

# Behind the Meter Net Generation Initiative: Energy Market Participation

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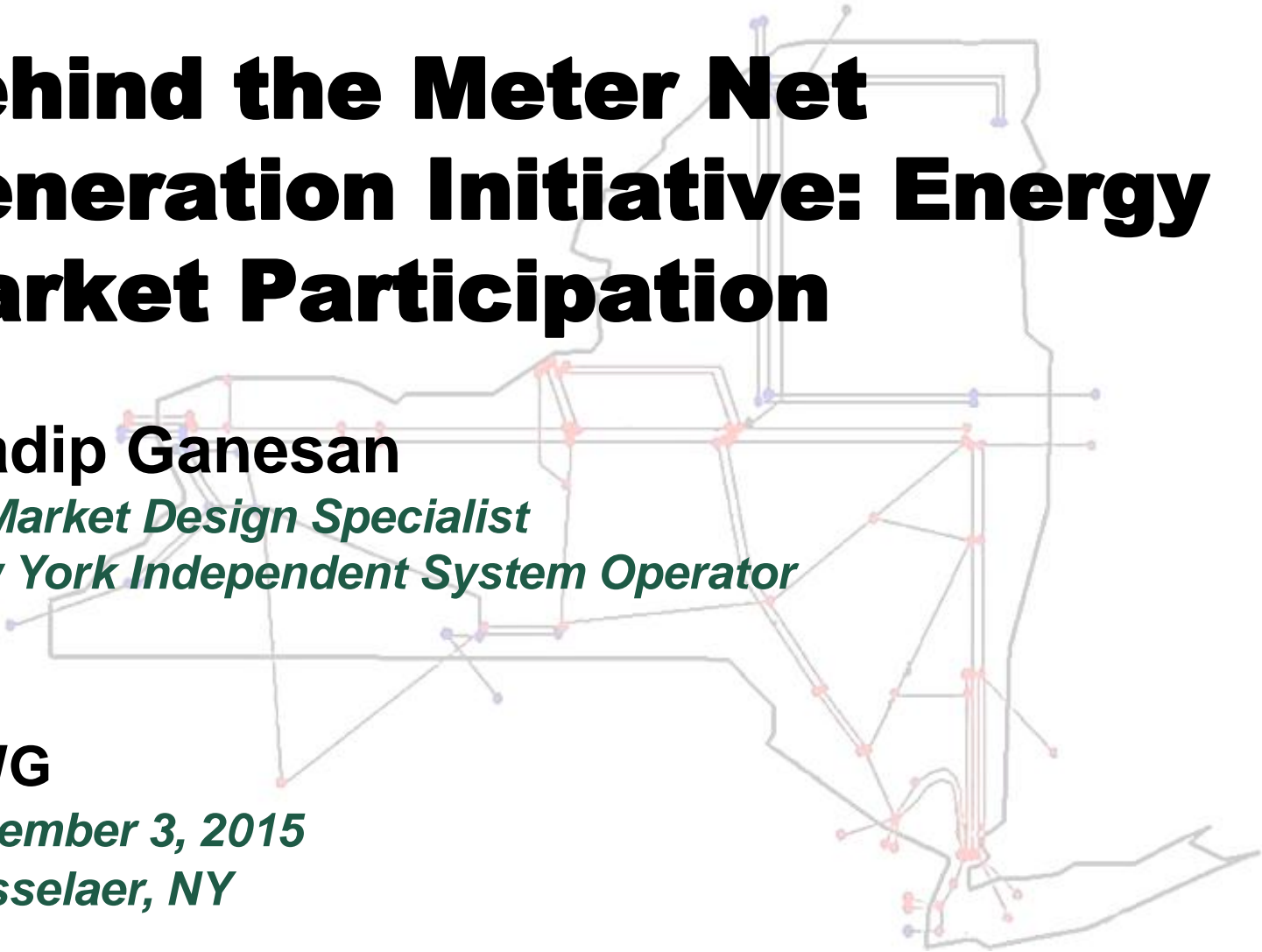
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# Topics

- ◆ **Review definition of behind the meter resource**
- ◆ **Review Participation requirements for BTM:NG Resources**
  - *Minimum Load Requirements*
  - *Minimum Net Generation Requirements*
  - *Telemetry & Metering Requirements*
- ◆ **Review of different BTM:NG Configurations**
  - *Review of ancillary services that can be offered in different bid modes*
- ◆ **Treatment of BTM:NG Resources**
  - *UOL*
  - *Start Up/Min Gen Costs*
  - *Min Gen MWs*
  - *Incremental Cost Curves*
  - *Required Offer Parameters*
- ◆ **Review Settlement Process**
- ◆ **Review Outage Scheduling Process**
- ◆ **Review Energy Market Mitigation**
- ◆ **BTM:NG Bidding, Scheduling and Settlement Example**
- ◆ **Next Steps**

# BTM:NG Resource Definition

- ◆ **The NYISO proposes the following definition of a BTM:NG resource:**
  - *A facility within which a generator, or an interconnected group of generators, routinely serves behind-the-meter load. The facility must:*
    - Be designed and operated to facilitate the business function of the on-site load by providing steam and/or electricity in the regular course of business;
    - Have its load and generation interconnected within a defined electrical boundary; and
    - Be responsive to dispatch instructions for each PTID as a single entity interfacing with the grid.
  - *All generation inside the electrical boundary that will be serving host load or providing the NYISO with excess energy must be permitted to operate as a wholesale seller of energy.*

# Participation Requirements

## Minimum Host Load Requirements

- ◆ **To qualify as a BTM:NG resource, a minimum of 1 MW of ACHL will be required.**
  - *The ACHL is the Average of the host load's top 20 Load hours coincident with the top 40 NYCA Peak Load hours of the Prior Capability Year.*
  - *This evaluation will be performed annually.*
- ◆ **An estimated ACHL can be used for the first year of participation.**
- ◆ **Host Load includes all electrically connected loads within the defined electrical boundary served by the on-site generation.**
  - *This includes station power.*
  - *A generator with no host load other than station power does not qualify to participate as a BTM:NG.*

# Participation Requirements (contd)

## Minimum Net Generation

- ◆ A BTM:NG resource must be large enough to export (inject to the grid) at least 1 MW in the energy market after serving its host load.
- ◆ The interconnection must also allow an export (injection to the grid) of at least 1 MW.
  - *Multiple injection points at lower voltages may be acceptable provided they aggregate to a single injection into the New York State Transmission System.*
  - *The ISO shall review and approve each plant configuration for facilities seeking to participate as a BTM:NG resource.*
- ◆ A BTM:NG resource may aggregate generation resources at the facility in order to inject at least 1 MW in the energy market provided the generation and host load are electrically connected behind the facility interconnection point(s).

# Participation Requirements (contd)

## Telemetry & Metering Requirements

- ◆ Each BTM:NG resource must have a TO net meter at each interconnection point from the BTM:NG resource to the distribution or transmission system.
- ◆ The TO net meter will be used to determine the energy injected into the grid by the BTM:NG resource and needs to be revenue grade quality.
  - *The TO net meter will be used in settlements to calculate payments to the BTM:NG resource for injecting energy into the grid.*
- ◆ Gross generator meter(s) and a facility net meter or gross load meter(s) will be used for qualification and verification purposes and to provide redundancy for the TO net meter.

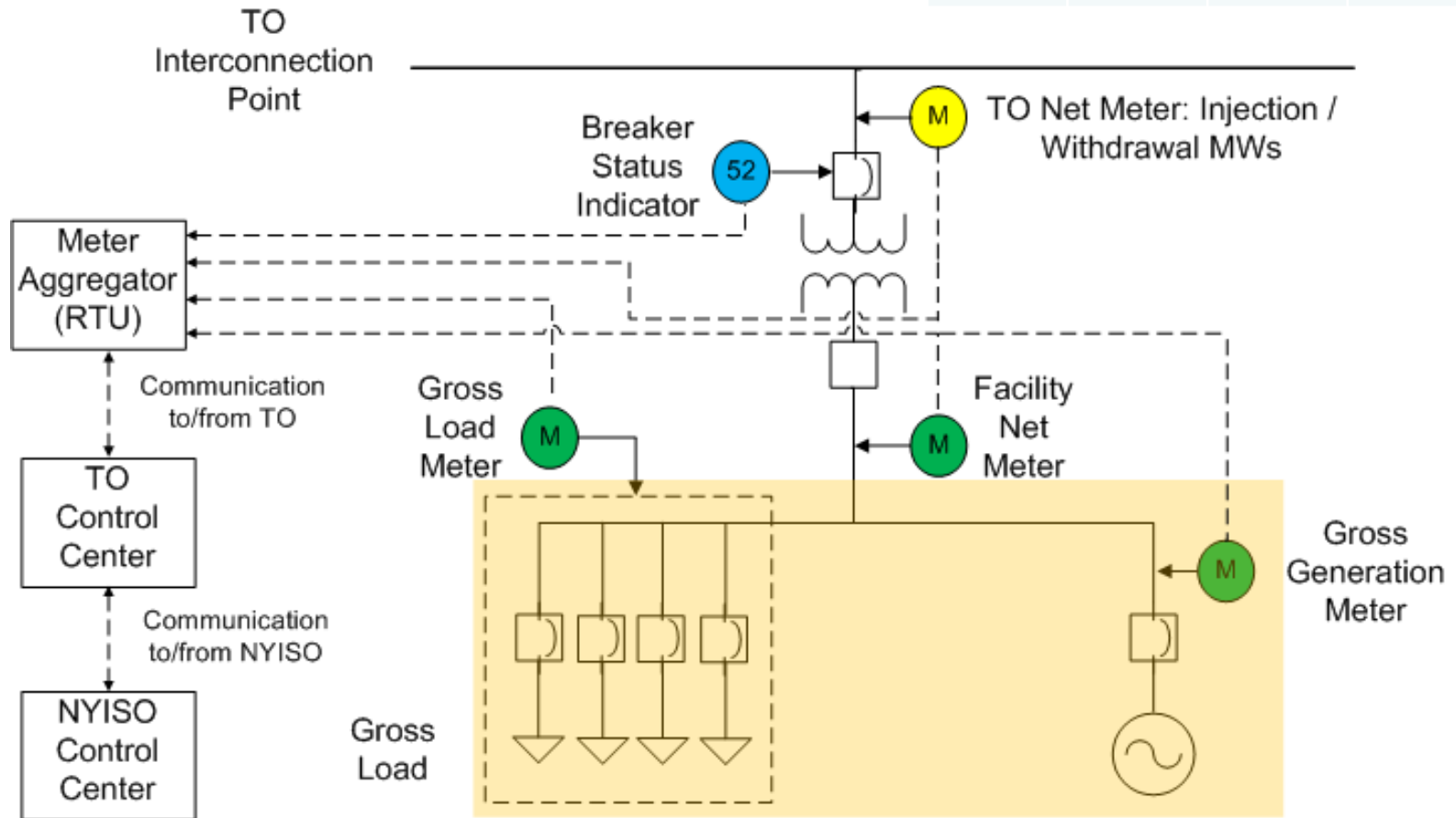
# BTM:NG Configurations

- ◆ **The BTM:NG resource must be able to follow dispatch instructions from NYISO via the connecting TO.**
  - *Direct communication with the NYISO is permitted as a secondary communication path.*
- ◆ **Participation at a facility will be either:**
  - *As a single generator serving a host load (Option 1);*
  - *As an aggregated set of generators serving a host load (Option 2).*

# BTM:NG Metering Configuration – Option 1

Single generator serving host load  
 - Facility must have meters in row 1 or row 2

Gross Generation Meter	Gross Load Meter	Facility Net Meter	TO Net Meter
✓	✓		✓
✓		✓	✓





# BTM:NG Resource Market Participation Review – Option 1

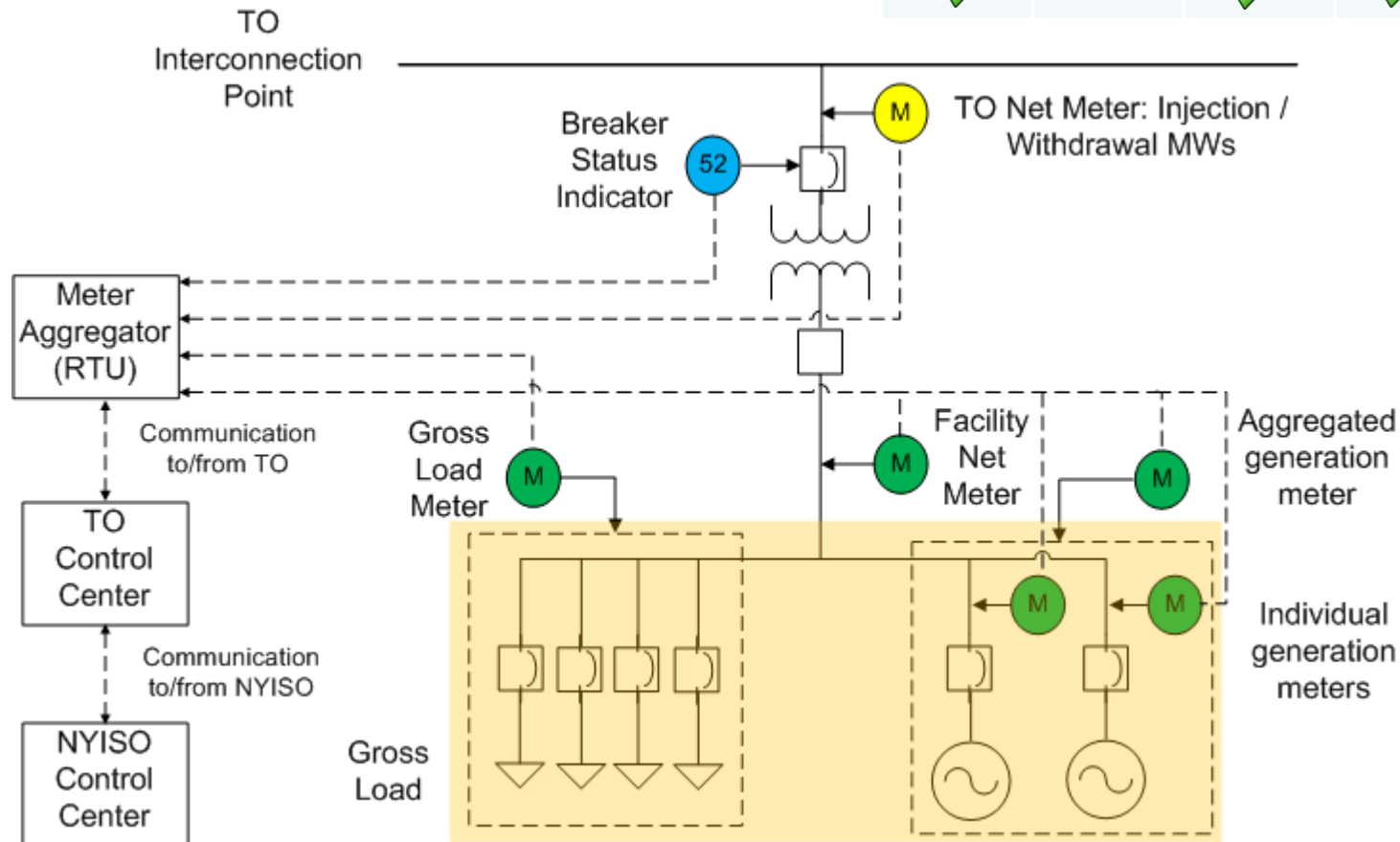
Single resource serving host load (Configuration Option 1)	Energy	Regulation	10-Min Spin	10-Min Non-Spin	30-Min Reserve
Self-Scheduled Fixed	✓	✗	✗	✗	✗
Self-Scheduled Flexible	✓	✓	✓	✓	✓
ISO-Committed Fixed	✓	✗	✗	✗	✗
ISO-Committed Flexible	✓	✓	✓	✓	✓

# BTM:NG Metering Configuration – Option 2

Aggregated set of generators  
Serving host load

- Facility must have meters in row 1 or row 2

Aggregated Meter or Individual Generation Meters	Gross Load Meter	Facility Net Meter	TO Net Meter
✓	✓		✓
✓		✓	✓



# BTM:NG Resource Market Participation Review – Option 2

Aggregated resource serving host load (Configuration Option 2)	Energy	Regulation*	10-Min Spin*	10-Min Non-Spin	30-Min Reserve
Self-Scheduled Fixed	✓	✗	✗	✗	✗
Self-Scheduled Flexible	✓	✗	✗	✓	✓
ISO-Committed Fixed	✓	✗	✗	✗	✗
ISO-Committed Flexible	✓	✗	✗	✓	✓

**\* Not allowed because NYISO has no visibility of the individual units to confirm that the product is being provided by a synchronous resource**

# Treatment of BTM:NG Resources in the Energy Markets – BTM:NG’s UOL

- ◆ The NYISO’s proposed market design will utilize the unit’s available net generation. The market model will treat the net generation as available energy from the BTM:NG resource. For flexibly bid BTM:NG resources, net generation will be their dispatchable range.
  - *The BTM:NG resource will enter the Normal UOL and the host load it expects to serve for each hour with its energy offer.*
  - *The Normal UOL for a BTM:NG resource is its net injection capability into the grid after serving its host load.*
    - BTM:NG facility shall adjust its Normal UOL to reflect its injection limit, as necessary.

# Treatment of BTM:NG Resources in the Energy Markets – Start Up/Min Gen Costs

- ◆ The NYISO has determined that start-up and minimum generation guarantees will not be available for BTM:NG.
  - *The primary function of a BTM:NG resource is to serve its host load before injecting into the grid, not to make its generation capacity available to the electric grid whenever it is economic.*
  - *In addition, the dispatch system does not have sufficient visibility of individual BTM:NG resource(s) to determine whether, when scheduled, the BTM:NG resource has to start up to provide energy to the grid.*

# Treatment of BTM:NG Resources in the Energy Markets – Min Gen MWs

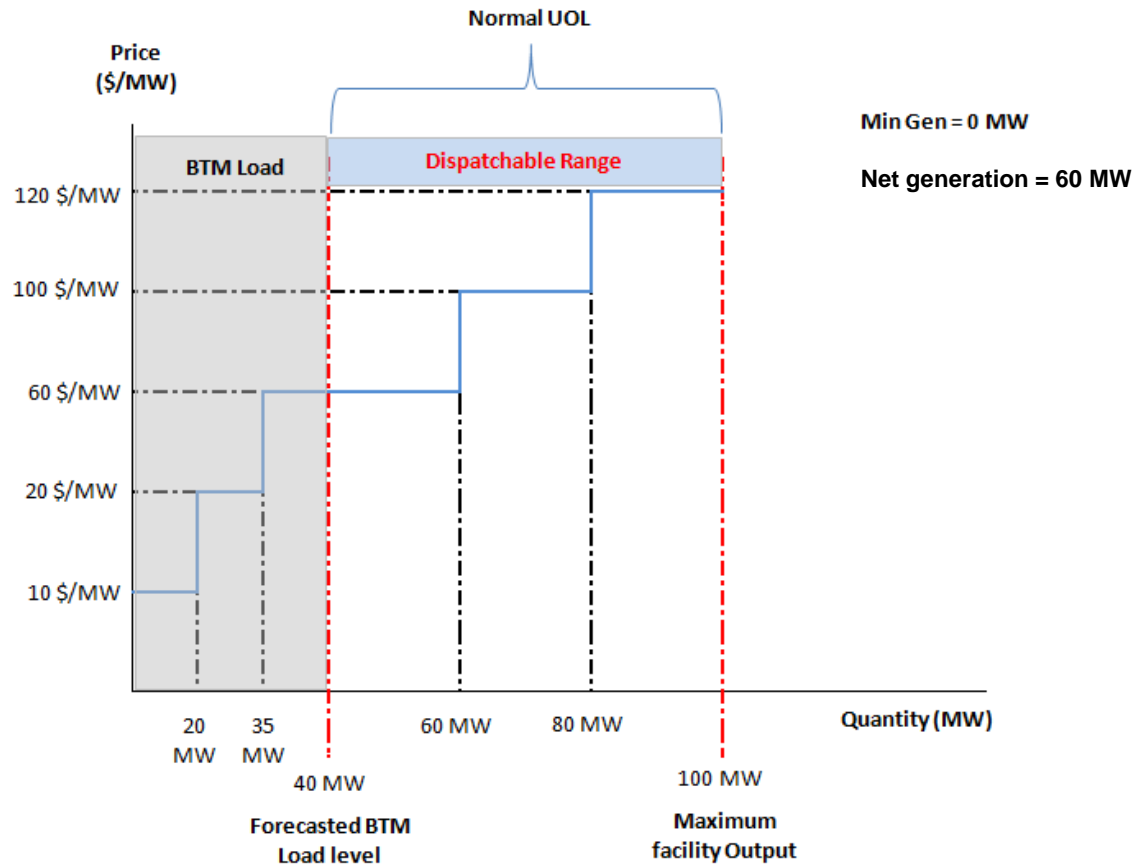
- ◆ The minimum generation MWs (Min Gen MWs) for a BTM:NG resource will be set to zero.
  - *Dispatch decisions for BTM:NG resources will be based on incremental cost curves.*
  - *The need for a BTM:NG resource to serve its host load stands in place of the minimum generation level needed to serve the grid.*
  - *The BTM:NG resource's net generation will be treated as available between zero and the Normal UOL submitted as part of its offer.*
    - Again, net generation is the portion of the BTM:NG's generation beyond the generation it uses to serve its host load.

# Treatment of BTM:NG Resources in the Energy Markets – Incr. Cost Curves

- ◆ The incremental cost curves for the entire range of the BTM:NG unit's output, including the output needed to serve the host load, are required as part of the energy offer.
  - *The cost curves for the entire range of generation are required to allow for proper reference level cost evaluation by Market Mitigation and Analysis.*
    - The reference level software will be available to BTM:NG resources.

# Treatment of BTM:NG Resources in the Energy Markets – Incr. Cost Curves

The incremental cost curves for the entire range of the BTM:NG resource’s output, including the output needed to serve the host load, are required as part of the energy offer. The portion of the cost curve that represents the MWs available for dispatch between zero and the Normal UOL is depicted below.





# Treatment of BTM:NG Resources in the Energy Markets – Req'd. Offer Parameters

- ◆ A BTM:NG resource is not required to submit any commitment related parameters as part of its offer.
- ◆ The following parameters are required as part of the energy offer.
  - *Bid Mode (ISO-Committed Flexible, ISO-Committed Fixed, Self-Committed Flexible, Self Committed Fixed)*
  - *Normal/Emergency UOL*
  - *Forecasted host load value*
  - *Incremental Cost Curves as discussed*
- ◆ Resource response rates will also be required.

# Settlement for BTM:NG Resources

- ◆ **The BTM:NG resource will be settled using the TO net meter reading at the interconnection point.**
  - *A net injection will receive LBMP for MW not associated with a bilateral.*
    - Deviations from base points are subject to the same rules and penalties as wholesale generators.
  - *A net withdrawal will be settled with the wholesale LSE, as is done today.*
- ◆ **The BTM:NG resource will be subject to wholesale market charges as a wholesale generator, based on its injections into the grid.**

# Outage Scheduling Process

- ◆ **BTM:NGs will be required to follow the same outage scheduling process as do other wholesale generators that plan to enter an outage, or cannot in real-time, meet their schedule.**
  - *Please refer to the Outage Scheduling Manual for details.*

# Energy Market Mitigation Review

- ◆ **The BTM:NG's incremental cost(s) will be subject to the same mitigation measures as other wholesale generators.**
- ◆ **A BTM:NG's forecasted host load value submitted at the time of bidding in the DA and RT markets is also subject to review and verification by MMA.**
  - *The costs of energy injected by the BTM:NG resource will be the costs that appear on the incremental cost curve above that portion of the curve that represents the energy used to serve the forecasted host load value.*

**Example – Illustrates how a facility set-up as option 1 (single physical generator serving host load) can offer its excess generation and get settled for the energy injected into the grid**

# BTM:NG Bidding Example

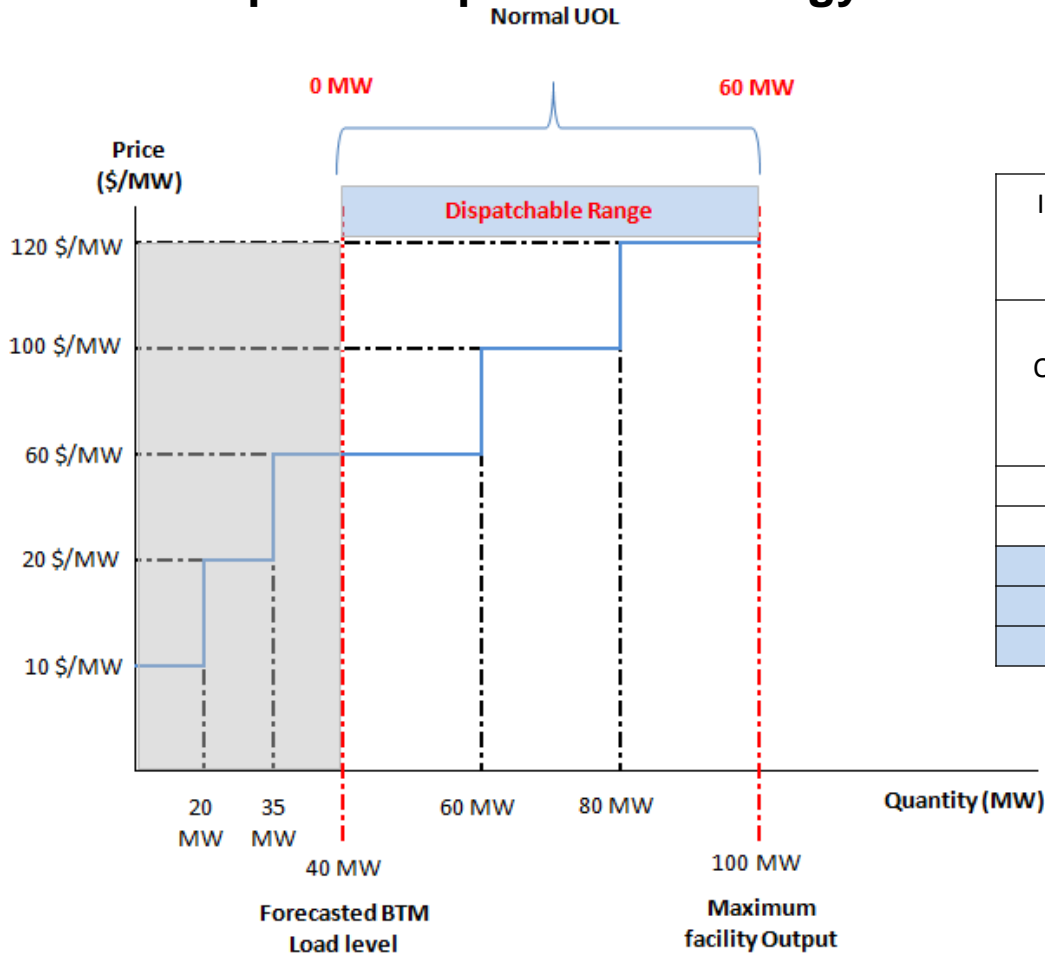
- ◆ A 100 MW behind the meter generator at a facility that serves a 40 MW host load is participating as a BTM:NG resource in the wholesale market.
- ◆ Information submitted as part of the unit's hourly offer:
  - *Normal UOL = 60 MW*
  - *Forecasted host load submitted with bid = 40 MW*
  - *The incremental cost curve provides the cost of energy for the entire range of the BTM:NG unit's output including the output needed to serve the host load.*

# BTM:NG Scheduling Example

- ◆ **The unit's offer will be presented to the scheduling software as follows:**
  - *Unit shall not be dispatched below 0 MW*
  - *BTM:NG's Normal UOL = 60 MW*
    - The Normal UOL in this example is 60 MW because there is a total capacity of 100 MW serving a host load of 40 MW behind the meter.
    - This facility has an excess of 60 MW to offer in the wholesale market.
  - *The incremental cost curves after accounting for the host load and up to the Normal UOL of the generator will be used to evaluate if the unit is economical for dispatch.*
  - *The dispatchable range is between 0 MW and 60 MW above the forecasted host load.*

# BTM:NG Scheduling Example (contd.)

- The incremental cost curves for the entire range of the BTM:NG resource's output, including the output needed to serve the host load, are required as part of the energy offer.



Incremental Cost curve submitted with the generation offer		Incremental Cost curve adjusted for host load	
Quantity (MW)	Price (\$/MW)	Quantity adjusted for host load (MW)	Price (\$/MW)
20	10	-	-
35	20	-	-
60	60	20	60
80	100	40	100
100	120	60	120



# BTM:NG Settlement Example

- ◆ The BTM:NG resource receives a schedule of 60 MW net injection in the DA market. The resource is not able to meet its DA schedule and can only inject 55 MW in that hour in real time.
  - *The RT values used in this example are the time-weighted hourly averages calculated from the five minute schedules.*
- ◆ The DA LBMP price at the PTID point is \$120/MW
  - *DA Settlement: Gen gets paid = 60 MW \* \$120/MW = \$7200*
- ◆ The RT LBMP price for the hour is \$140/MW
  - *RT Settlement: Generator pays = (60 MW – 55 MW) \* \$140/MW = \$700*
  - *Net generator settlement = \$7200 - \$700 = \$6500*
  - *Rate Schedule 1 charges (2015) = \$0.27188/MW \* 55 MW = \$14.95*
  - *Net payment to generator = \$6500 - \$14.95 = \$6485.05*

# Next Steps

- ◆ **September 4: Review capacity and energy market concepts for BTM:NG participation.**
- ◆ **September 16: Market concepts presentation at BIC meeting**

The New York Independent System Operator (NYISO) is a not-for-profit corporation responsible for operating the state's bulk electricity grid, administering New York's competitive wholesale electricity markets, conducting comprehensive long-term planning for the state's electric power system, and advancing the technological infrastructure of the electric system serving the Empire State.



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