

# Behind the Meter Net Generation Initiative: Energy Market Design Proposal

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# Background

- ◆ There have been several requests from generators that serve load behind the meter to allow them to participate in the NYISO wholesale markets as a generator.
- ◆ A behind the meter (BTM) generator has excess or ‘net’ generation (NG) capability after serving its retail load.
- ◆ The NYISO is proposing a set of market rule changes that would allow these generators to participate in the NYISO energy and capacity markets with this net generation.
  - *The NYISO BPWG process has identified a market design deliverable for 2015.*

# Benefits of BTM:NG

- ◆ **Access to this additional supply may improve grid reliability and operational flexibility.**
- ◆ **Improve awareness of resources not currently participating in the NYISO wholesale markets.**
- ◆ **Provide more clarity and certainty for future resource investment within New York State.**

# Introduction

- ◆ **Currently, behind the meter resources can register as a wholesale generator by:**
  - *Qualifying to and then selling the full capability into the wholesale markets (“coming out from behind the meter”).*
  - *Moving the load they serve into the wholesale market via an LSE and,*
  - *Setting up a wholesale market bilateral contract between the generator and LSE.*
- ◆ **The BTM:NG model is designed to allow the generator to participate in the NYISO wholesale markets without:**
  - *Requiring the load to also become a wholesale customer; or*
  - *Requiring the generator to avail itself entirely to the NYISO wholesale market.*

# Participation Requirements

- ◆ **The BTM:NG resource:**
  - *Must have a minimum of 1 MW of net generation (above load requirements).*
    - Excess generation above 1 MW can be in increments of one-tenths of a MW.
  - *Must meet minimum participation criteria as described in the tariff for generators.*
    - Requirements including but not limited to Section 26.1 of the MST.
- ◆ **Will be subject to requirements, and penalties for non-compliance, that are the same as those assessed against wholesale generators.**

# BTM:NG Treatment

- ◆ **The NYISO’s proposed market design will utilize the unit’s available net generation. The market model will derive net generation through an assessment of the size of the load served by the BTM:NG and its gross generation. These elements have to be included in the BTM:NG’s DAM and RT offers.**
  - ◆ *The generator will enter gross generation and the load it expects to serve for each hour with its generation offer and the NYISO will calculate the available “net” generation, which will also be subject to the size of its interconnection. This is discussed in detail starting at slide 12.*

# Benefits of This Approach

- ◆ Provides the NYISO with better visibility of the information needed to accurately calculate available net generation.
- ◆ Increases transparency of generation, and load being served, in the NYCA.

# Registration requirements

- ◆ **The BTM:NG resource shall be required to submit the following information, among other information, at the time of registration:**
  - *Export limits at the inter connection point. The resource will be required to submit a copy of their interconnection agreement, if they have an existing agreement and did not go through the ISO interconnection process.*
  - *Gross Generation details.*
  - *Generation Response/Ramp Rates.*



# **BTM:NG Bidding**

## **(Current bidding requirements that apply)**

- ◆ **The proposed model treats the BTM:NG the same as a wholesale generator. The BTM:NG can offer as:**
  - *ISO-Committed Flexible.*
  - *ISO-Committed Fixed (Day Ahead).*
  - *Self-Committed Flexible.*
  - *Self-Committed Fixed.*
  - *Units at a single location with the same characteristics can bid the units in aggregate as a single plant.*
- ◆ **The proposed model requires BTM:NG resources to offer up to their UOL.**
  - *The generator will be required to provide all parameters including UOL (normal and emergency), Min Run Time, Min Down Time, Max Stops per Day, Notification Time, Start Up Cost, Min Gen Cost, Min Gen MW and Incremental Cost Curves.*

# **BTM:NG Bidding**

## **(Current bidding requirements that apply)**

- ◆ **If qualified and bidding flexibly, reserve offers will be required.**
  - *Operating Reserve Costs required in the DAM; set to zero in RTM.*
  - *Operating Reserve response rates required.*
- ◆ **If qualified and bidding flexibly, regulation service may be offered.**
  - *Regulation MWs, Costs and response rates required when offering regulation.*

# **BTM:NG Bidding**

## **(New bidding requirements)**

- ◆ **The BTM:NG resource will submit the forecasted BTM load in MWs served by the resource each hour.**
  - *To qualify as an energy supplier (as opposed to an energy and ICAP supplier) it is expected that the BTM:NG resource will have a minimum of 0.1 MW load behind the meter that they have to serve before injecting the excess generation into the grid.*

# BTM:NG Scheduling

- ◆ The generation offer and the BTM load information submitted by the MP will be used for scheduling purposes, as described in the examples provided later.
  - *The NYISO will determine the excess energy available from the BTM:NG resource for dispatch.*
- ◆ For energy offers, the following parameters will also be included in the creation of the BTM:NG bid.
  - *UOL (Normal and Emergency), Start Up Cost, Min Gen MW, Min Gen Cost, Incremental cost curves.*
- ◆ For ancillary service offers, the bid-in values will be used.

# BTM:NG – Scheduling (Setting the UOL)

- ◆ The BTM:NG’s UOL shall be set to the lesser of\*:
  - *The difference between the Normal UOL and the BTM Load included in the bid of BTM:NG or*
  - *The interconnection export limit (maintained by NYISO staff).*
- ◆ The unit’s Normal UOL is the upper operating limit the unit expects to reach under normal conditions and accounts for both the production to serve load and the excess production that would normally be available.

*\*Example slides included later in this presentation*

# **BTM:NG – Scheduling (Setting the Start Up Cost)**

- ◆ **Start Up costs are:**
  - *Zero dollars if the load included in the BTM bid  $> 0$  MW; or*
  - *The start-up cost submitted by the resource if load included in the BTM bid = 0 MW.*
  - *These rules are intended to allow a start-up cost only if the generation has cycled off and has a cost to start should the NYISO commit it.*
- ◆ **The expectation is that a BTM:NG resource is usually on, serving a BTM load, and has excess energy to be dispatched.**

# BTM:NG – Scheduling (Setting the Min Gen MWs)

- ◆ The min gen MW shall be the greater of\*:
  - *The difference between the Bid min gen MW and the Load included in the bid of BTM:NG; or*
  - *Zero.*
  
- ◆ A generator's min gen MW is the minimum MW that it needs to generate for stable operation (whether serving load or not).
  - *If the BTM load included in the bid of BTM:NG is more than the min gen MW of the BTM:NG resource, then the min gen MW is set to zero.*
  - *If the BTM Load included in the bid of BTM:NG is below or equal to the min gen MWs of the BTM:NG resource, then the min gen MW is set to the delta between the two.*

*\*Example slides included later in this presentation*

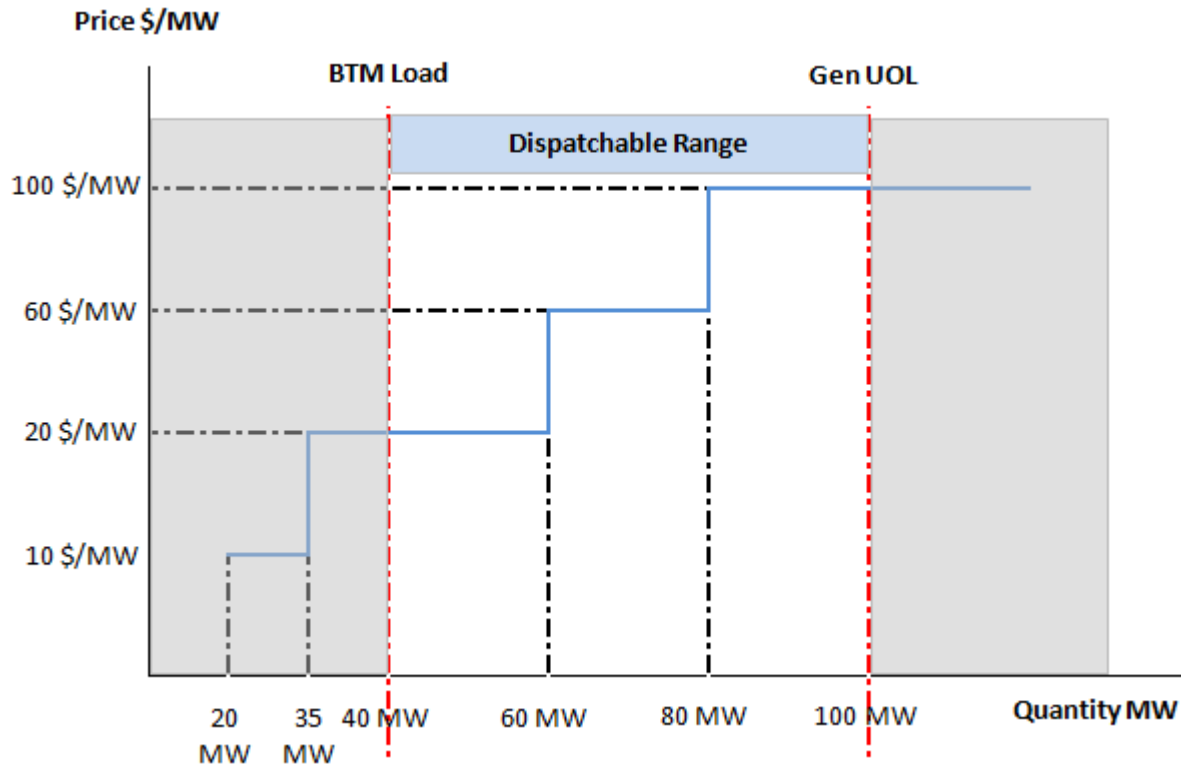
# **BTM:NG – Scheduling (Setting the Min Gen Cost)**

- ◆ **Minimum Generation costs shall be:**
  - *Zero dollars if the load included in the BTM bid > 0 MW; or*
  - *The min gen cost submitted by the resource if load included in the BTM bid = 0 MW.*
  - *These rules are intended to allow a min gen cost only if the generation has cycled off and has a cost to start should the NYISO commit it.*
  
- ◆ **The expectation is that a BTM:NG resource is usually on, serving a BTM load, that is in excess of its Min Gen MWs.**



# BTM:NG – Scheduling (Setting the Incremental Cost Curves)

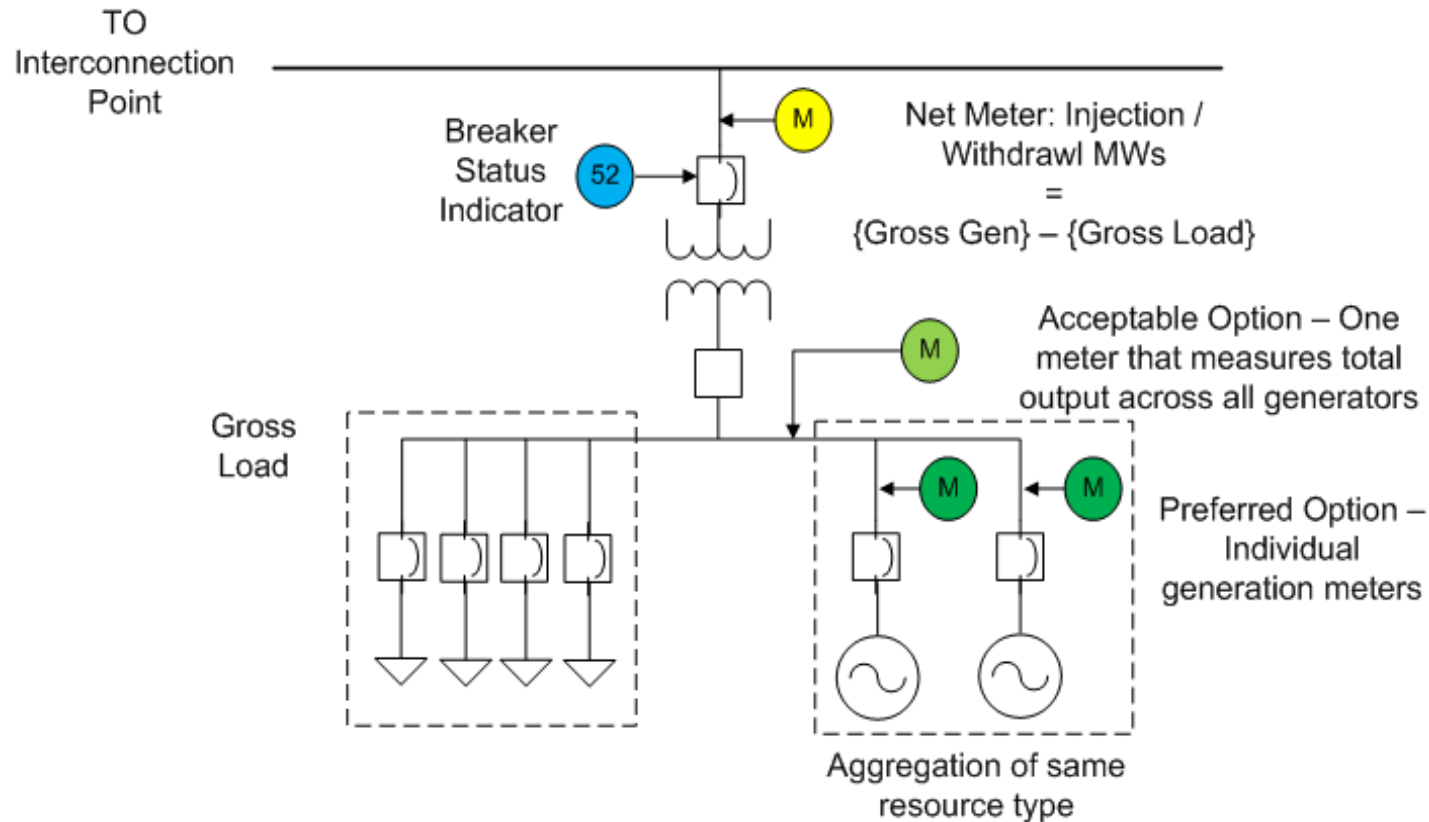
The incremental cost curve between the min gen MW and the UOL MW is the dispatchable range for the BTM:NG resource.



# BTM:NG Metering

- ◆ A meter measuring the gross output of the generator is needed to perform DMNC testing and determine gross output of facility. A single generation meter may be acceptable if it reads the combined output of individual generators of the same resource type.
- ◆ A meter at the point of interconnection is needed to determine:
  - *Net energy injection for real-time dispatch*
  - *Initial settlement calculations and*
  - *Calculating BTM load for capacity eligibility.*

# Minimum Metering Requirements



**A single generation meter reading the combined output of individual generators is acceptable only if all individual generators, otherwise required to be metered, are of the same resource type.**

# BTM:NG Settlement

- ◆ The BTM:NG resource shall be settled using the net meter reading at the interconnection point.
  - *A net injection shall receive LBMP prices.*
  - *A net withdrawal shall be settled by the wholesale LSE, as is done today, not the net generator.*

# Appendix

## Examples to illustrate treatment of BTM:NG resources

# BTM:NG Bidding/Scheduling Example 1

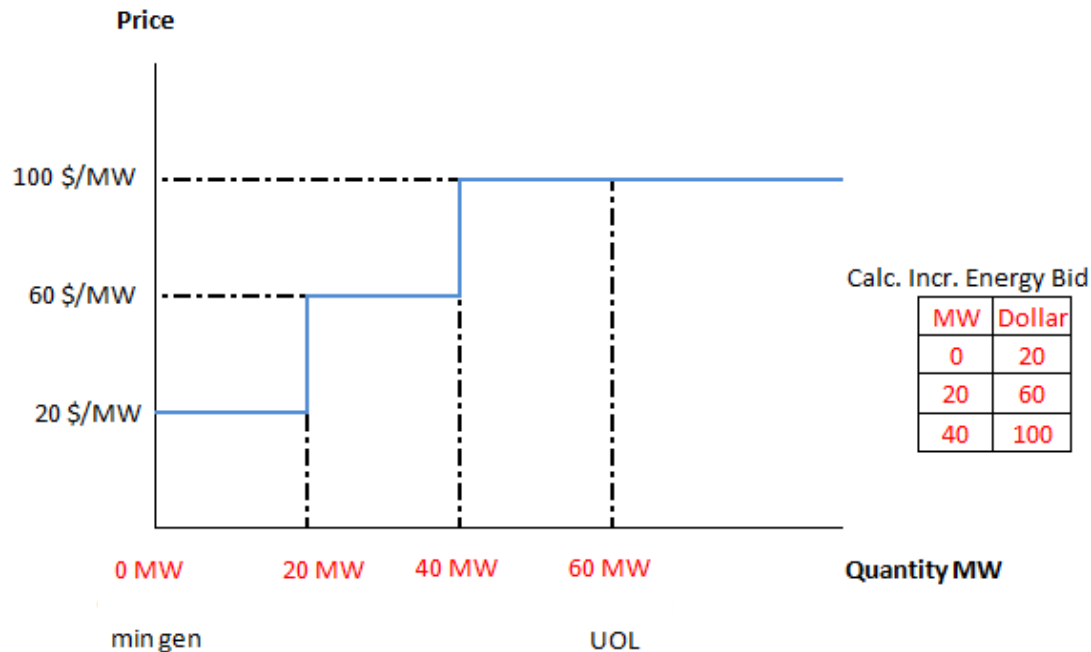
- ◆ Consider a BTM:NG resource whose **min gen MWs are less than or equal to the submitted BTM load MWs**:
  - *Total energy output = 100 MW*
  - *BTM Load submitted with bid = 40 MW*
  - *Interconnection limit = 250 MW*
  - *Start Up Cost = \$5000*
  - *Min gen MW = 20 MW (Min gen MWs ≤ Submitted BTM Load)*
  - *Min Gen Cost = \$1000*
  - *Incremental energy bid:*

MW	Dollar
20	10
35	20
60	60
80	100

# BTM:NG Bidding/Scheduling Example 1

◆ The bid would be scheduled using the following:

- *BTM:NG's UOL =  $\text{Min} \{100 - 40, 250\} = 60 \text{ MW}$*
- *Start Up Cost = \$0 (BTM Load submitted > 0 MW)*
- *Min gen MW =  $\text{Max} \{20 - 40, 0\} = 0 \text{ MW}$*
- *Min Gen Cost = \$0 (BTM Load submitted > 0 MW)*
- *Incremental energy bid curve:*



# BTM:NG Bidding/Scheduling Example 2

- ◆ Consider a BTM:NG resource whose **min gen MWs are greater than the submitted BTM load MWs**:
  - *Total energy output = 100 MW*
  - *BTM Load submitted with bid = 10 MW*
  - *Interconnection limit = 250 MW*
  - *Start Up Cost = \$5000*
  - *Min gen MW = 20 MW (Min gen MWs > Submitted BTM Load)*
  - *Min Gen Cost = \$1000*
  - *Incremental energy bid:*

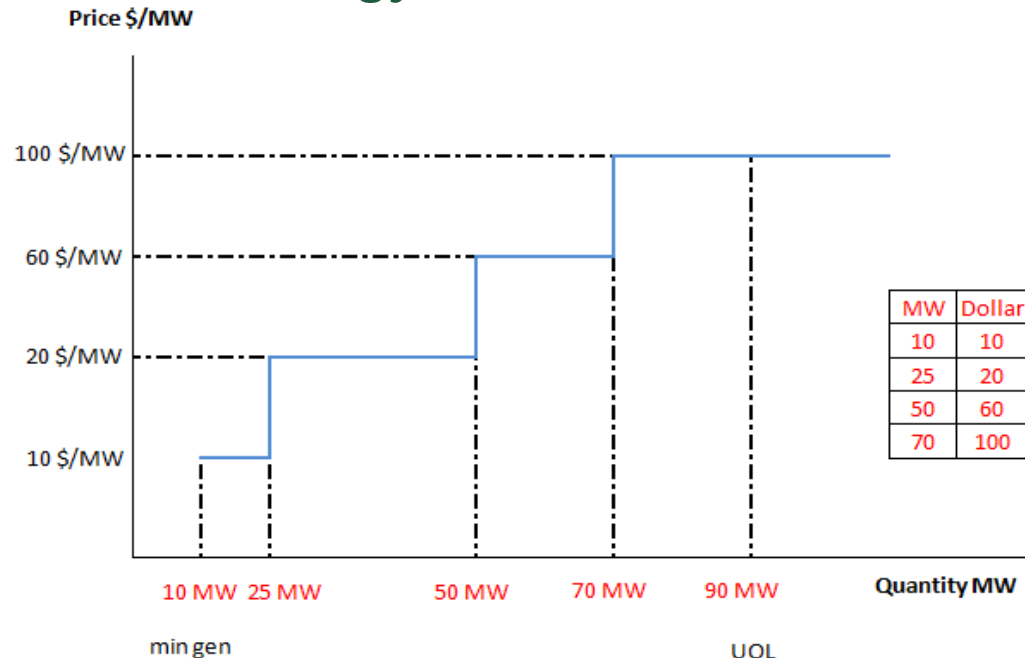
MW	Dollar
20	10
35	20
60	60
80	100



# BTM:NG Bidding/Scheduling Example 2

◆ The bid would be scheduled using the following:

- *BTM:NG's UOL = Min {100 – 10, 250} = 90 MW*
- *Start Up Cost = \$0 (BTM Load submitted > 0 MW)*
- *Min gen MW = Max {20 – 10, 0} = 10 MW*
- *Min Gen Cost = \$0 (BTM Load submitted > 0 MW)*
- *Incremental energy bid curve:*



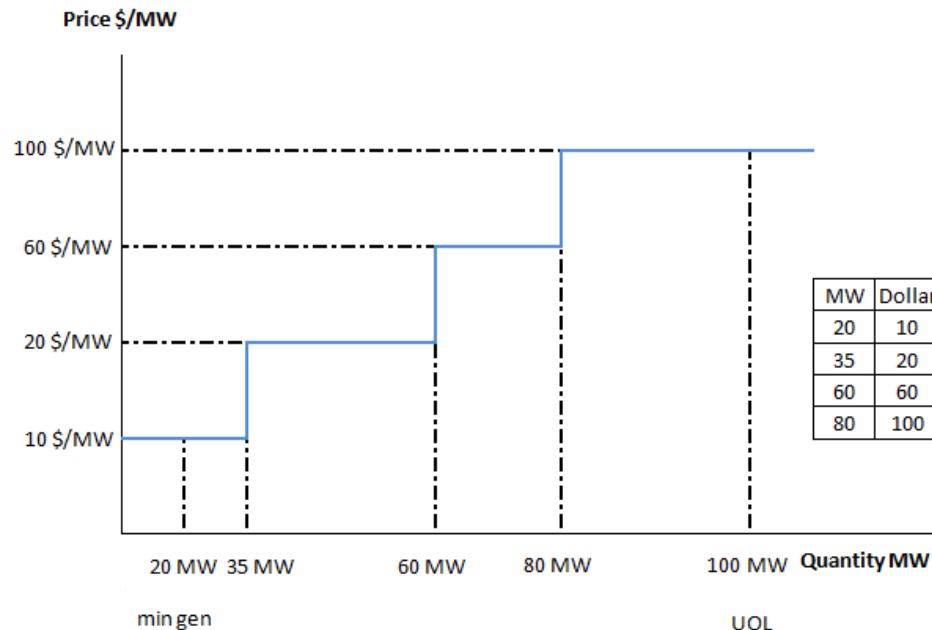
# BTM:NG Bidding/Scheduling Example 3

- ◆ Consider a BTM:NG resource **that has cycled off and is committed by the ISO:**
  - *Total energy output = 100 MW*
  - *BTM Load submitted with bid = 0 MW*
  - *Interconnection limit = 250 MW*
  - *Start Up Cost = \$5000*
  - *Min gen MW = 20 MW*
  - *Min Gen Cost = \$1000*
  - *Incremental energy bid:*

MW	Dollar
20	10
35	20
60	60
80	100

# BTM:NG Bidding/Scheduling Example 3

- ◆ The bid would be scheduled using the following:
  - *BTM:NG's UOL =  $\text{Min} \{100 - 0, 250\} = 100 \text{ MW}$*
  - *Start Up Cost = \$5000 (BTM Load submitted = 0 MW)*
  - *Min gen MW =  $\text{Max} \{20 - 0, 0\} = 20 \text{ MW}$*
  - *Min Gen Cost = \$1000 (BTM Load submitted = 0 MW)*
  - *Incremental energy bid curve:*



# BTM:NG Bidding/Scheduling Example 4

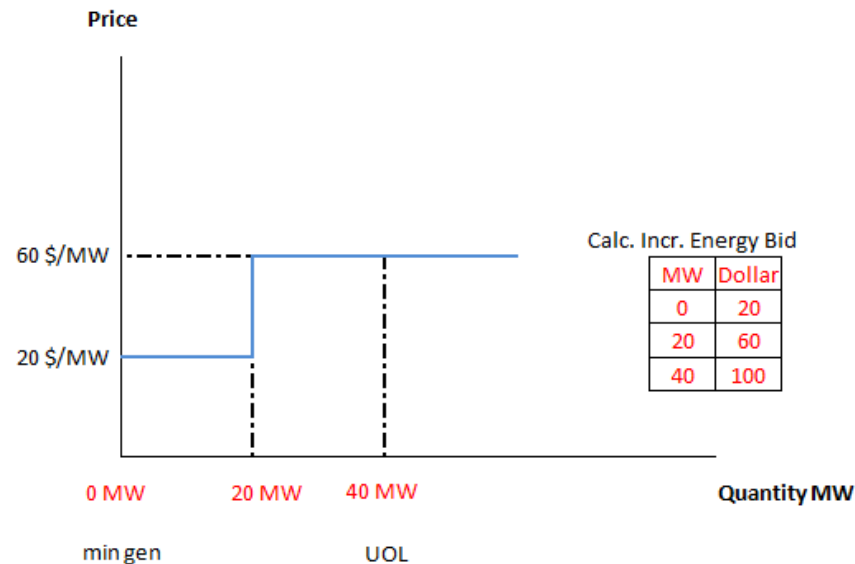
- ◆ Consider a BTM:NG resource whose **interconnection limit is less than the net generation output of the resource:**

- *Total energy output = 100 MW*
- *BTM Load submitted with bid = 40 MW*
- *Interconnection limit = 40 MW*
- *Start Up Cost = \$5000*
- *Min gen MW = 20 MW*
- *Min Gen Cost = \$1000*
- *Incremental energy bid:*

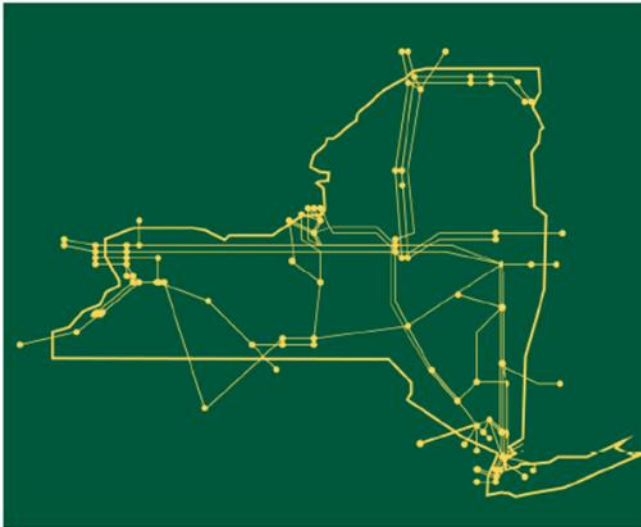
MW	Dollar
20	10
35	20
60	60
80	100

# BTM:NG Bidding/Scheduling Example 4

- ◆ The bid would be scheduled using the following:
  - *BTM:NG's UOL =  $\text{Min} \{100 - 40, 40\} = 40 \text{ MW}$*
  - *Start Up Cost = \$0 (BTM Load submitted > 0 MW)*
  - *Min gen MW =  $\text{Max} \{20 - 40, 0\} = 0 \text{ MW}$*
  - *Min Gen Cost = \$0 (BTM Load submitted > 0 MW)*
  - *Incremental energy bid curve:*



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