

# Behind-the-Meter Net Generation Resource (BTM:NG)

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#### **Demand Response In-Depth Course**

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#### **Session Objectives**



- Describe the characteristics of a Behind the Meter Net Generation (BTM:NG)
- Identify program eligibility requirements (include size, aggregation and metering)
- Explain the process for enrollment
- Explain how Average Coincident Host Load (ACHL) is calculated

#### **Session Objectives**



- Identify the specific requirements associated with participating in the Energy and Ancillary Service Markets
- Outline the process for bidding and scheduling a BTM:NG Resource
- Describe how a BTM:NG Resource participates in the Installed Capacity market
- Describe the DMGC testing requirements for a BTM:NG Resource

#### **Session Objectives**



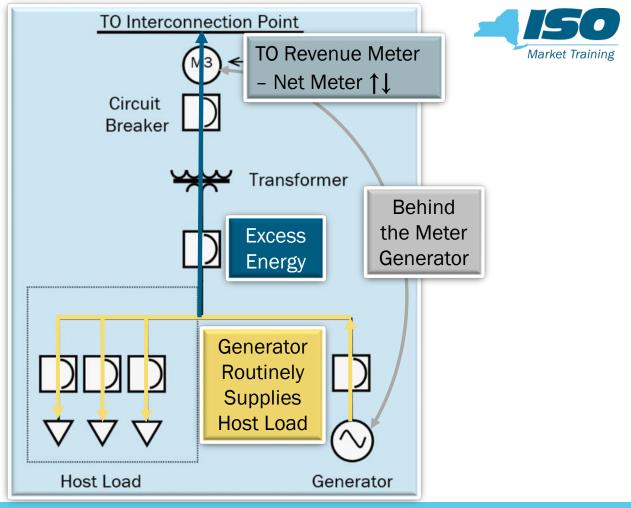
- Calculate the Adjusted Host Load (AHL) for a BTM:NG Resource
- Calculate Net-ICAP and Net-UCAP for a BTM:NG Resource
- Describe method for measuring and reporting performance
- Identify the various settlements associated with BTM:NG Resources

#### What is a BTM:NG Resource?



- A BTM:NG Resource is a facility, consisting of a Generator and an associated Load that has:
  - On-site generation that routinely serves its Host Load, and
  - Excess (or "net") generation after serving its Host Load that it offers in the NYISO's markets
- BTM:NG Resources may participate in the NYISO's:
  - Energy Market
  - Ancillary Services Market
  - Capacity Market

# BTM:NG Resource Illustration Only

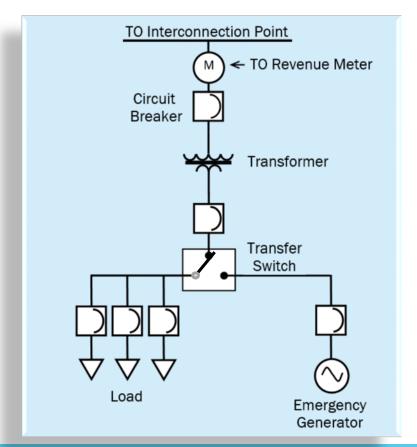


#### **Let's Review**



#### BTM:NG Resource

Does this represent a Behind-the-Meter Net Generator Resource?





### Program Eligibility Requirements

#### **Program Eligibility Requirements**



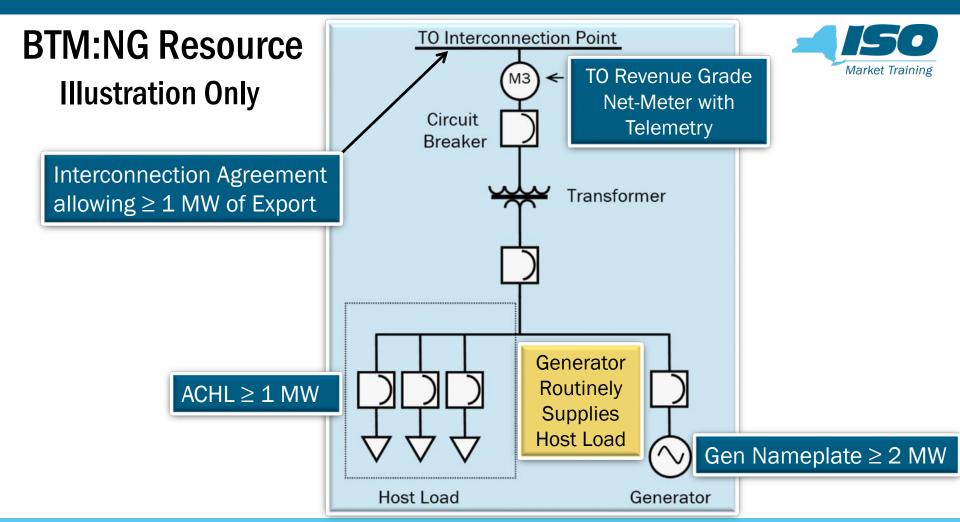
- To participate in the NYISO's wholesale electricity markets, a BTM:NG Resource must have:
  - Generator with a nameplate rating ≥ 2 MW
  - \*Average Coincident Host Load (ACHL) ≥ 1 MW
  - Interconnection Agreement allowing an export of at least 1
     MW
  - Revenue-grade TO Net-meter at each interconnection point
  - Telemetry to provide meter data in real time

<sup>\*</sup> ACHL will be covered in detail later in the presentation

#### **Program Eligibility Requirements**

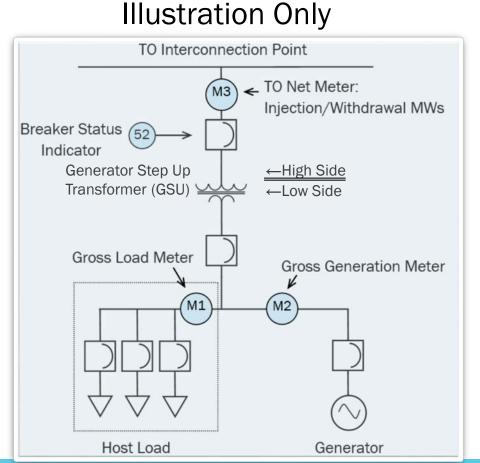


- To participate in the NYISO's wholesale electricity markets, a BTM:NG Resource must have:
  - Capability to follow dispatch instructions from the NYISO via the connecting TO
  - Meet New York Department of Environmental Conservation (NYS DEC) requirements to operate under non-emergency conditions
  - Meet Credit Requirements
    - Collateral to be obtained by provider before program participation begins
    - Additional collateral may be requested by NYISO credit department if warranted



#### BTM:NG Revenue Metering Requirements





Meters used must have real-time telemetry and be accepted by the Metering Authority (MA), and must use one of these 3 options:

- Option 1: M3, M2 compensated for high side of GSU, M1 compensated for high side of GSU
- Option 2: M3, M1 compensated for high side of GSU (NYISO estimates M2 compensated for high side of GSU)
- Option 3: M3, M2 compensated for high side of GSU (NYISO estimates M1 compensated for high side of GSU)

# BTM:NG Resource Facility Configurations



- Participation at a facility is either:
  - As a <u>single generator</u> serving a Host Load
  - As a set of multiple Generators that are a single aggregated unit serving a Host Load
    - Comprised of more than one generating unit and dispatched as a <u>single aggregated unit</u>, <u>under a</u> <u>single PTID</u>
  - NYISO will review and approve each facility seeking to participate as a BTM:NG Resource

## Resources <u>Not</u> Eligible to Participate as a BTM:NG Resource



- Intermittent Power Resources
- A Resource that has made an election to participate as a Generator or Demand Side Resource
  - Note: a facility that meets the requirements to be a BTM:NG Resource must participate as a BTM:NG Resource
  - Facilities that separate the Load from the Generator, may participate as a Generator
  - Facilities may seek to re-qualify as a BTM:NG Resource annually by written notice sent to NYISO prior to August 1st

#### Resources <u>Not</u> Eligible to Participate as a BTM:NG Resource

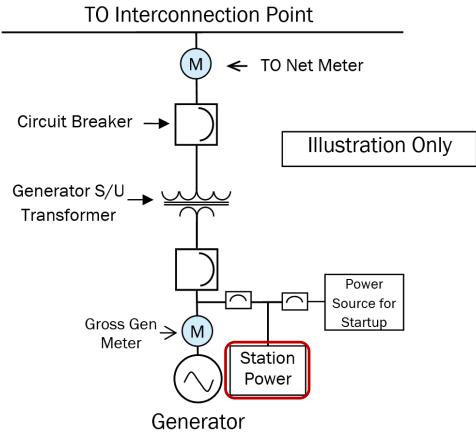


- Resources cannot simultaneously participate in NYISO and/or TO administered Demand Response or Generation buy-back programs
- Facilities whose Host Load consists of Station Power only

#### **Station Power Explained**

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- Station Power is the energy used by a Generator for operating electrical equipment needed for the production of power
- Examples of Station Power equipment
  - Cooling Water Pumps
  - Oil Pumps
  - Compressed Air
  - Building HVAC, Lighting etc.
  - Control Systems
- Sometimes referred to as "Station Service Load"
- In this example, Host Load consists only of Station Power, not eligible for BTM:NG program



#### **Let's Review**



#### **Program Eligibility**

To participate in the wholesale energy market, the BTM:NG Resource must have a nameplate greater than or equal to \_\_\_\_\_ MW(s).

To participate in the wholesale energy market, the BTM:NG Resource must have an Average Coincident Host Load greater than or equal to \_\_\_\_\_ MW(s).

A Generator Resource with a Station Power load of 1.5 MW with no Host Load is eligible to participate as a BTM:NG Resource. True or False



## Process for Enrollment/Participation

#### **BTM:NG Resource Enrollment**



- Register as a Market Participant
- Enrollment as a BTM:NG Resource completed in DRIS
- Enrollment in the Energy Markets completed as a Generator
  - Some specific rules or exceptions are outlined in the Market Users Participant Guide
- ICAP Market participation follows the requirements of the NYISO ICAP Manual
  - ICAP AMS system used for resource testing data entry and bidding into capacity market

#### **BTM:NG Resource Enrollment**



- A BTM:NG Resource's injection limit is first verified
  - in the registration process
- The BTM:NG Resource must demonstrate a valid interconnection agreement
  - must specify the injection limit
- Any updates to the injection limit must be approved by both the NYISO and the Transmission Owner



## Calculation of Average Coincident Host Load (ACHL)

#### **Average Coincident Host Load**



#### Average Coincident Host Load (ACHL)

 The peak proxy load value adjusted by the weather normalization factor (WNF) and regional load growth factor (RLGF)

#### Peak Proxy Load Value:

 Average of the BTM:NG Resource's top-20 peak Load hours that occur during the top-40 NYCA peak Load hours of the prior Summer Capability Period and the Winter Capability Period immediately prior

ACHL = Peak Proxy Load Value x (1+WNF) x (1+RLGF)

#### **Average Coincident Host Load**



#### Weather Normalization Factor (WNF):

- WNF is the ratio of the weather normalized load to the actual load in the current capability year
- Calculated by the NYISO for each Transmission District in accordance with the Load Forecasting Manual
- The NYISO will import into DRIS the applicable WNF for each Capability Year

ACHL = Peak Proxy Load Value x (1+WNF) x (1+RLGF)

#### **Average Coincident Host Load**



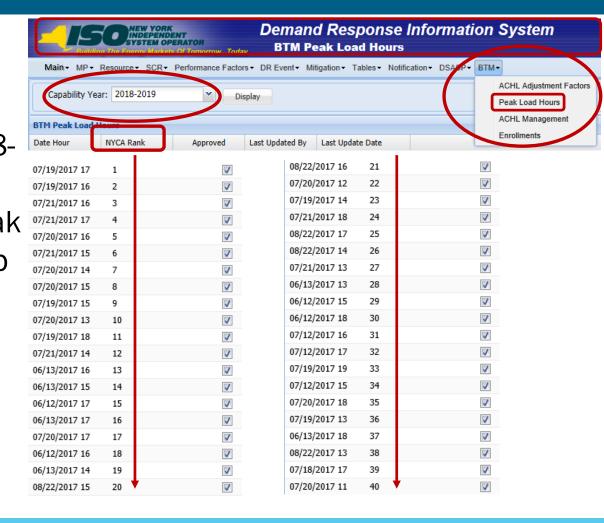
- Regional Load Growth Factor (RLGF):
  - RLGF is the ratio of its projected load during the hour and on the date of the NYCA peak for the next Capability Year to the weather-normalized actual load during the hour and on the date of the NYCA peak in the current Capability Year
  - Provided by each Transmission Owner and Municipal Electric
     System that reflects the percent change in expected Load
- ACHL must be at least 1 MW to participate as a BTM:NG Resource

ACHL = Peak Proxy Load Value x (1+WNF) x (1+RLGF)

Refer to ICAP Manual, Section 4.15.1.1

# Resource Peak Load Hours

For example, the 2018-19 Capability Year BTM:NG Resource peak Load hours are the top forty (40) NYCA peak Load hours in the Summer 2017 Capability Period and Winter 2016-2017 Capability Period



# Calculation of Peak Proxy Load Value - Example

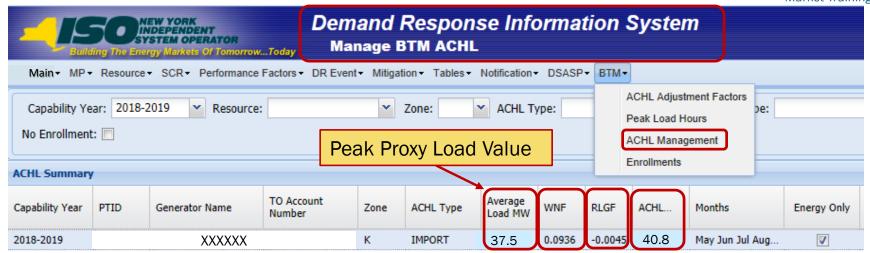
		Final	
Peak Load Date HB		Meter	Used In
		MW	Calculation
7/19/2017 13:00		41.1	TRUE
7/19/2017 14:00		40.5	TRUE
7/19/2017 15:00		39.8	TRUE
7/12/2017 15:00		38.8	TRUE
7/19/2017 17:00		37.9	TRUE
7/12/2017 16:00		37.4	TRUE
7/19/2017 16:00		37.4	TRUE
8/22/2017 15:00		37.3	TRUE
7/20/2017 13:00		37.1	TRUE
7/20/2017 14:00		37.1	TRUE
8/22/2017 14:00		36.9	TRUE
7/20/2017 15:00		36.9	TRUE
8/22/2017 13:00		36.8	TRUE
7/20/2017 12:00		36.8	TRUE
7/18/2017 17:00		36.6	TRUE
7/12/2017 17:00		36.6	TRUE
8/22/2017 16:00		36.6	TRUE
7/20/2017 16:00		36.5	TRUE
7/19/2017 18:00		36.2	TRUE
7/20/2017 11:00		36.0	TRUE
	Average	37.5	Peak Proxy
			Load Value



Top 20 Peak
Load Hours
for Resource
occurring in
the NYCA Top
40 Peak Load
Hours

#### **DRIS ACHL Information**





ACHL = Peak Proxy Load Value x (1+WNF) x (1+RLGF)

 $ACHL = 37.5 \times (1 + 0.0936) \times (1 + -0.0045) = 37.5 \times 1.0936 \times 0.9955 = 40.8$ 

#### **Let's Review**



- For the 2018-19 Capability Year BTM:NG Resource peak Load hours are the top forty (40) NYCA peak Load hours in the Summer 2018 Capability Period and Winter 2017-2018 Capability Period.
- The Peak Proxy Load value is the sum of the Resource's top 10 Peak Load Hours that occurs in the NYCA Top 40 Peak Load Hours.





- BTM:NG Resource participates as a <u>Generator</u> in the NYISO's wholesale markets
  - Existing rules and penalties for Generators apply, except where there are specific rules for BTM:NG Resources
  - Resources must bid Self-Committed (Fixed or Flexible)
  - BTM:NG Resources will not be able to unilaterally change Unit Commitment data once it is initially entered by the MP and activated as part of the registration process

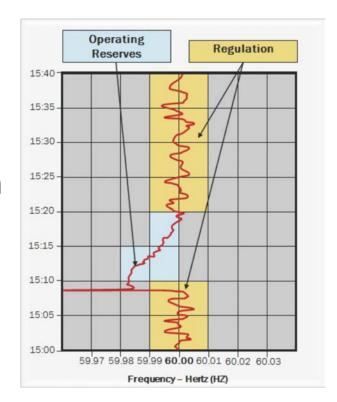


- BTM:NG Resource participates as a <u>Generator</u> in the NYISO's wholesale markets
  - BTM:NG Resources do not enter (bid) a Minimum Generation MW or Cost
  - BTM:NG Resources do not enter (bid) a Start-up Cost
  - Treated as a dispatch-only unit during the economic evaluation



#### Regulation and Reserves

- Must meet the eligibility requirements including metering and performance testing covered in the DSASP session
- Bidding requirements covered later



#### **Ancillary Services-Regulation and Reserves**



- Regulation
  - Only Resources that bid as Self-committed <u>Flexible</u> can provide Regulation Services
  - A BTM:NG Resource with a single generator serving a Host Load can offer Regulation Service
    - Entered value based on the MWs the unit can provide above the Host Load
  - An aggregated unit serving a Host Load <u>cannot</u> offer Regulation Service

#### **Ancillary Services-Regulation and Reserves**



- Reserves
  - Only Resources that bid as Self-committed <u>Flexible</u> can provide Reserve Services
  - Single generator serving a Host Load
    - Can only provide 10-min <u>Spinning</u> or 30-min <u>Synchronized</u>
       Operating Reserves
  - An aggregated unit serving a Host Load
    - Can only provide 10-min or 30-min <u>Non-Synchronized</u> Operating Reserves



- Voltage Support Service (VSS)
  - BTM:NG Resources may provide VSS:
    - Do not have to participate in the ICAP market to provide VSS
    - Must meet the supplier qualification requirements described in the Ancillary Services manual including;
      - Functioning Automatic Voltage Regulator
      - Capable of Producing and Absorbing Reactive Power
      - Perform Reactive Capability testing
      - Maintain specific voltage levels





#### **Let's Review**



#### Participating in Energy and Ancillary Services Markets

A single generator servicing a host load can provide Reserve service.

- a. 10 Min Spinning or 10 Min Non-Synchronized
- b. 30 Min Synchronized or 30 Min Non-Synchronized
- c. 10 Min Spinning or 30 Min Synchronized
- d. 10 Min Non-Synchronized or 30 Min Non-Synchronized

#### **Let's Review**



#### Participating in Energy and Ancillary Services Markets

To participate in the Voltage Support Service a BTM:NG Resource must also participate in the ICAP market.

True or False

To participate in the Ancillary Services market a BTM:NG Resource must bid ISO-Committed Flexible of Self-Committed Flexible.

True or False



## Bidding and Scheduling

#### BTM:NG Resource Bidding in MIS





#### Generator Details Screen

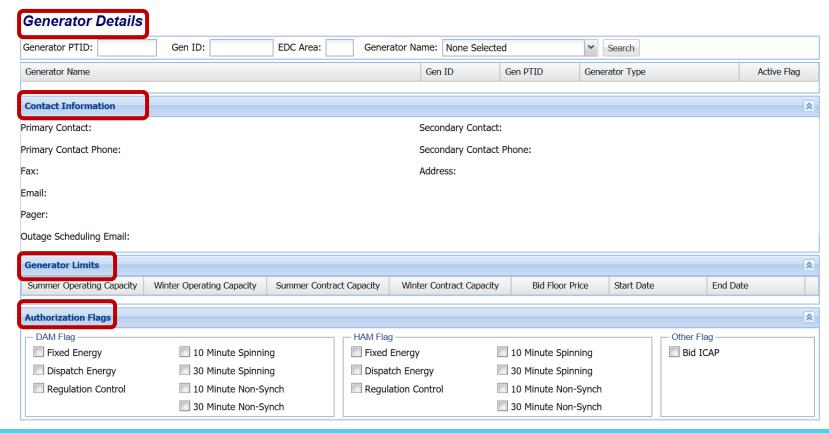
- Includes physical attributes such as Response Rates
- Data submitted by MP is validated and entered by NYISO

#### Generator Bid [Offer] Screen

Data entered by the MP as part of their energy offer

#### **Generator Details Screen - Top**





#### **Generator Details Screen - Middle**



Authorization Flags					*
DAM Flag Fixed Energy Dispatch Energy Regulation Control	<ul><li>10 Minute Spinning</li><li>30 Minute Spinning</li><li>10 Minute Non-Synch</li><li>30 Minute Non-Synch</li></ul>	Fixed Energy Dispatch Energy Regulation Control	10 Minute Spinning 30 Minute Spinning 10 Minute Non-Synch 30 Minute Non-Synch	Other Flag  Bid ICAP	
Generator Physical Attributes					×
Physical Min Generation MW:	Normal Res	sponse Rate 1 MW/Min:	Normal Response Rat	e 1 MW:	
Emergency Response Rate:	Normal Res	sponse Rate 2 MW/Min:	Normal Response Rat	e 2 MW:	
Regulation Capacity Response Rate MW/Min:	e Normal Res	sponse Rate 3 MW/Min:			
6-Second Regulation Response Rate MW/6Sec:	e				

#### **Generator Details Screen - Bottom**





#### **BTM:NG Resource Bidding**



- Generator offers must include
  - Forecasted Host Load
  - Normal Upper Operating Limit (UOL<sub>N</sub>)
  - Emergency Upper Operating Limit (UOL<sub>E</sub>)
  - Incremental Cost Curve
  - Fixed or Flexible Bid Mode
  - Ancillary Service product bids (optional)

#### **BTM:NG Resource Bidding**



#### Forecasted Host Load

- Expectation of the load served by the BTM:NG
   Resource for the bidding increment (e.g., hour)
- Host Load MW cannot be increased on HAM bids for any hours for which the generator received a DAM schedule
  - Increased Host Load must be reflected in a unit de-rate if the increase prevents the BTM:NG Resource from meeting its DAM schedule

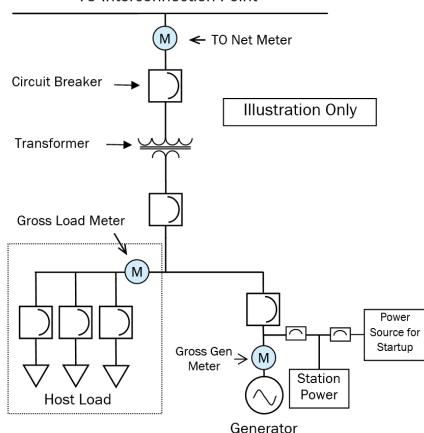
Refer to the Market Participant User's Guide MPUG, Section 7.4.1

#### **Forecasted Host Load**

- Host Load MW value includes the facility's Station Power if the BTM:NG Resource's Station Power is not separately metered
  - In this illustration drawing, the Station Power is not separately metered
    - The Station Power to be included in the Host Load
  - The Gross Gen Meter would include the Station Power MWh



#### TO Interconnection Point



#### **BTM:NG Resource Bidding**



#### Injection Limit

The maximum injection of a BTM:NG Resource, in MW, into the NYS
Transmission System or distribution system at the BTM:NG Resource's
Point of Injection. The Injection Limit for a BTM:NG Resource must be at
least 1 MW

#### UOL<sub>N</sub> - Normal Upper Operating Limit for BTM:NG Resources

 The limit a BTM:NG Resource indicates it expects to inject into the grid after serving its Host Load, subject to its Injection Limit

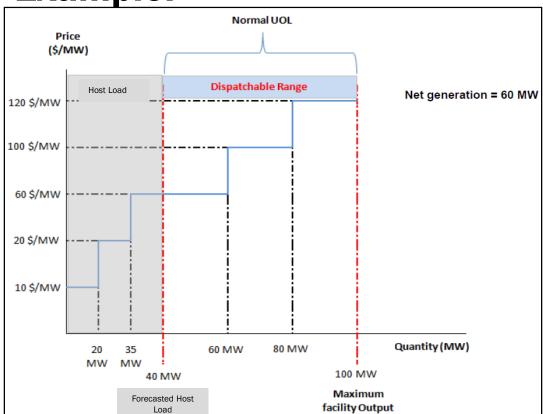
#### UOL<sub>E</sub> – Emergency Upper Operating Limit for BTM:NG Resources

- The maximum injection of a BTM:NG Resource subject to its Injection Limit
  - The  $UOL_E$  entered by the BTM:NG Resource shall be the lower of the injection limit or the seasonal operating limits in the MIS
  - BTM:NG Resource's UOL<sub>E</sub> can include injections achievable via Load reductions at the facility

BTM:NG Resource Incremental Cost Curves

Market Training

**Example:** 

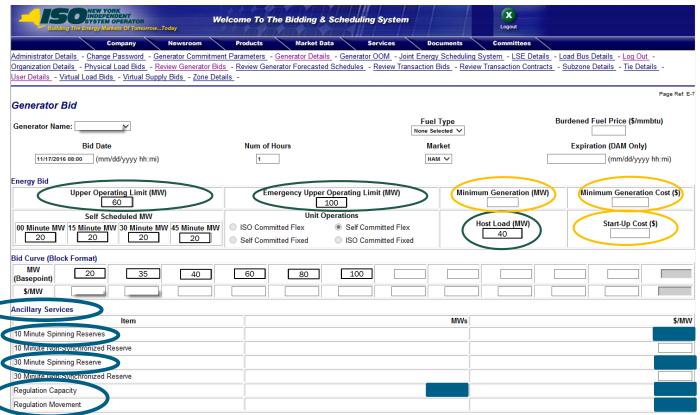


BTM:NG Resource Energy Offer	MW
UOL <sub>E</sub>	100
Host Load	40
UOL <sub>N</sub> Dispatch MW (from 41-100)	60

- The incremental cost curves for the entire range of the BTM:NG Resource's output, including the output needed to serve its Host Load, are required as part of the energy offer
- The portion of the cost curve that represents the MWs available for dispatch are those above the Host Load up to the maximum output (100 MW) as shown in the graph
- Only the segments of the BTM:NG Resource's energy bid that exceed the Resource's Host Load are evaluated

## Generation Bid [Offer] Screen for Energy and Ancillary Services





#### BTM:NG Resource Energy Schedule



#### DAM Schedule

Sche	dule			
(Only	applicable	after	DAM/HAM	posting)

(Only applicable after DAW/HAW posting)		
Generator Name	Bid Status	Market Selected
XXXXXXX	BID ACCEPTED	DAM

#### Scheduled MWs

(Based on Unit, Date and Market Displayed)

Bid Date	Energy	10 Min Spin	10 Min Non-Synch	30 Min Spin	30 Min Non-Synch	Regulation Capacity	Operating Cap Reserve
04/20/2018 08:00 EDT	20.00						0.0

#### HAM Schedule

#### Schedule

(Only applicable after DAM/HAM posting)

Generator Name	Bid Status	Market Selected
XXXXXXXX	BID ACCEPTED	HAM

#### **Scheduled MWs**

(Based on Unit. Date and Market Displayed)

(Based off Offic, Bate and Market Bis	piayou	1					
Bid Date	Energy	10 Min Spin	10 Min Non-Synch	30 Min Spin	30 Min Non-Synch	Regulation Capacity	Operating Cap Reserve
04/20/2018 08:00 EDT	20.00						
04/20/2018 08:15 EDT	20.00						
04/20/2018 08:30 EDT	20.00						
04/20/2018 08:45 EDT	20.00						

# BTM:NG Resource Operating Point, Upper Operating Limit and Host Load

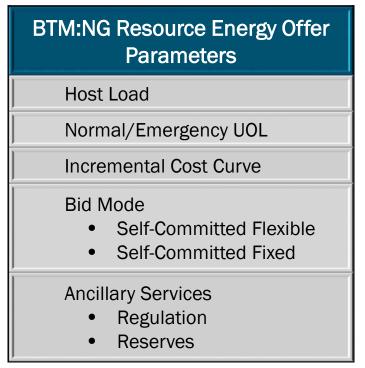


- The Bid evaluation will be performed for Energy (and Ancillary Services) offers that correspond to production that <u>exceeds</u> the Resource's Host Load
- The Self-Schedule MWs for BTM:NG Resources should reflect the desired MW schedule above the Host Load
- Example:
  - Unit bids 100 MW Emergency Upper Operating Limit
  - Host load is 30 MWs
  - Unit wants to self schedule starting from 10 MWs
  - Self Schedule MWs should commence from 10 MWs and not 40 MWs

#### **Summary: Required BTM:NG Resource**



**Bidding** 



 Other than initial Unit Commitment data provided during the registration process a BTM:NG Resource is not allowed to modify commitment related parameters as part of its offer

#### **Let's Review**



#### Bidding and Scheduling

The Host Load on the Generator Bid sheet is the ACHL MW from DRIS for the respective capability month of the bid.

True or False

When bidding availability for Reserve Service, you must enter the number of MWs and the bid price in \$/MW.

True or False



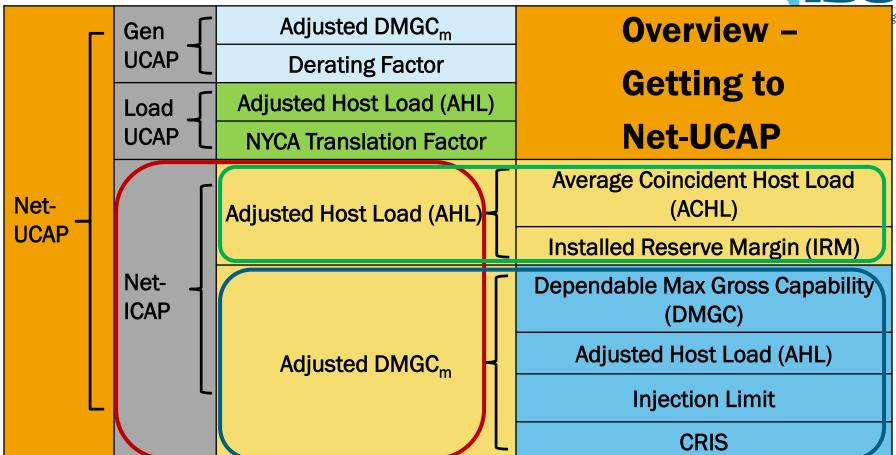
# BTM:NG Resource Participation in the Capacity Market

# BTM:NG Resource Participation in Capacity Market



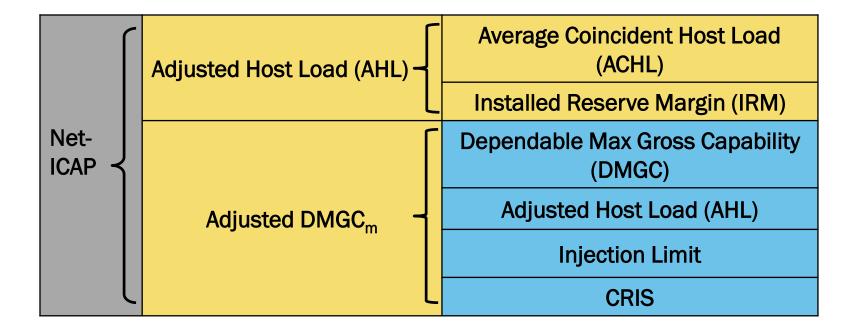
- BTM:NG Resource participates as an ICAP Supplier in the NYISO Capacity market
  - Except where noted in the Tariffs, existing ICAP rules and penalties for Generators apply
  - May offer the available <u>net</u> generation into ICAP Auctions after serving its Host Load
  - Must have Capacity Resource Interconnection Service (CRIS)





#### **Net-ICAP**





#### **Net-ICAP (Available ICAP in ICAP AMS)**



- Net-ICAP is the amount of Installed Capacity a BTM:NG Resource has demonstrated it is capable of supplying to the wholesale market
- Net-ICAP consists of a Load and a Generator Component

**Load Component** 

Adjusted Host Load (AHL)

**Generator Component** 

Adjusted Dependable Maximum Gross Capability (Adj. DMGC<sub>m</sub>)

Refer to the ICAP Manual, Section 4.15

## **Net-ICAP Load Component**





**AHL** 

Adjusted Dependable Maximum Gross Capability (month)

Adjusted Host Load

## **Adjusted Host Load**



## $AHL = ACHL \times (1+IRM)$

- Adjusted Host Load ("AHL") is the Load value used by the NYISO to calculate a BTM:NG Resource's Net-ICAP
- The NYISO will calculate each BTM:NG Resource's AHL on an annual basis
- AHL for an existing BTM:NG Resource is calculated prior to the start of the Summer Capability Period
- AHL for new BTM:NG Resources entering the market shall be calculated at the time of registration

#### **Adjusted Host Load (AHL)**



## $AHL = ACHL \times (1+IRM)$

 Average Coincident Host Load (ACHL) is the peak proxy Load value adjusted by the weather normalization factor and regional Load growth factor

ACHL = Peak Proxy Load Value x (1+WNF) x (1+RLGF)

Refer to the ICAP Manual, Section 4.15

**Installed Reserve Margin (IRM) is** an annual value that represents the amount of capacity that is needed to ensure resource adequacy of the bulk electric system (18.2 % for the May 1, 2018 - April 30, 2019 Capability Year)

#### **Net-ICAP: Load Component**



- A BTM:NG Resource's ACHL and the related load data will reside in the Demand Response Information System (DRIS)
  - MPs who register BTM:NG Resources are capable of viewing the data
- The BTM:NG Resource's ACHL value for a Capability Year calculated in DRIS
  - Used by the NYISO's ICAP Automated Market System (AMS) to calculate the resource's AHL and Net-ICAP value

Refer to the ICAP Manual, Section 4.15

#### **Net-ICAP: Load Component**

Market Training

Example: Adjusted Host Load (AHL)

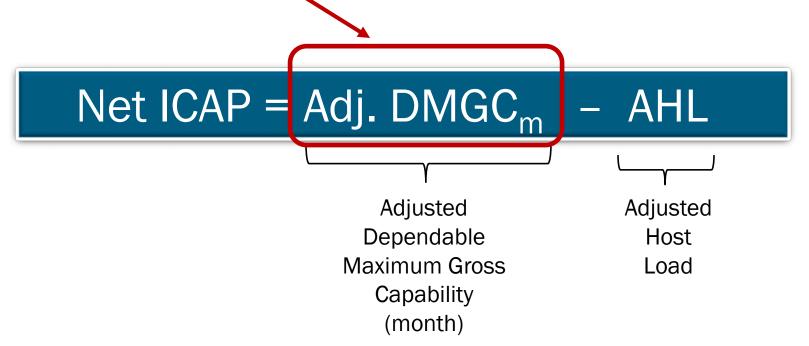
 $AHL = ACHL \times (1+IRM)$ 

ACHL (MW)	33.84				
IRM 18.2%					
AHL = 33.84 x (1+0.182)					
AHL = 40.00 MW					

Net ICAP = Adj. DMGC<sub>m</sub> - AHL

#### **Net-ICAP:** <u>Generation</u> Component





#### **DMNC Versus DMGC for a BTM:NG RESOURCE**



- The Generator of a BTM:NG Resource may elect to perform a DMNC Test instead of a DMGC Test when the:
  - Station service Load of a BTM:NG Resource is separately metered from all other Load of the resource
    - "separately metered" means that the Station Power of the Generator is metered by an individual meter located at the Generator such that it measures only the Station Power consumed by the Generator
  - Station service Load can be independently measured and verified
- Such election must be made in writing to the NYISO prior to the start of the DMNC Test Period

\*\*\*Refer to Market Services Tariff, section 5.12.6.1.1 and section 4.2 of the ICAP Manual

#### **DMNC Versus DMGC for a BTM:NG Resource**



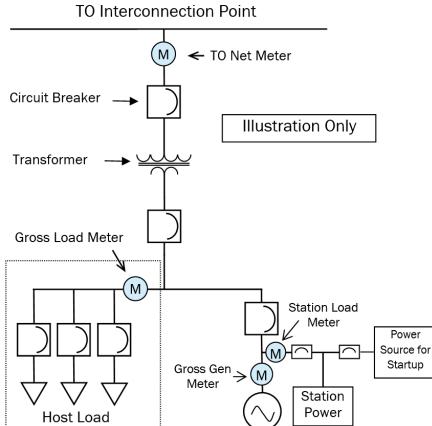
- If a BTM:NG Resource elects to perform a DMNC Test
  - The station service Load measured during such DMNC Test shall not be included in the Resource's Host Load
- The DMNC value for the Capability Period shall be used in lieu of a DMGC value in the calculation of the resource's Adjusted DMGC

\*\*\*Refer to Services Tariff section 5.12.6.1.1 and section 4.2 of the ICAP Manual)

#### BTM:NG Resource Separately Metered Station



**Power** 



Generator

# Dependable Maximum Gross Capability: Definition



- Sustained maximum output of the Generator of a BTM:NG Resource
  - Demonstrated by a performance test or through actual operation for specified time duration
  - Example Test Durations
    - Fossil Fuel and Nuclear Stations 4 hour test
    - Hydro Stations 4 hour test
    - Internal Combustion Units and Combustion Turbines 1 hour test
    - Combined Cycle Stations 4 hour test
    - Intermittent Power Resources nameplate capacity used
    - Limited Control Run-of-River Hydro Resources nameplate capacity

#### **Net-ICAP: Generation Component**



#### Adjusted DMGC

- Maximum capability of the BTM:NG Resource's Generator(s) in a given month; measured as the least of:
  - the DMGC Test for the Capability Period
  - the AHL plus its Injection Limit
  - the AHL plus its MW amount of CRIS
- Although DMGC is a 'monthly' value in the ICAP AMS, the Resource only needs to test twice a year, and the value is the same for each month of the applicable Capability Period (Summer or Winter)

#### **Net-ICAP: Generation Component**



#### Adj. $DMGC_m = Min (DMGC_m, AHL_m + Injection Limit, AHL_m + CRIS_{CP})$

- DMGC<sub>m</sub> is the maximum generation output of the BTM:NG Resource for a month (calculated seasonally)
- AHL<sub>m</sub> is the Adjusted Host Load of the BTM:NG Resource for a month (calculated annually)
- Injection Limit is the maximum number of MW a BTM:NG Resource is permitted to inject into the grid
- CRIS<sub>CP</sub> is the amount of Capacity Resource Interconnection Service the BTM:NG Resource has been awarded (on a Capability Period basis)

#### **Net-ICAP: Generation Component**



Example: Adjusted DMGC

Adj.  $DMGC_m = Min (DMGC_m, AHL_m + Injection Limit, AHL_m + CRIS_{CP})$ 

DMGC (MW)	100			
AHL (MW)	40			
Injection Limit	95			
CRIS (MW)	98			
Adj. DMGC = Min (100, (40 + 95), (40 + 98))				
Adj. DMGC = 100 MW				

 $Net-ICAP = Adj. DMGC_m - AHL$ 

#### **Example: Net-ICAP**



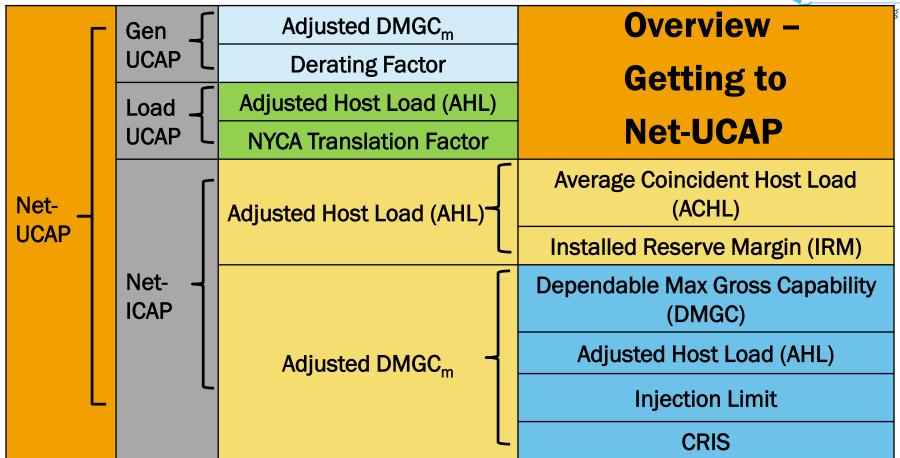
 $Net-ICAP = Adj. DMGC_m - AHL$ 

Adj. DMGC (MW)	100			
AHL (MW)	40			
Net-ICAP = 100 - 40				
Net-ICAP = 60 MW				

Used in the Net-<u>UCAP</u> calculation

#### **Net-UCAP**





# Net-UCAP (Available for Sale UCAP in ICAP AMS)



- Net-UCAP is the amount of unforced capacity a BTM:NG Resource can sell in the NYISO's Capacity market
  - Net-UCAP of a BTM:NG Resource is calculated by applying derating factors to the Generator serving the BTM:NG Resource and to its Load
    - Gen UCAP
    - Load UCAP
  - Net-UCAP is capped at the Resource's Net-ICAP value

### **Net-UCAP Calculation**



Net-UCAP = Max (Min([Gen UCAP] - [Load UCAP], Net-ICAP), 0)

Gen UCAP = Adj. DMGC<sub>m</sub> x (1 - Derating Factor)

 Adjusted DMGC is then adjusted by the generator's Derating Factor\*

\*In the ICAP Manual EFORd is used instead of derating factor, but most resources including BTM:NG Resources use a derating factor

# **Net-UCAP Calculation**



Net-UCAP = Max (Min([Gen UCAP] - [Load UCAP], Net-ICAP), 0)

# Load UCAP = $AHL_m \times (1 - NYCA TF_{CP})$

- The Load of the BTM:NG Resource is adjusted by the NYCA Translation Factor (TF) for the applicable Capability Period
  - The NYCA TF will be the season initial NYCA TF
- The Translation Factor applied to the BTM:NG Resource's Load is consistent with the calculation that translates LSE Load from ICAP to UCAP
- The Translation Factor is the weighted average of the derating factors associated with all Resources electrically located in the NYCA for that Capability Period

# **Example: Net-UCAP**



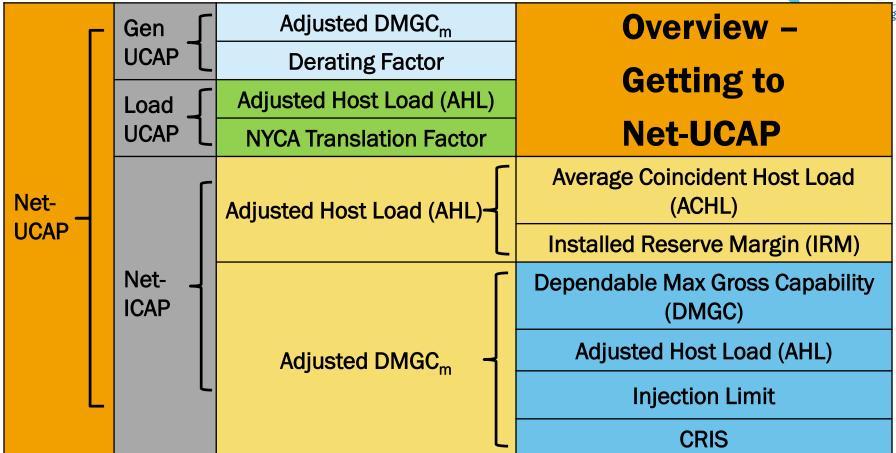
Net-UCAP = Max (Min([Gen UCAP] - [Load UCAP], Net-ICAP), 0)

Gen UCAP = Adj.  $DMGC_m \times (1 - DF)$ 

Load UCAP =  $AHL_m \times (1 - NYCA TF_{CP})$ 

Adj. DMGC (MW)	100						
Derating Factor	1.72%						
Gen UCAP = 100 x (1 - 0.0172)							
Gen UCAP = 98.3 MW							
AHL	40						
NYCA Translation Factor 9.2%							
Load UCAP = 40 x (1 - 0.092)							
Load UCAP = 36.3 MW							





# **Example: Net-UCAP**

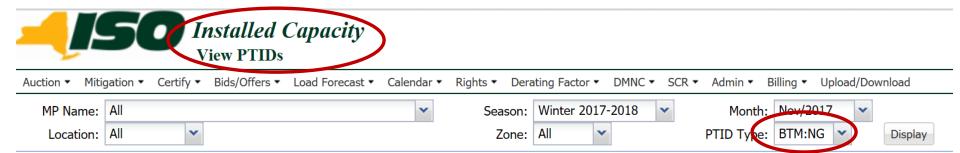


Net-UCAP = Max (Min([Gen UCAP] - [Load UCAP], Net-ICAP), 0)

Net-ICAP (MW)	60						
Gen UCAP (MW)	98.3						
Load UCAP (MW)	36.3						
Net-UCAP = Max (Min (98.3 – 36.3), 60), 0)							
Net-UCAP = 60 MW							

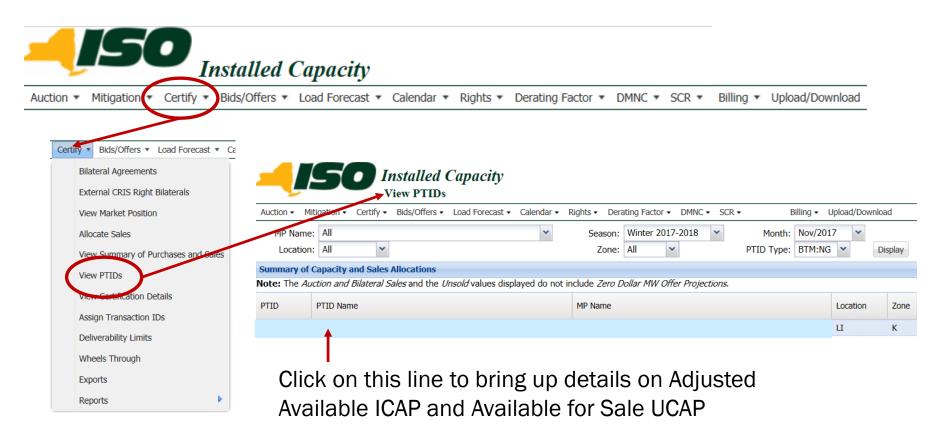
#### BTM:NG ICAP AMS





## **BTM:NG Resource ICAP AMS**





# **BTM:NG Resource ICAP AMS**



PTID Details Current Selected PTID: Adj. Available ICAP Available For Sale UCAP **Auction and Bilateral Sales Input Values** Calculated Values Value Cached? Value Name Name 100.00 DMGC MW AHL MW 40.00 95.00 Injection Limit MW AHL + Inj Limit MW 135.00 **CRIS MW** 98.00 AHL + CRIS MW 138.00 **ACHL MW** 33.84 Adj. DMGC MW 100.00 NYCA Requirement % 118.2 DMGC MW - AHL MW NYCA Derating Factor % 60.00 9.20 Adj. DMGC MW - AHL MW(Available IC... 60.00 Adj. Available ICAP 60.00

### **BTM:NG Resource ICAP AMS**



#### PTID Details

Current Selected PTID:

Adj. Available ICAP Available For Sale UCAP

**Auction and Bilateral Sales** 

Input Values		Calculated Values				
Name	Value	Name	Value			
NYCA Derating Factor %	9.20	Gen UCAP MW	98.30			
Derating Factor %	1.72	Load UCAP MW	36.30			
AHL MW	40.00	Prelim. Net UCAP MW	62.00			
Adj. DMGC MW	100.00	Available For Sale UCAP MW	60.00			
Adj. Available ICAP	60.00					

#### **Let's Review**



#### AHL – Fill in the missing variable

Adjusted Host Load (AHL)

Average Coincident Host Load (ACHL)

#### **Let's Review**



#### Adjusted DMGC – Fill in the missing variables

	Dependable Max Gross Capability (DMGC)
Adjusted DMGC <sub>m</sub>	
	CRIS

# Gen UCAP and Load UCAP – fill in the missing variables



Con LICAD	Adjusted DMGC <sub>m</sub>
Gen UCAP	
	Adjusted Host Load (AHL)
Load UCAP	

#### **Let's Review**



#### Which formula is correct for Net-UCAP

- a. Net-UCAP = Min (Max([Gen UCAP] [Load UCAP], Net-ICAP), 0)
- b. Net-UCAP = Max (Min([Gen UCAP] + [Load UCAP], Net-ICAP), 0)
- c. Net-UCAP = Max (Min([Gen UCAP] [Load UCAP], Net-ICAP), 0)
- d. Net-UCAP = Max (Min([Gen UCAP] [Load UCAP], ACHL), 0)



# Performance Tracking System (PTS)



- Computes the difference between the Energy actually supplied and the Energy scheduled by the NYISO for all Suppliers located within the NYCA
- PTS is also used to assess a performance charge to all Regulation Service providers with Real-Time Regulation Service schedules
- Determines penalties assessed to non-regulating Generators that do not follow their RTD base points, thereby increasing the regulation burden

# Performance Tracking System (PTS)



- The ISO may disqualify suppliers of reserve that consistently fail to provide Energy or Demand Reduction when required to do so in real time
- The Reserve Performance Index is used in the Day-Ahead Margin Assurance Payment ("DAMAP") calculation which may reduce the DAMAP payments to Demand Side Resources



#### VSS - Reactive Capability Test

- Each year resources that participate in VSS must be tested to demonstrate Lagging and Leading Reactive Power capability
- Test data reports must be submitted electronically by the VSS Supplier within ten (10) business days of the test
- Lagging MVAr capability must be tested or demonstrated during the Summer Capability Period (May 1 through October 31, inclusive).
  - Lagging MVAr capability testing will normally be performed during on-peak hours
- Leading MVAr capability must be tested or demonstrated between January 1 and October 31, inclusive
  - The Leading MVAr testing will normally be performed during off-peak hours



- Failure to Perform by VSS Suppliers\*
  - Failure to comply with the ISO's request for steady-state voltage control will impact Voltage Support Service payments for that month
  - Failure to Provide Voltage Support Service When a Contingency occurs
    - Initial Failure: The ISO will withhold from the Supplier one-twelfth (1/12th) of the annual payment
  - Failure to Maintain an Automatic Voltage Regulator or Commence Timely Repairs within 30 days

\* Refer to MST 15.2.3 for details



#### DMGC or DMNC Test Data

- Suppliers offering to supply Unforced Capacity must submit DMNC/DMGC test data or data from actual operation for each Generator comprising the BTM:NG Resource
- NYISO's Market Monitoring Unit will verify the DMNC and DMGC test data received from Suppliers
- Internal combustion, combustion units and combined cycle units must be temperature adjusted

# **DMGC Testing**



- All generating Resources must test using usual and customary industry practices
  - No extraordinary means to achieve results
- Installed Capacity Suppliers must submit results from a DMNC/DMGC test or data from actual operation ("DMNC/DMGC Demonstration") from within the DMNC Test Periods ("in-period")

# **DMGC/DMNC** Test Form - Example



											Version 1.5 of Attachment D		
											Last Updated on November 04, 2008		
NEW YORK ISO													
	DEPENDABLE MAXIMUM NET CAPABILITY (DMNC) TEST And PROVEN MAXIMUM PRODUCTION CAPABILITY (PMPC) TEST												
			A		EN MAXIMUM rnal Combustion								
				Inte	i nai Combustion	n and Co	moustion Turbi	ne Generatio	,11	Check a	Il that apply:		
Company:											□DMNC		
											□ PMPC		
				Post-Tes	t Rating is trun	cated to	tenth of a MW;	NO rounding	g		_		
									at Average				
			Avg.		Capability at Te	st Temp	. (MW)		Temperature				
	PTID	Date of	Amb					(1	MW)				
Generator or Station Name	Number	Test	Temp.	Test				Pre-Test	Post-Test	Remarks			
			(/F)	Temp.	Demonstrated PMPC	Per	Excess (+)		DMNC/PMPC				
				(/F)	PMPC	Curve	Deficiency (-)	PC Rating*	Rating				
	1										=		
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	4.30												
* From Last Like Ca	apability P	enod				Name	(if submitted ele	ectronically).					
						Sign	ed (if submitted	by fax/mail):					
								Title:					
								ritte:					
								Date:					

# **DMGC Test Periods**



Winter Capability Period Summer Capability Period								od			
Nov	Dec	Jan	Feb	Mar	Apr	May	May June July Aug Sep Oc				
Winter TEST Period						Sum	mer TES	ST Perio	od		

### Summer Capability Period

• June 1st through September 15th

#### Winter Capability Period

November 1st through April 15th

# **DMGC Testing**



- Resources submitting DMNC or DMGC Demonstration results from outside the normally applicable DMNC Test Period ("out-of-period") must verify the approved "out-ofperiod" DMNC/DMGC rating during the next DMNC Test Period (an "in-period" test)
  - Failure to verify "out-of-period" test may result in sanctions and deficiency charges

# **Out-of-Period DMNC/DMGC Test**



Winter Capability Period						S	ummer	Capabi	ility Peri	od
Nov	Dec	Jan	Feb	Mar	Apr	May	June	Sep	Oct	
	Winter TEST Period					Sumi	mer TE	ST Peri	od	
Out-of-Period To for Summe Capability Per					er	 			Out-of- Test for Capabili	

- To begin next Capability Period
  - Summer: Test data from after 3/1 and prior to 6/1
  - Winter: Test data from after 9/1 and prior to 11/1
- The OOP test must be verified with equal or greater test result within the next Test Period or penalties may apply

# **Outage Scheduling Requirements**



- BTM:NG Resources are required to follow the same outage scheduling process as all other Generators – examples
  - All Installed Capacity (ICAP) Suppliers are required to abide by NYISO maintenance coordination
  - All other generating resources are required to inform the NYISO of their annual maintenance plans
  - Two day minimum notification for outages and re-schedules
  - NYISO/TO authorization to remove generator from service
  - Forced outages or de-rates should be reported immediately
  - Increased Host Load must be reflected in a unit de-rate if the increase prevents the BTM:NG Resource from meeting its DAM schedule

<sup>\*</sup>Refer to the Outage Scheduling Manual for details

# **GADS** Reporting



- All reporting requirements applicable to Generators will apply to BTM:NG Resources
- BTM:NG Resources with an aggregation of units will report GADS data and NYISO will calculate a "fleet" Derating Factor for the facility
- Host Load data will not be reported into GADS

# **Let's Review**



# Measuring and Reporting

A generating unit outage request must be submitted to the NYISO Scheduling Department and the TO within the minimum notification time of \_\_\_\_\_ calendar days.

All increases in Host Load must be reported to the NYISO and will be considered a derate.

True or False



# Settlements

#### **Energy Settlements for BTM:NG Resources**



- BTM:NG Resources are settled using TO net meter data at the interconnection point
  - Net injections receive LBMP for MW not associated with a bilateral transaction
    - Deviations from Base Point Signals are subject to the same rules and penalties as other wholesale Generators
  - Net withdrawals settle with the wholesale LSE
- BTM:NG Resources are subject to wholesale market charges as a wholesale Generator, based on its injections into the grid

## **BTM:NG Potential Payments and Charges**



Energy Market	Schedule 1 Payments and Charges	Regulation Market	Reserve Market	Voltage Support Service	ICAP Market
Day Ahead Energy Payment	OATT Schedule 1 Injection Charges	Day Ahead Regulation Capacity Payment	Day Ahead Reserve Payment	VSS Availability Payments	ICAP Capacity Payments
Real Time Energy Balancing Settlement	Schedule 1 FERC Fees	Real Time Regulation Capacity Balancing Settlement	Real Time Reserve Balancing Settlement	VSS Lost Opportunity Cost	ICAP Penalties and Deficiency Charges
DAMAP Payments		Regulation Movement Payments		VSS Failure to Perform Charge	
Day Ahead BPCG Payments		Regulation Performance Charges			
Real Time BPCG Payments		Regulation Revenue Adjustment Charge/ Payment			

# **Summary**



- Characteristics of a Behind-the-Meter: Net Generation Resource
- Program Eligibility Requirements
- Process for Enrollment
- Calculating ACHL
- Participating in the Energy and Ancillary Services Markets
- Bidding and Scheduling
- BTM:NG Resource Participation in the Installed Capacity Market
- Measuring and Reporting Performance
- Settlements

#### References



- Market Services Tariff (MST)
- Open Access Transmission Tariff (OATT)
- Installed Capacity Manual
- Ancillary Services Manual
- Outage Scheduling Manual
- Revenue Metering Requirements Manual
- Market Participant User's Guide
- ICAP Automated Market System User's Guide
- Demand Response Information System User's Guide