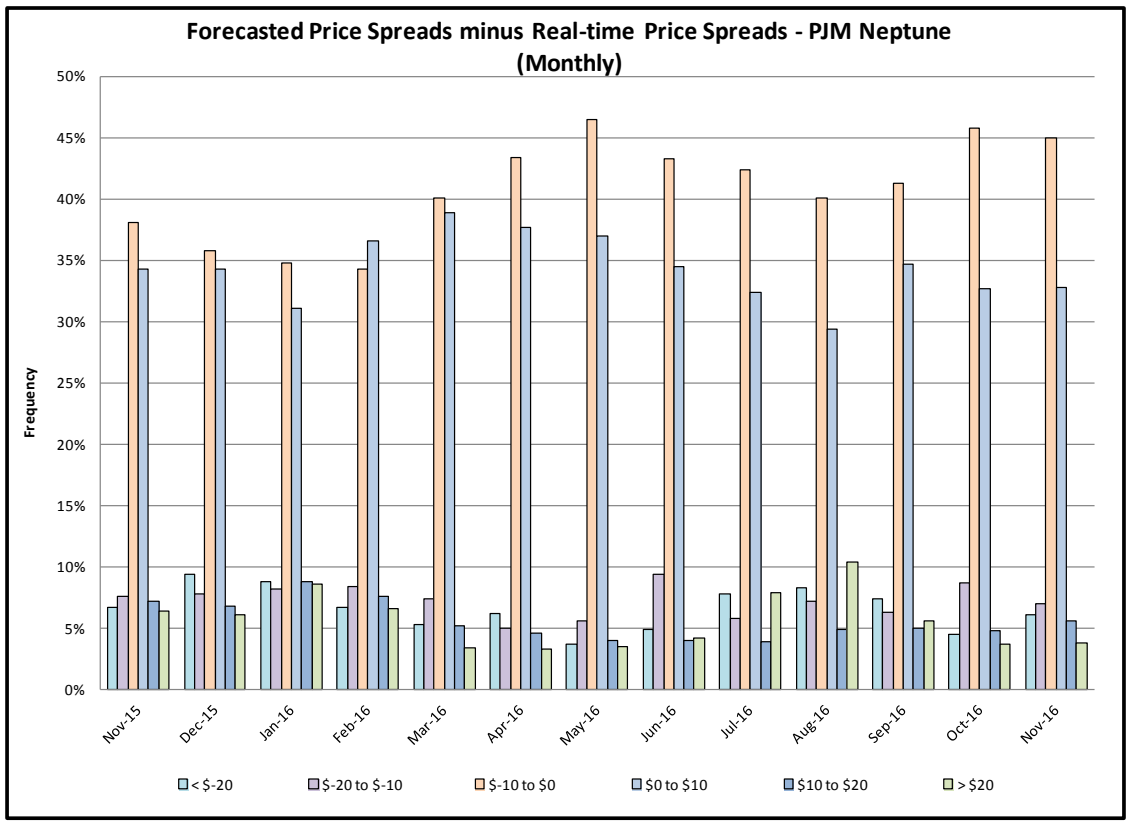

Avg Hourly CTS Scheduled vs Non-scheduled - ISO-NE AC (Monthly)
MW
2500
2000
1500
1000
500
0
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
CTS - Scheduled
CTS - Not Scheduled

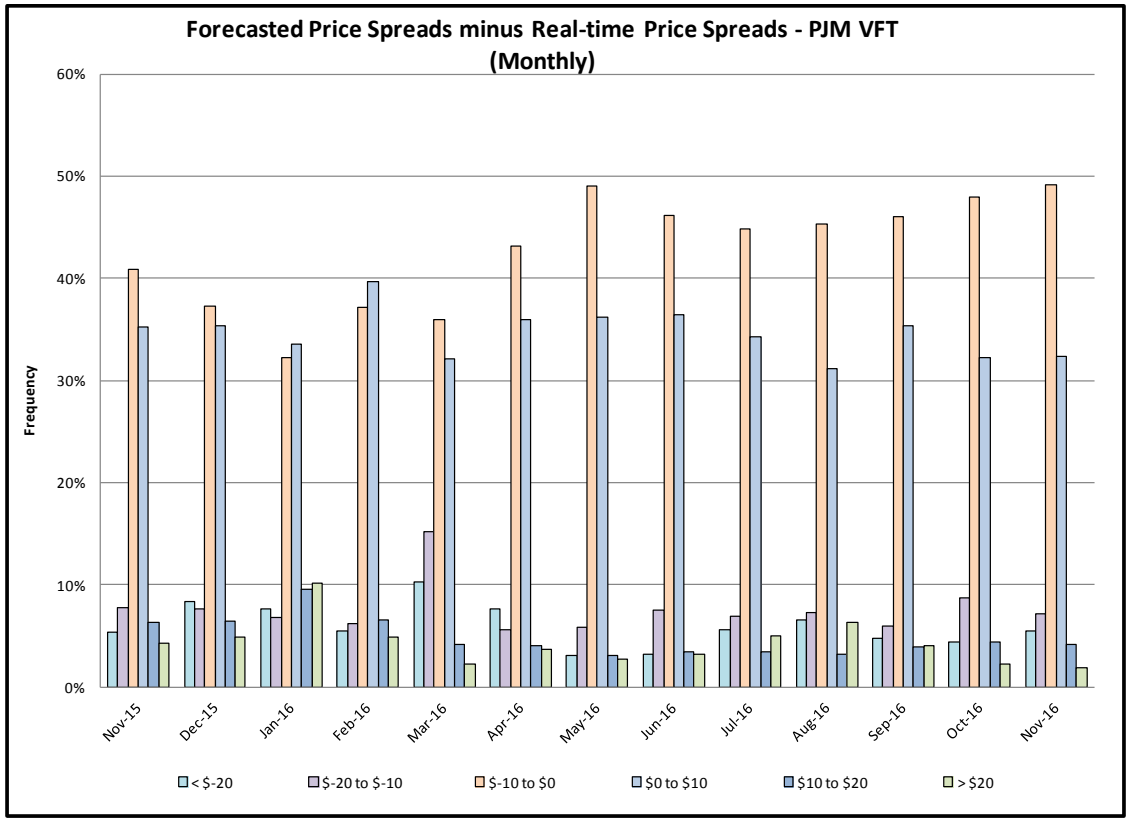

Avg Hourly CTS Scheduled vs Non-scheduled - ISO-NE AC (Daily)
MW
3000
2500
2000
1500
1000
500
0
11/1/2016
11/2/2016
11/3/2016
11/4/2016
11/5/2016
11/6/2016
11/7/2016
11/8/2016
11/9/2016
11/10/2016
11/11/2016
11/12/2016
11/13/2016
11/14/2016
11/15/2016
11/16/2016
11/17/2016
11/18/2016
11/19/2016
11/20/2016
11/21/2016
11/22/2016
11/23/2016
11/24/2016
11/25/2016
11/26/2016
11/27/2016
11/28/2016
11/29/2016
11/30/2016
CTS - Scheduled
CTS - Not Scheduled

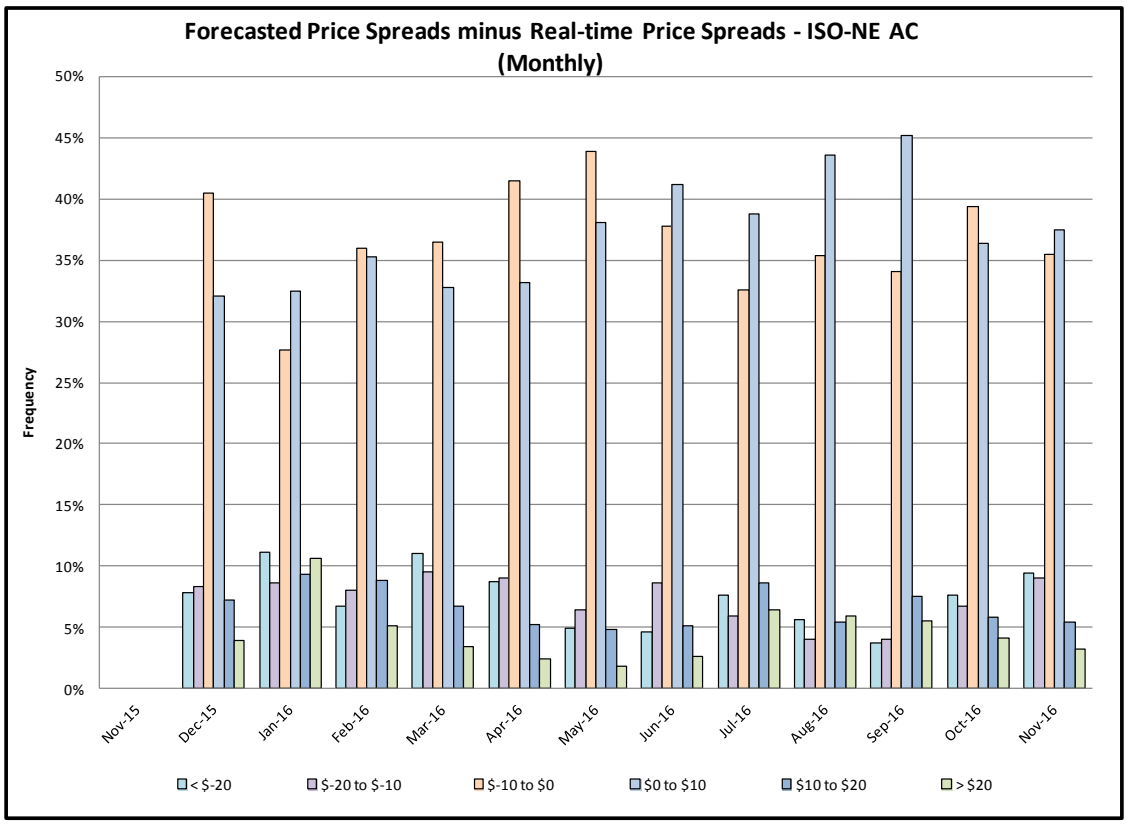

Forecasted Price Spread Distribution* (PJM and ISO-NE)
Occurrence
1800
1600
1400
1200
1000
800
600
400
200
0
<-$1,000
-$1,000 to -$500
-$500 to -$100
-$100 to -$50
-$50 to -$20
-$20 to -$10
-$10 to $0
$0 to $10
$10 to $20
$20 to $50
$50 to $100
$100 to $500
$500 to $1,000
>$1,000
Keystone
HTP
NEPTUNE
VFT
ISO-NE AC
*NYISO RTC LBMP minus RTO Forecasted LMP


Forecasted Price Spreads minus Real-time Price Spreads - PJM Keystone
(Monthly)
60%
50%
40%
30%
20%
10%
0%
Frequency
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
< $-20
$-20 to $-10
$-10 to $0
$0 to $10
$10 to $20
> $20


Forecasted Price Spreads minus Real-time Price Spreads - PJM HTP
(Monthly)
60%
50%
40%
30%
20%
10%
0%
Frequency
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
< $-20
$-20 to $-10
$-10 to $0
$0 to $10
$10 to $20
> $20


Forecasted Price Spreads minus Real-time Price Spreads - PJM Neptune
(Monthly)
Frequency
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
< $-20
$-20 to $-10
$-10 to $0
$0 to $10
$10 to $20
> $20


Forecasted Price Spreads minus Real-time Price Spreads - PJM VFT
(Monthly)
Frequency
60%
50%
40%
30%
20%
10%
0%
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
< $-20
$-20 to $-10
$-10 to $0
$0 to $10
$10 to $20
> $20


Forecasted Price Spreads minus Real-time Price Spreads - ISO-NE AC
(Monthly)
Frequency
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
< $-20
$-20 to $-10
$-10 to $0
$0 to $10
$10 to $20
> $20