Behind the Meter Net Generation Initiative: Energy Market Design

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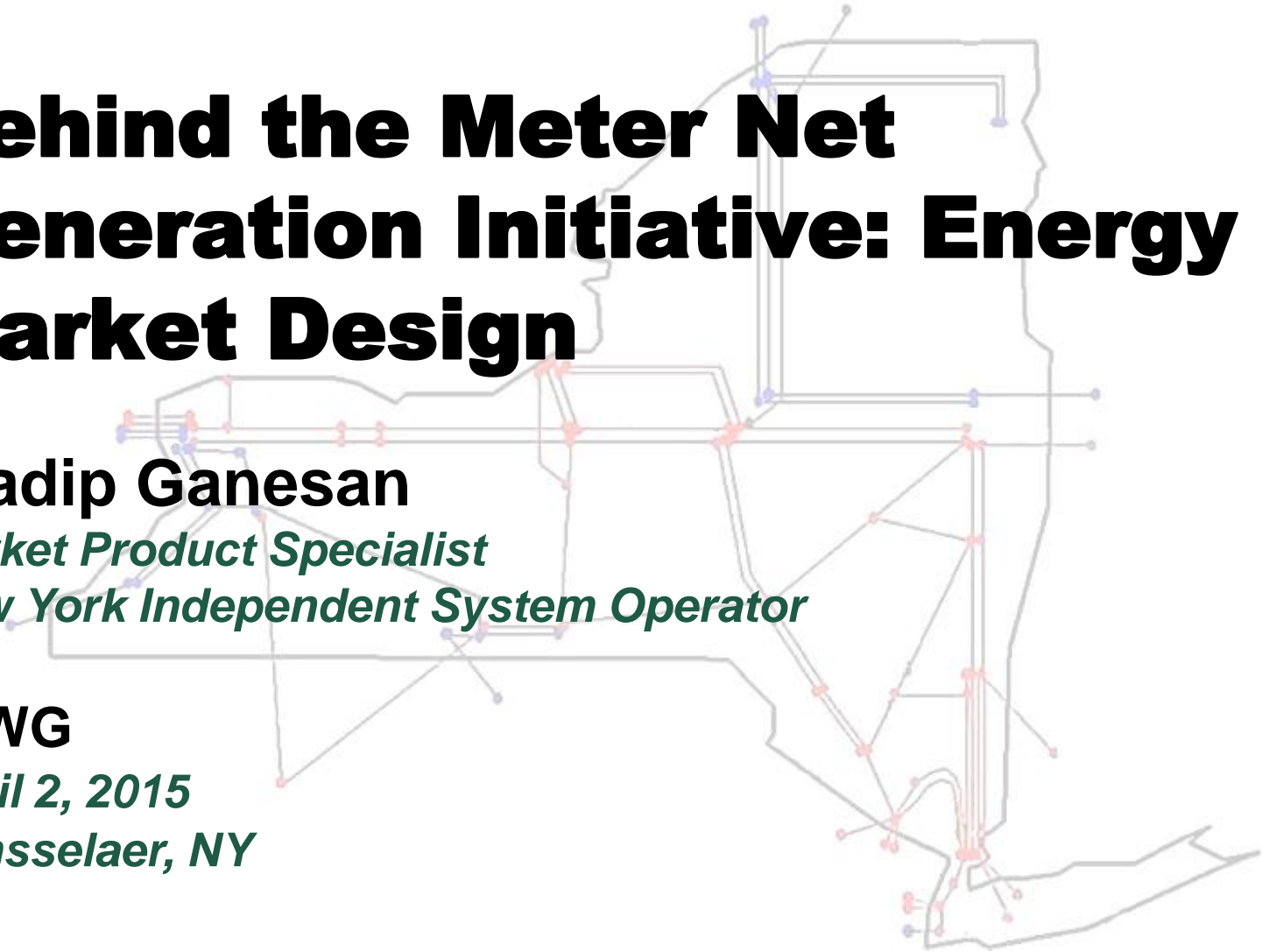*Market Product Specialist*
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Background

- ◆ **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.**

- ◆ **The behind the meter (BTM) generators have excess or 'net' generation (NG) capability after serving its retail load.**

- ◆ **Generators have requested that they be allowed 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.**

  - ▪ *Allow eligible behind the meter generation that serves retail load to sell the 'net' generation into the wholesale market.*

Benefits of BTM:NG

- **Improve awareness of resources not currently participating in the NYISO wholesale markets.**

- **Access to this additional supply may improve grid reliability and operational flexibility.**

  - *The NYISO is aware of over 100MW of behind the meter generator capacity not currently available to the 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 load.*

- **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.*

BTM:NG Model

- **The proposed model treats the generation and load as two separate components.**
  - *Provides better visibility of load behind the meter.*
  - *Allows the NYISO to use all of the information to determine net generation schedules.*
  - *The generator will enter gross generation and the load it expects to serve for each hour and the NYISO will calculate the available "net" generation, subject to the size of its interconnection. This is discussed in detail starting at slide 9.*

- **This presentation introduces design concepts for modeling Behind-the-Meter Net Generators (BTM:NG) in the Energy Markets and covers:**
  - *Registration*
  - *Bidding*
  - *Scheduling*
  - *Metering*
  - *Settlements*

BTM:NG 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.*

    - *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 where the BTM:NG can offer as:**
  - *ISO-Committed Flexible.*
  - *ISO-Committed Fixed (Day Ahead).*
  - *Self-Committed Flexible.*
  - *Self-Committed Fixed.*
  - *Allows several units at a single location with the same characteristics to aggregate as a single plant.*

- **The proposed model allows BTM:NG resources to bid the same as a wholesale generator up to their maximum gross capability.**
  - *The generator may 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 shall submit the forecasted BTM load in MWs served by the resource each hour.**
  - *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 shall be combined to <u>synthesize a new bid.</u>**
  - *The synthesized bid shall be reflective of the excess generation available to schedule in DA and RT commitment.*
  - *This allows the NYISO dispatch to be consistent with what is expected at the net interconnection meter.*

- **For energy offers, the following parameters shall 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 offers, the bid in values shall be used.**

BTM:NG – Scheduling
(Setting the UOL)

- **The BTM:NG's UOL shall be set to the <u>lesser of</u>*:**
    - *The Gross UOL – BTM Load included in the bid of BTM:NG; or*
    - *Interconnection export limit (maintained by NYISO staff).*

- **Reducing the UOL by the forecasted BTM load for the hour provides the net excess generation that can be injected.**

- **If the interconnection limit is less than the net excess generation available then the interconnection limit is used to set the BTM:NG's UOL.**

*Example slides included later in this presentation

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

- **Start Up costs shall be:**

  - *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 the NYISO is committing the generator.*

- **The expectation is that a BTM:NG resource is usually on, serving its BTM load, and has excess energy to be dispatched.**

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

- **The min gen MW shall be the <u>greater of</u>*:**
  - *Bid min gen MW - 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 (before serving any load).**
  - *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 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)

◆ **The min gen cost shall be prorated in each hour based on the calculated min gen MW discussed in the previous slide*.**

  ▪ *If calculated min gen = 0 MW, there should be no cost to wholesale market customers for the cost of maintaining a minimum output.*

  ▪ *If calculated min gen > 0 MW, the portion of the min gen MW included in net injection MW shall be taken into account when committing the BTM:NG resource.*

*Example slides included later in this presentation

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

The incremental cost curve between the calculated min gen MW and the calculated UOL MW is the dispatchable range for the BTM:NG resource.
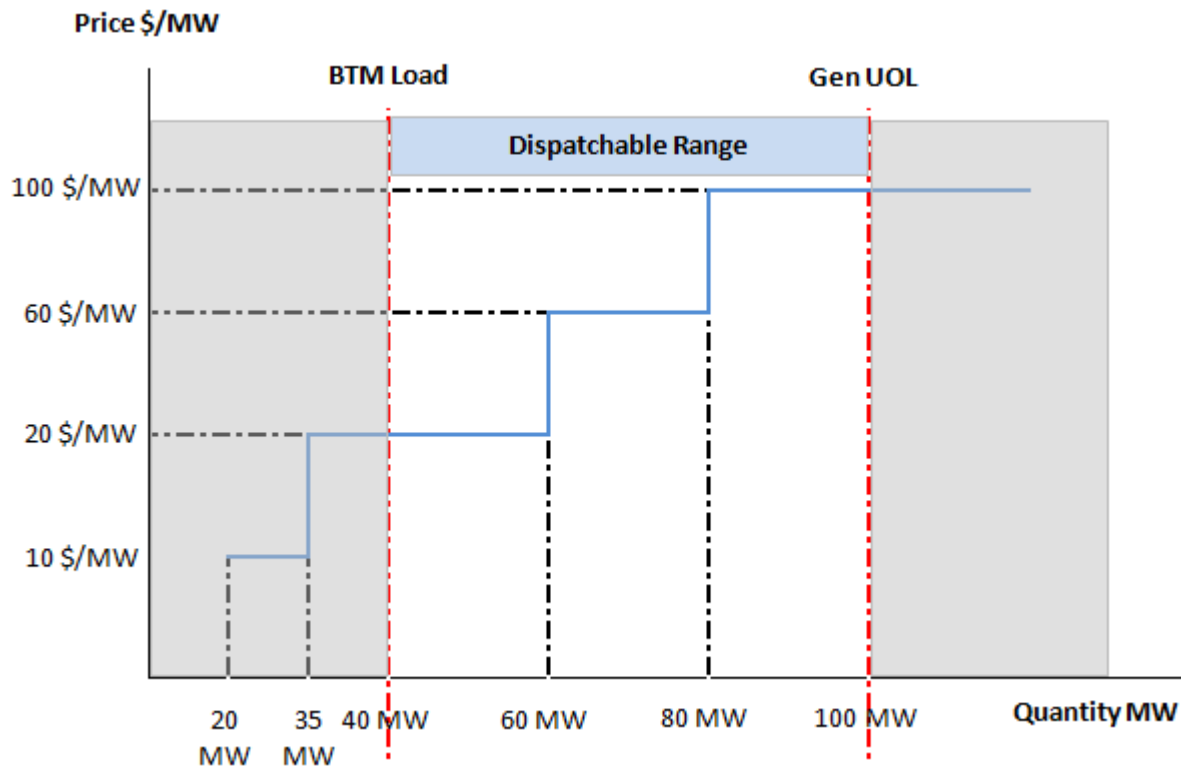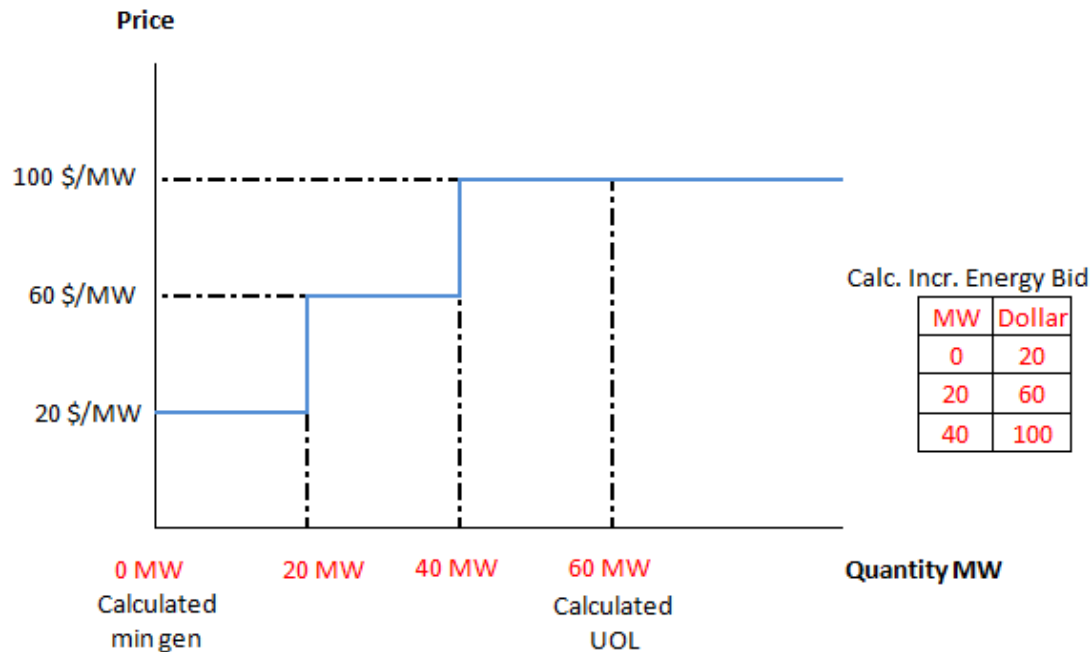
BTM:NG Bidding/Scheduling Example 1

- ◆ **Consider a BTM:NG resource with the following setup:**
  - ▪ *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 synthesized bid is as follows:**
  - ▪ *BTM:NG's UOL = Min {100 − 40, 250} = 60 MW*
  - ▪ *Start Up Cost = $0 (BTM Load submitted > 1 MW)*
  - ▪ *Min gen MW = Max {20 − 40, 0} = 0 MW*
  - ▪ *Min Gen Cost = {0 MW/ 10 MW} * $1000 = $0*
  - ▪ *Incremental energy bid curve:*

Calc. Incr. Energy Bid

| MW	Dollar
0	20
20	60
40	100

BTM:NG Bidding/Scheduling Example 2

- ❖ **Consider a BTM:NG resource with the following setup:**
  - ▪ *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 synthesized bid is as follows:**
    - ▪ *BTM:NG's UOL = Min {100 – 10, 250} = 90 MW*
    - ▪ *Start Up Cost = $0 (BTM Load submitted > 1 MW)*
    - ▪ *Min gen MW = Max {20 – 10, 0} = 10 MW*
    - ▪ *Min Gen Cost = {10 MW/ 20 MW} * $1000 = $500*
    - ▪ *Incremental energy bid curve:*

MW	Dollar
10	10
25	20
50	60
70	100
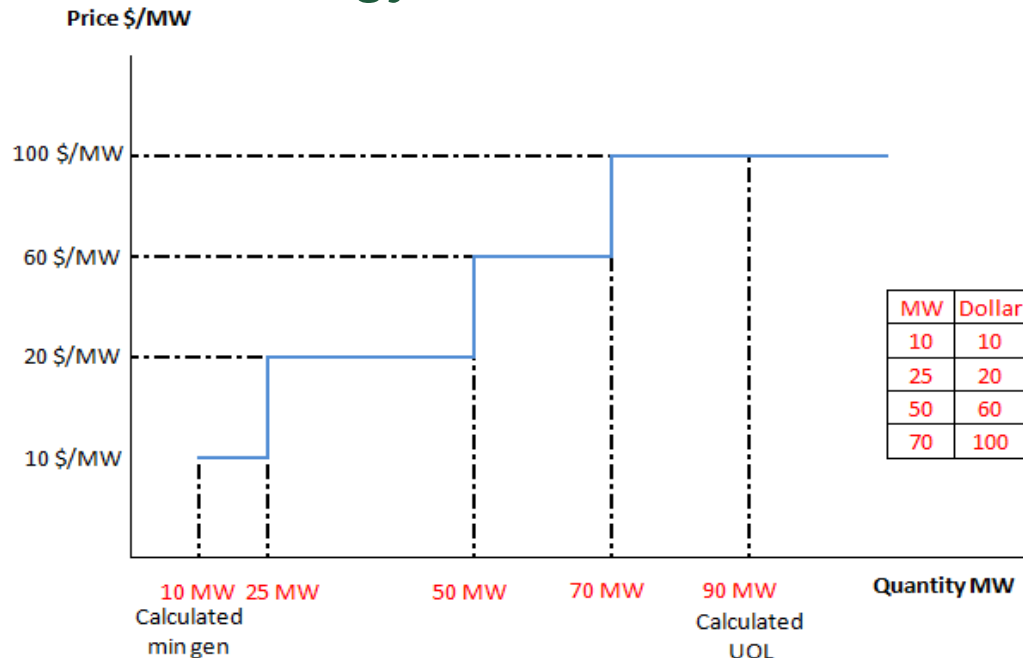
BTM:NG Metering

◆ **Gross generation Meter needed to perform DMNC testing and determine gross output of facility.**

◆ **Net meter at the point of interconnection needed to determine:**

- *Net energy injection for real-time dispatch*
- *Initial settlement calculations and*
- *Calculating BTM load for capacity eligibility.*

Minimum Metering Requirements
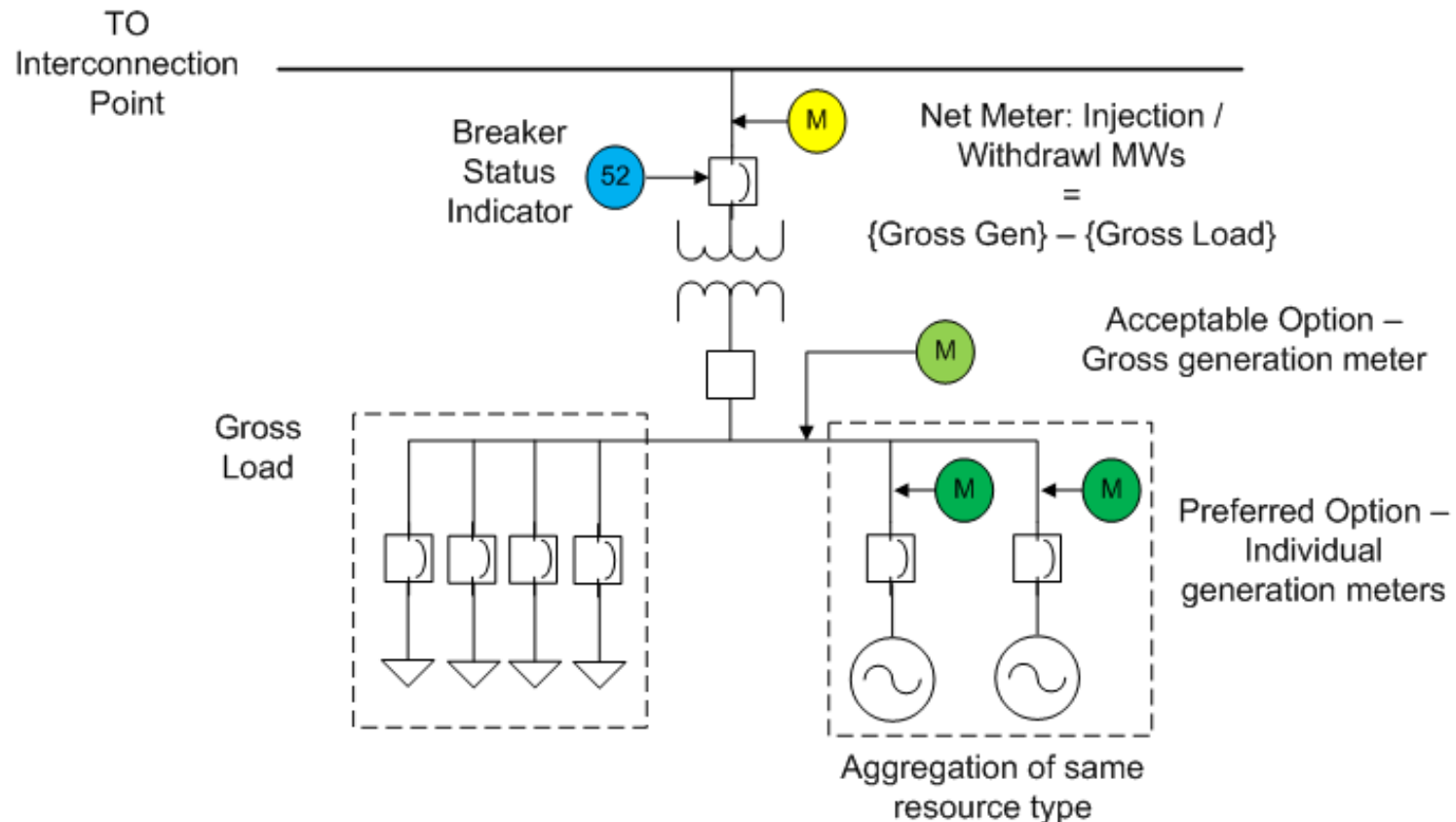
A gross generation meter is acceptable only if all individual generators, otherwise required to be metered, are of the same resource type.

BTM:NG Settlement

- **The BTM:NG resource shall be settled using the net metered value.**
  - *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.*

BTM:NG Settlement Example

- **BTM:NG has an injection capability of 100 MW**
  - *Generator has no start up cost or min gen cost and is scheduled for incremental energy because it is economic.*

- **Settlement**
  - *UOL = 100 MW*
  - *Load served BTM = 40 MW*
  - *Max energy injection = 60 MW*
  - *RTD energy schedule = 25 MW*
  - *RTD bus LBMP = $30/MWh*
  - *Net Generator gets paid $750 = (25MW * $30/MWh)*
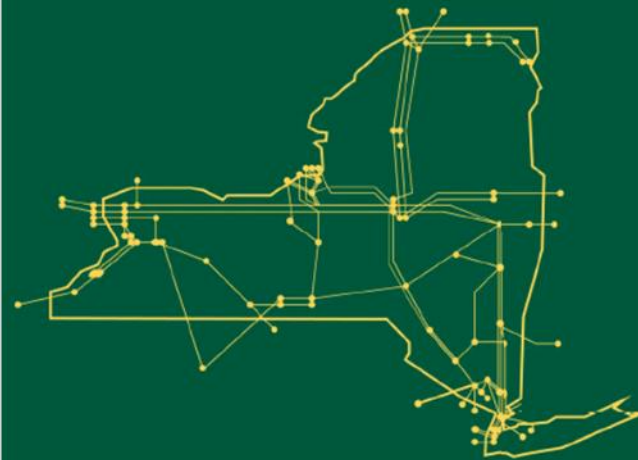
ERIS Requirements

- ERIS was discussed at the February 24, 2015 ICAP WG meeting.

- Under current tariff requirements, generators proposing to interconnect to either transmission or FERC-jurisdictional distribution are subject to the NYISO interconnection process and must satisfy the NYISO Minimum Interconnection Standard in order to be eligible for ERIS.

- ERIS, within the meaning of the tariff, is an interconnection service provided to resources subject to the NYISO interconnection process.

- Generators proposing to interconnect to non-FERC-jurisdictional distribution are not subject to the NYISO interconnection process and, instead, are subject to applicable Transmission Owner/NYPSC interconnection processes.

Next Steps

- Introduce the participation of BTM:NG in NYISO markets (September 19th, 2014 MIWG/ICAPWG)

- Review wholesale generator requirements to participate in NYISO markets (November 19th, 2014 MIWG)

- Introduce Energy Market design concepts for BTM:NG participation (January 29th, 2015 MIWG/ICAPWG)

- Introduce Capacity Market design concepts for BTM:NG participation (February 24th, 2015 ICAPWG)

- DMNCs, Net ICAP, Facility Availability and Net UCAP and Capacity Market Design Concepts (March 18th, 2015 ICAPWG)

- Energy Market design concepts and ERIS Requirements for BTM:NG participation (April 2nd, 2015 MIWG)

- **Continue to discuss with stakeholders**
  - *April 2015 – May 2015*

- **Present final proposal at BIC**
  - *June 2015*

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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