

Fuel Assurance Initiative: Fuel and Performance Incentives *Critical Operating Day Incentives*

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December 18, 2014

Krey Control Center, Rensselaer

Reposted with corrections in
BLUE on pages 11, 18-20, 22-23.

Today

- ◆ **Today's meeting continues the overview of potential ICAP market changes to create additional incentives for ICAP resource performance on Critical Operating Days. It refines the Critical Operating Day criteria, addresses some of the questions and comments from the last meeting and provides some numerical examples.**
- ◆ **As indicated in the last presentation, this is a design concept that the NYISO thinks is promising and we are open to feedback from stakeholders on any aspect of the proposal including alternate constructs. The NYISO also continues to explore alternate construct to the EFORd baseline.**

Fuel Assurance

- ◆ **NYISO needs mechanisms that provide incentives for generation to be available to reliably meet the real-time needs of the NYCA - especially on days when there is a high risk of a reduction in real-time resource availability due to factors including high demand from neighboring Control Areas and fuel supply uncertainty.**

Fuel Assurance

- ◆ **Why the NYISO does not need to make costly changes to its Market Structure for Fuel Assurance:**
 - *New York faces a different problem than ISO NE and PJM face, including different reliability needs.*
 - *The NYISO already has in place capabilities in its energy and capacity markets that are important to fuel assurance.*
 - *The NYISO also faces structural differences from PJM and ISO NE.*

Reasons why the NYISO does not need to make costly changes to its Market Structure for Fuel Assurance: Market Features

- *Ability for a supplier to offer unique hourly bids (DAM and RT) so units can reflect changing costs.*
- *Integration of DARU and Reliability Units in the Day Ahead Market, so these units receive day-ahead market schedules in time to buy and schedule gas.*
- *Ability to increase hourly bids in real-time to reflect the supplier's expectation of fuel costs and manage the consumption of gas over the day.*
- *Earliest Day-Ahead Market posting time: 930AM – two and half hours before the next day gas nomination period ends and a reliability commitment that is completed at the same time, allowing resources committed in the forecast load pass to buy and schedule gas.*

Reasons why the NYISO does not need to make costly changes to its Market Structure for Fuel Assurance: Market Features

- *Hybrid, offline GT and Shortage pricing: signals when short of reserve, regulation, or transmission to incentivize resources to procure fuel necessary to meet their schedule obligations and reflect critical operating conditions.*
- *Monthly capacity market spot auctions, rather than an annual procurement period, allows a resource to offer supply in the winter and summer months based on the resource's actual availability during that time of year.*

Reasons Why the NYISO does not need to make costly changes to its Market Structure for Fuel Assurance: Structural Differences

- **NY has different reliability needs which have led to NYC and LI dual fuel requirements.**
- **ISO NE has inadequate natural gas pipelines- located at the end of the pipelines, they have less access to natural gas.**
- **PJM and ISO NE have fewer dual fuel units – A substantial proportion of NY’s gas fired resources have access to an alternate fuel.**
- **Not all PJM or New England states have competitive gas markets. In some states, gas is allocated by the LDC based on curtailment rules, rather than willingness to pay, reducing the gas supply available to gas fired generation on gas LDC systems.**
- **PJM is looking at significant coal retirements based in part on the Mercury and Air Toxics Standards (MATS) and Regional Haze programs.**

Looking to the Future

- ◆ **This measure is looking to the future when the operating conditions may be tighter, due to greater reliance on natural gas in the region or for other reasons. The NYISO wants to establish the incentives that will help us maintain reliability going forward.**
- ◆ **The NYISO has been reviewing shortage pricing (and scarcity pricing) because real-time price signals are the most effective way to reliably meet real-time operating conditions.**
- ◆ **The NYISO capacity market currently compensates capacity resources based on performance expectations; however, the NYISO believes that there is value in additional short run incentives to supplement real-time prices.**

Fuel Assurance Initiative

- ◆ **Multiple components:**
 - *Energy & Ancillary Service Market Changes,*
 - *Capacity Market Changes.*
- ◆ **Multi-phase with implementation over the next several years.**

Fuel Assurance Initiative: *Fuel and Performance Incentives*

Incent
Intra-day
Operational
Flexibility

Promote
Increased
Resource
Availability
and
Performance

The NYISO's Efforts

Capacity Market

- *Ways to better incent and reflect performance*
- *Possible separate Summer/Winter EFORD*

Energy Market

- *Comprehensive Shortage Pricing*
- *Comprehensive Scarcity Pricing*
- *RLS Changes*

Gas-Electric Coordination

- *EMS Visualization of Gas System*
- *Gas Operational Information Sharing*
- *Fuel Availability Self Reporting project*

Performance Incentive

◆ Objective:

- *To provide more incentive for units scheduled in the DAM (Energy and/or reserves) or via timely SRE (or in a Forced Outage at DAM close) to be available on Critical Operating Days.*
 - Timely SREs are when the units can still reasonably purchase/schedule gas.
- *Do not want to dis-incent units from offering in real-time.*

◆ Why a Performance Incentive?

- *Increases incentive for units the NYISO is relying on (i.e., scheduled in the DAM or via SRE) to operate on Critical Operating Days. This increases resource availability during tight operational periods.*

Critical Operating Days

- ◆ The NYISO will be instituting Critical Operating Day notices:
 - *Can be called with two days notice, one day notice or in real-time.*
- ◆ The criteria have been updated
 - *Removed the use of the external area forecast*
 - *Combined two other criteria*
- ◆ Two day notice: On a best efforts basis, the NYISO will declare a Critical Operating Day by 17:00 two days prior to the operating day based on forecasted conditions.
 - *Conditions to declare a Critical Operating Day include:*
 - Load forecasts of greater than 30,000MW (without losses) for any hour of the day in the Summer Capability Period (May 1-October 31). The source of the load forecast used will be the posted load forecast on NYISO.com.
 - Load forecasts of greater than 23,000MW (without losses) for any hour of the day in the Winter Capability Period (November 1-April 30). The source of the load forecast used will be the posted load forecast on NYISO.com.
 - NYISO forecasting the inability to meet load or reserve requirements on a system wide or locational basis
 - Forecast of insufficient generation availability to meet transmission security (SENY N-1-1 as an example).

Critical Operating Days

- ◆ **One day notice, DAM post to real-time: On a best efforts basis, the NYISO will declare a Critical Operating Day by noon on the day prior to the operating day, based on forecasted conditions.**
 - ***Conditions to declare a Critical Operating Day, if not already called on a two day ahead basis, include:***
 - **Load forecasts of greater than 31,200MW (including losses) for any hour of the day in the Summer Capability Period (May 1-October 31). The source of the load forecast will be the best available load forecast for the next operating day.**
 - **Load forecasts of greater than 24,200MWs (including losses) for any hour of the day in the Winter Capability Period (November 1-April 30). The source of the load forecast will be the best available load forecast for the next operating day.**
 - **NYISO forecasting the inability to meet load or reserve requirements on a system wide or locational basis.**
 - **Insufficient generation availability to meet transmission security (SENY N-1-1 as an example).**
 - **Issuing a Day Ahead Advisory for SCR/EDRP.**

Critical Operating Day Data

- ◆ At the last presentation there was a request for information on what days would have been declared Critical Operating Days had the criteria existed in 2012-2014
- ◆ Day Ahead and 2 Day Ahead forecasts from January 3, 2012 through October 28, 2014:
 - *In the Winter Capability period the two day Day Ahead forecast thresholds would have been met 9 times in 2014 (January 3, 7, 8, 22, 23, 24, 27, 28, 29), 8 times in 2013 (January 23, 24, 25 and December 12, 13, 16, 17, 18) and not at all in 2012. The Day Ahead criteria or any other would not have caused any additional days to be declared Critical Operating Days.*
 - *In the Summer Capability period the two day Day Ahead forecasts thresholds would have been met 4 times in 2012 (June 21, July 16, 17, 18), 5 times in 2013 (July 10, 15, 16, 17, 18) and 0 times in 2014. The Day Ahead criteria would have triggered the notice on June 20th 2012. The SCR Criteria would have also indicated June 22nd was a Critical Operating Day.*

How it works

- ◆ Use the GADS/EFORd/availability calculation for Critical Operating Days (PI EFORd) and compare that performance to a baseline.
 - *If the unit*, using this metric, under-performs relative to the baseline, the unit gets a charge,*
 - *If the unit*, using this metric, over-performs relative to the baseline, it is eligible to receive a payment.*
 - *If the unit*, using this metric, performs exactly at its baseline level, the unit does not get a charge or a payment.*
- ◆ The revenue collected from charges will be used to fund the payments.
- ◆ If insufficient revenue to pay the over-performers is collected from under-performers, the collected revenue is distributed *pro rata* to over-performers.

*More than one unit at the same PTID can continue to be aggregated for purposes of GADS/EFORd and for the performance incentive.

How it works

- ◆ In other words, the charges from units underperforming relative to their baseline will fund the payments to units over performing relative to their baseline.
- ◆ The charges and payments will be assessed on a monthly basis.
- ◆ Charges and payments will be calculated based on Capacity Zone prices.
- ◆ If more is collected in charges in a month than is paid out, the excess will be included with the next months charges to fund payments to units over performing.
- ◆ There will be no additional *direct* charges to loads from this Performance Incentive.

Performance Incentive

- ◆ Units will be included in the Performance Incentive if:
 1. The unit is DAM scheduled for Energy or Reserves, or the unit has been timely SREd (prior to noon on the day prior to the operating day), or the unit is in a Forced Outage at the time of the DAM close, and
 2. A Critical Operating Day has been noticed prior to noon on the day prior to the operating day.
- ◆ Includes units “in a Forced Outage at the time of the DAM close” because those units are not evaluated by the DAM and because this might create an incentive to declare a forced outage to avoid being subject to the Performance Incentive.
- ◆ Proposing that “noon on the day prior to the operating day” be the bright line cut off for participation in the Performance Incentive.

Performance Incentive

- ◆ The Performance Incentive for a unit is calculated using the same rules as the Baseline EFORd but only on the days where the unit is subject to the Performance Incentive.
- ◆ The Performance Incentive is assessed on a monthly basis and is scaled so that a single Critical Operating Day of forced outage does not account for more than 20% of monthly ICAP revenue. If there are 5 or more Critical Operating Days the maximum charge is the monthly ICAP revenue.
- ◆ What does this mean for capacity market revenues?
 - *If there are no Critical Operating Days, capacity market revenue will be based on the long term performance (AEFORd) (no change from current practice).*
 - *If there are five or more Critical Operating Days in a month, then capacity market revenue will depend only on the performance on Critical Operating Days in that month.*
 - *If there are fewer than 5 operating days capacity compensation will be a blend of their performance in the month and their longer term performance (AEFORd).*

Example 1- Base under-performing example

- ◆ Unit A 100MW unit has an AEFORd=0.1 and a summer baseline EFORd=0.1
- ◆ The ICAP Market Clearing Price for the area that includes the unit (i.e., the Locality or NYCA clearing price) is \$6/kW-Month (i.e., \$6000/MW-Month).
 - *Unit A received a monthly ICAP market payment of $100 * (1-0.1) * 6000 = \$540,000$ and their UCAP is $100 * (1-0.1) = 90\text{MW}$*
- ◆ In the month of July, there were 6 “two day ahead” called Critical Operating Days. (i.e., scaling factor=1)
- ◆ Unit A had a DAM schedule on all 6 Critical Operating Days
- ◆ Unit A has a PI EFORd=0.2 for those 6 Critical Operating Days.
- ◆ Unit A receives a charge of:
 - *[Baseline EFORd- PI EFORd]* MW ICAP* Zonal UCAP Price*Scaling Factor= charge (if negative, and credit if positive)*
 - *[0.1-0.2]* 100*6000*1= -60,000 → A \$60,000 charge.*
 - *This means that their total Capacity payments are: [Auction Revenue]-[Charge]=\$540,000-\$60,000=\$480,000*

Example 2- Base over-performing example

- ◆ Unit B 100MW unit has an AEFORd=0.1 and a summer baseline EFORd=0.1
- ◆ The ICAP Market Clearing Price for the area that includes the unit (i.e., the Locality or NYCA clearing price) is \$6/kW-Month (i.e., \$6000/MW-Month).
 - *Unit B received a monthly ICAP market payment of $100 * (1-0.1) * 6000 = \$540,000$ and their UCAP is $100 * (1-0.1) = 90MW$*
- ◆ In the month of July, there were 6 “two day ahead” called Critical Operating Days. (i.e., scaling factor=1)
- ◆ Unit B had a DAM schedule on all 6 Critical Operating Days
- ◆ Unit B has a PI EFORd=0 for those 6 Critical Operating Days.
- ◆ Unit B receives a credit** of:
 - *[Baseline EFORd- PI EFORd]* MW ICAP * Zonal UCAP Price*Scaling Factor= charge (if negative, and credit if positive)*
 - *[0.1-0]* 100*6000*1= 60,000 → A \$60,000 credit.*
 - *This means that their total Capacity payments are: [Auction Revenue]-[Charge]=\$540,000+\$60,000=\$600,000*

** Assumes that sufficient revenue has been collected from under-performers

Example 3- Scaling example

- ◆ Unit B 100MW unit has an AEFORd=0.1 and a summer baseline EFORd=0.1
- ◆ The ICAP Market Clearing Price for the area that includes the unit (i.e., the Locality or NYCA clearing price) is \$6/kW-Month (i.e., \$6000/MW-Month).
 - *Unit B received a monthly ICAP market payment of $100 * (1-0.1) * 6000 = \$540,000$ and their UCAP is $100 * (1-0.1) = 90\text{MW}$*
- ◆ In the month of July, there was one “two day ahead” called Critical Operating Days.
- ◆ Unit B had a DAM schedule on the single Critical Operating Day.
- ◆ Unit B has a PI EFORd=0 for that one Critical Operating Days.
- ◆ Unit B receives a credit** of:
 - *[Baseline EFORd- PI EFORd]* MW ICAP * Zonal UCAP Price*Scaling Factor= charge (if negative, and credit if positive)*
 - *[0.1-0]* 100*6000*0.2= 12,000 → A \$12,000 credit.*
 - *This means that their total Capacity payments are: [Auction Revenue]-[Charge]=\$540,000+\$12,000=\$552,000*

** Assumes that sufficient revenue has been collected from under-performers

Example 4 - comparing a “good performer” and a “bad performer”

- ◆ **Unit X** 100MW unit has an AEFORd=0.1 and a summer baseline EFORd=0.1.
- ◆ **Unit Z** 100 MW unit has an AEFORd=0.5 and a summer baseline EFORd=0.5.
- ◆ The ICAP Market Clearing Price for the area that includes the units (i.e., the Locality or NYCA clearing price) is \$6/kW-Month (i.e., \$6000/MW-Month).
 - *Unit X received a monthly ICAP market payment of $100 * (1-0.1) * 6000 = \$540,000$ and their UCAP is $100 * (1-0.1) = 90\text{MW}$*
 - *Unit Z received a monthly ICAP market payment of $100 * (1-0.5) * 6000 = \$300,000$ and their UCAP is $100 * (1-0.5) = 50\text{MW}$*

Example 4 (cont.)

- ◆ In the month of July, there were 6 “two day ahead” called Critical Operating Days (the scaling factor=1).
- ◆ Both units had a DAM schedule on all six Critical Operating Days.
- ◆ Both units had complete forced outages on two of the days and operated without a problem on the other three Critical Operating Days.
 - *Unit X PI EFORd* = $2/6 = 0.333$
 - *Unit Z PI EFORd* = $2/6 = 0.333$
- ◆ **Unit X** receives a charge of:
 - *[Baseline EFORd- PI EFORd]* MW ICAP* Zonal UCAP Price* Scaling Factor= charge (if negative, and credit if positive)*
 - $[0.1-0.333]* 100*6,000*1 = -139,800 \rightarrow$ A \$ 139,800 charge.
- ◆ This means that their total Capacity payments are:
 - $[Auction Revenue]-[Charge]=\$540,000 - \$ 139,800 =\$400,200$

Example 4 (cont.)

- ◆ **Unit Z** receives a credit** of:
 - *[Baseline EFORd- PI EFORd]* MW ICAP* Zonal UCAP Price* Scaling factor= charge (if negative, and credit if positive)*
 - *[0.5-0.333]* 100*6,000*1= 100,200 → A \$ 100,200 credit.*

- ◆ This means that their total Capacity payments are:
 - *[Auction Revenue]+[Credit]=\$300,000+ \$ 100,200 =\$400,200*

- ◆ Because both units performed the same in July on the six Critical Operating Days, *both units had the same ICAP Auction revenue net of the Performance Incentive payments.*
 - *Unit X [Auction Revenue]-[Charge]=\$540,000 - \$ 139,800 = \$400,200*
 - *Unit Z [Auction Revenue]+[Credit]=\$300,000 + \$ 100,200 = \$400,200*

** Assumes that sufficient revenue has been collected from under-performers

Next Steps

- ◆ The next meeting will include additional discussion on the proposed changes as well as specifics on the treatment of non-generator resources (Demand Response, Intermittent Resources, etc.) including a proposed baseline for those resources and if that baseline could also be used for all resources.
- ◆ The next meeting is anticipated to be in January/February.
- ◆ The NYISO welcomes all comments.
 - *Written comments can be sent to Debbie Eckels deckels@nyiso.com*

APPENDICES

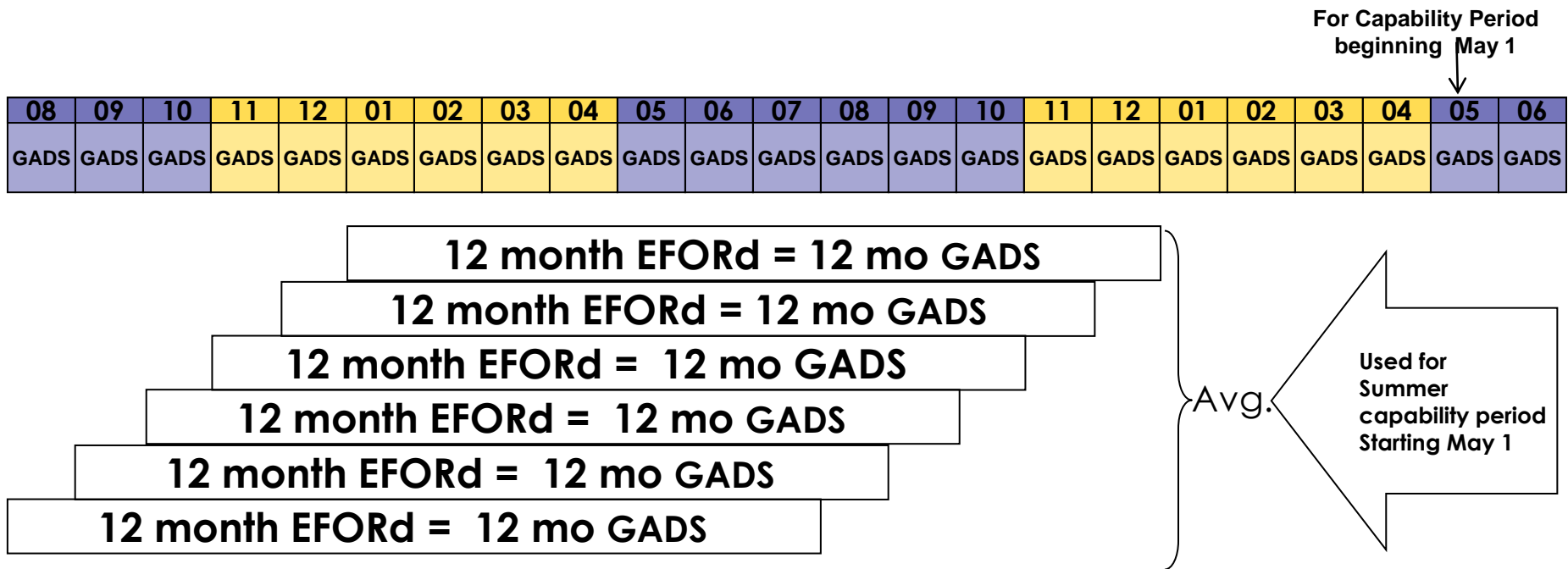
APPENDIX A: EFORD BASELINE AND CURRENT AEFORD METHOD

What's the baseline?

- ◆ For generators, the NYISO uses an average of six 12-month EFORd calculations to establish a Summer and Winter ICAP to UCAP derating factor (the AEFORd).
 - *This means that the derating factors for Summer and Winter blend both Summer and Winter GADS Data and effectively weights some of the months more heavily than others.*
- ◆ Since some units are likely to have different performance characteristics in the Summer and Winter, the NYISO is considering a “like season EFORd” baseline for the performance incentive (“Baseline EFORd”).

EFORd Example:

NYISO uses an average of six 12-month EFORd calculations to establish a Summer ICAP to UCAP derating factor ($AEFORd_{summer}$)



If month m is in the Summer Capability Period, its $AEFORd$ = average of the GADs outage values for the 12 month periods ending in July, Aug, Sept, Oct, Nov, Dec that precede month m .
 If month m is in the Winter Capability Period, its $AEFORd$ = average of the GADs outage values for the 12 months periods ending in Jan, Feb, Mar, Apr, May, June.

“Like Season” Baseline EFORd

- ◆ The objective is to have a baseline from which to measure ICAP unit performance on Critical Operating Days.
- ◆ The “like season” baseline EFORd would use the data from the past 3 “like” capability seasons to calculate the EFORd.
 - *For example, the most recent 18 months of summer data would be used to calculate the baseline for summer capability periods.*
 - *There would be no weighting of the months – each month would be considered on the same basis.*
 - *The same rules would be used as are currently used in the EFORd currently.*
 - No additional data submittals would be required.

“Like Season” Baseline EFORd Example:

Uses the data from the past 3 “like” capability seasons with no weighting.

Summer 2014												2015						For Capability Period beginning May 1, 2015 ↓		
11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	
GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS

6 mo GADS

Summer 2012												Summer 2013							
05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10		
GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS	GADS		

+6 mo GADS

+6 mo GADS

If month *m* is in the Summer Capability Period, its “Baseline EFORd” = average of the GADs outage values for the 18 summer months that precede the summer capability period.
 If month *m* is in the Winter Capability Period, its “Baseline EFORd” = average of the GADs outage values for the 18 months that precede the winter capability period

Baseline EFORd

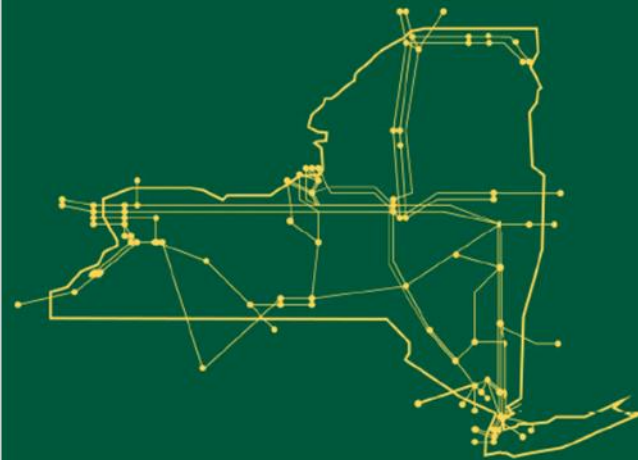
- ◆ The NYISO calculated what the Baseline EFORd would have been for Summer 2014 and Winter 2014-15 versus the existing EFORd:

Generation Type*	Average SUMMER 2014 EFORd	Average of SUMMER 2014 Baseline EFORd	Average of WINTER 2014-15 EFORd	Average of WINTER 2014-15 Baseline EFORd
COMBINED CYCLE	6.4%	5.2%	5.0%	4.1%
COMBUSTION	12.0%	10.4%	13.4%	14.7%
FOSSIL FUEL	6.9%	6.9%	5.7%	6.9%
NUCLEAR STEAM	3.0%	2.3%	2.0%	3.7%
Average (all Types*)	10.0%	8.7%	10.4%	11.3%

- ◆ The NYISO is considering if the EFORd used in the auction should also be changed to the “like season” baseline EFORd.

* Some generation types have been omitted to preserve confidentiality however all units are included in the Average

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