NEW YORK INDEPENDENT SYSTEM OPERATOR
10 Krey Boulevard ♦ Rensselaer, NY 12144

May 16, 2016

VIA ELECTRONIC FILING

Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Re: Docket No. AD16-20-000; Electric Storage Participation in Regions With Organized Wholesale Electric Markets

Dear Ms. Bose:

Enclosed for filing in the above-referenced docket is the New York Independent System Operator's ("NYISO's") Response to the Office of Energy Policy and Innovation's April 11, 2016 data request regarding energy storage resources.

Respectfully submitted,

/s/Gregory J. Campbell
Gregory J. Campbell
Counsel for
New York Independent System Operator, Inc.

cc: Michael Bardee
Anna Cochrane
Kurt Longo
Max Minzner
Daniel Nowak
Larry Parkinson
J. Arnold Quinn
Douglas Roe
Kathleen Schnorf
Jamie Simler
Gary Will

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding in accordance with the requirements of Rule 2010 of the Rules of Practice and Procedure, 18 C.F.R. § 385.2010.

Dated at Rensselaer, NY this 16th day of May 2016.

By: */s/ John C. Cutting*

John C. Cutting
New York Independent System Operator, Inc.
10 Krey Blvd.
Rensselaer, NY 12144
(518) 356-7521

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Electric Storage Participation in Regions With Organized Wholesale Electric Markets	**)** **)** **)** **)**	**Docket No. AD16-20-000**

RESPONSE OF THE NEW YORK INDEPENDENT SYSTEM OPERATOR, INC.

In accordance with the Federal Energy Regulatory Commission ("Commission") Office of Energy Policy and Innovation's ("OEPI's") April 11, 2016 Request for information regarding Regional Transmission Operator ("RTO") and Independent System Operator ("ISO") market rules related to energy storage resources (the "Request") in the above-referenced docket, the New York Independent System Operator, Inc. ("NYISO") hereby submits its response to OEPI's Request (the "Response"). The NYISO shares the Commission's vision for proper integration of energy storage resources ("ESRs") in the wholesale markets it administers, and is currently seeking to expand the opportunities for such resources in New York.

I. COMMUNICATIONS AND CORRESPONDENCE

All communications and correspondence concerning this Response should be served as follows:

Robert E. Fernandez, General Counsel
Raymond Stalter, Director, Regulatory Affairs
Alex M. Schnell, Assistant General Counsel;
Registered Corporate Counsel
*Gregory J. Campbell, Attorney
10 Krey Boulevard
Rensselaer, NY 12144
Tel: (518) 356-6000
Fax: (518) 356-8825

rfernandez@nyiso.com
rstalter@nyiso.com
aschnell@nyiso.com
gcampbell@nyiso.com

* Person designated for receipt of service.

II. RESPONSE TO OEPI QUESTIONS

The NYISO provides the following responses to the questions posed by OEPI in the Request:

A. The Eligibility of Electric Storage Resources to be Market Participants

OEPI Questions

1. If electric storage resources[1] are eligible to qualify as sellers in the capacity, energy, and/or ancillary service markets, please indicate the resource types (e.g. limited energy resource, generator, demand response, etc.) for which they may qualify in each market. In addition, please list where each applicable resource type is defined in the tariff, as well as the criteria for qualifying as each resource type.

NYISO Response

ESRs are permitted to participate in the NYISO's Capacity, Energy and Ancillary Services markets as either of two Generator types: Energy Limited Resources ("ELRs") or Limited Energy Storage Resources ("LESRs").[2] ESRs can also participate in the NYISO's markets as components of one of three different types of Demand Side Resources that sell Capacity, Energy and/or Ancillary Services: Special Case Resources ("SCRs"), Demand Side

[1] In the Request, OEPI defined electric storage resources ("ESRs") as "a facility that can receive electric energy from the grid and store it for later injection of electricity back to the grid. This includes all types of electric storage technologies, regardless of their size and storage medium, or whether they are interconnected to the transmission system, distribution system, or behind a customer meter." Fed. Energy Regulatory Comm'n Office of Energy Policy and Innovation April 11, 2016 Request at 1 n.1.

[2] Capitalized terms not otherwise defined herein shall have the meaning specified in Section 1 of the NYISO's Open Access Transmission Tariff ("OATT") and Section 2 of the Market Administration and Control Area Services Tariff ("Services Tariff").

Ancillary Services Program ("DSASP") Resources, and Emergency Demand Response Program ("EDRP") resources. Although Demand Side Resources (including ESR components, if applicable) are not permitted to inject electricity onto the grid, an ESR can absorb energy, or operate to partially or wholly serve the Demand Side Resource's host load, which may facilitate the provision of the identified demand-side services in the NYISO's markets.

ELRs are Installed Capacity ("ICAP") Suppliers that are unable to operate continuously on a daily basis due to certain restrictions (*e.g.*, environmental restrictions or the need to re-charge), but that can provide energy for at least four contiguous hours each day.[3] ELRs may also be eligible to provide Energy, Spinning Reserve, 10-Minute Non-Synchronized Reserve, 30-Minute Reserve,[4] and/or Regulation Service.[5] The majority of ELR megawatts participating in the NYISO's markets consist of pumped storage hydroelectric facilities.[6] There are other ELRs that are subject to energy limitations based on fuel availability or environmental factors. Demand Side Resources are not eligible to be ELRs.

LESRs are Generators that are not able to sustain continuous operation at maximum Energy withdrawal or maximum Energy injection for a minimum period of one hour.[7] The

[3] Services Tariff Section 2.5 ("Energy Limited Resource: Capacity resources that, due to environmental restrictions on operations, cyclical requirements, such as the need to recharge or refill, or other non-economic reasons, are unable to operate continuously on a daily basis, but are able to operate for at least four consecutive hours each day. Energy Limited Resources must register their Energy limiting characteristics with, and justify them to, the ISO consistent with ISO procedures.").

[4] Although the Services Tariff at this time does not prohibit resources using inverter technology from providing synchronous reserves, the NYISO has asked for clarification from the Northeast Power Coordinating Council ("NPCC") to confirm that resources that rely on inverter technology can provide synchronous reserves.

[5] *See* Services Tariff Sections 2.5, 2.15 and 2.18.

[6] The NYISO does not currently have battery storage resources participating in the Capacity market.

[7] Services Tariff Section 2.12 ("Limited Energy Storage Resource ("LESR"): A Generator authorized to offer Regulation Service only and characterized by limited Energy storage, that is, the inability to sustain continuous operation at maximum Energy withdrawal or maximum Energy injection for a minimum period of one hour.").

NYISO limits LESRs to providing Regulation Service only. Demand Side Resources and Generators that can sustain operation for longer than 1 hour are not eligible to be LESRs.

As noted above, ESRs may participate in the NYISO's markets as components of a Demand Side Resource in the EDRP, DSASP or SCR program. The NYISO's Tariffs prohibit Demand Side Resources from injecting electricity onto the grid, therefore an ESR participating in a demand-side context would be limited to absorbing energy, or operating to partially or wholly serve the Demand Side Resource's host load.

The Services Tariff defines a DSASP Resource as a Demand Side Resource (or an aggregation thereof) located in the New York Control Area ("NYCA") with at least one MW of Load reduction capability that is capable of controlling demand and is qualified to participate in the NYISO's Ancillary Services Market as a Supplier of Operating Reserves or Regulation Service.[8] DSASP Resources may be eligible to provide Spinning Reserve, 10-Minute Non-Synchronized Reserve, 30-Minute Reserve and Regulation Service.[9] DSASP Resources are required to submit Energy offers,[10] and may rely upon ESRs to meet demand reduction obligations when called upon by the NYISO. All charging requirements of the ESR will be billed at the DSASP Resource's retail or wholesale rate.[11] DSASP Resources may also

[8] Services Tariff Section 2.4 ("Demand Side Ancillary Service Program Resource (DSASP Resource): A Demand Side Resource or an aggregation of Demand Side Resources located in the NYCA with at least 1 MW of load reduction that is represented by a point identifier (PTID) and is assigned to a Load Zone or Subzone by the ISO and that is: (i) Capable of controlling demand in a responsive, measureable and verifiable manner within time limits prescribed by the ISO; and (ii) Qualified to participate in the ISO's Ancillary Services Market as a Supplier of Operating Reserves or Regulation Service pursuant to the ISO Services Tariff and ISO Procedures.").

[9] See Services Tariff Sections 2.15 and 2.18.

[10] DSASP Resources do not receive energy payments if their reserves are converted to energy or their energy offer price is reached.

[11] If a DSASP Resource is a direct customer of the NYISO its Load will be billed at the wholesale rate.

participate in a reliability-based demand response program (the SCR or EDRP programs) if they can satisfy program requirements.

SCRs are demand side ICAP Suppliers with Load that is capable of being interrupted on demand at the direction of the NYISO, or that have a Local Generator that can be operated to reduce Load on the NYS Transmission System or the distribution system at the direction of the NYISO.[12] Although the majority of the SCRs in the NYISO's program facilitate their Load reduction from the grid by curtailing the facility's Load, a SCR can use an ESR to satisfy or augment the resource's response.[13] Unlike EDRP resources, SCRs are obligated to respond to NYISO-directed Load reductions when the NYISO provides adequate notice. SCRs are eligible to receive capacity payments based on their ability to reduce Load from the resource's baseline, and energy payments for actual curtailment during NYISO-initiated tests or called events. SCRs that meet the applicable requirements to be a DSASP Resource are eligible to sell Operating Reserves and/or Regulation Service.[14]

Individual resources may participate in the NYISO's EDRP through a Curtailment Service Provider. Curtailment Service Providers are qualified entities that can provide real-time

[12] Services Tariff Section 2.19 ("Special Case Resource ('SCR'): Demand Side Resources whose Load is capable of being interrupted upon demand at the direction of the ISO, and/or Demand Side Resources that have a Local Generator, which is not visible to the ISO's Market Information System and is rated 100 kW or higher, that can be operated to reduce Load from the NYS Transmission System or the distribution system at the direction of the ISO. Special Case Resources are subject to special rules, set forth in Section 5.12.11.1 of this ISO Services Tariff and related ISO Procedures, in order to facilitate their participation in the Installed Capacity market as Installed Capacity Suppliers. SCRs that do not use Local Generators may be offered as synchronized Operating Reserves and Regulation Service and Energy in the Day-Ahead Market. SCRs, using Local Generators rated at 100 kW or higher, that are not visible to the ISO's Market Information System, may also be offered as non-synchronized Operating Reserves.").

[13] As with DSASP Resources, any ESR charging activity would be billed through the SCR's existing retail service, or through a wholesale rate if the SCR is a direct NYISO customer.

[14] Demand Side Resources may participate in one reliability-based demand response program (*i.e.*, the SCR program or EDRP) and one economic-based demand response program (*i.e.*, the Day-Ahead Demand Response Program ("DADRP") or the DSASP) if they can satisfy the requirements of both programs.

reductions in NYCA Load of at least 100 kW in a single Load Zone.[15] EDRP resources participate in the program on a voluntary basis and are not obligated to reduce their Load when called by the NYISO. Much like SCRs, the majority of EDRP resources facilitate their Load reduction by curtailing facility Load during a test or called event. An EDRP resource can use ESR technology to satisfy or augment its curtailment response, provided the resource otherwise meets program requirements. EDRP resources are eligible to receive energy payments for their actual curtailments during NYISO-initiated tests or events. EDRP resources are not eligible to sell Installed Capacity, Operating Reserves or Regulation Service.

2. Are certain types of resources ineligible to participate as sellers in the capacity, energy, or ancillary service markets by definition? If so, please explain which types of resources are ineligible to participate in which markets and why, including citations to any authority for such ineligibility (e.g., NERC standards, etc.).

NYISO Response

In general, the NYISO's tariffs do not condition participation in the Capacity, Energy and Ancillary Services markets based on resource type. If a resource can meet the obligations for participation in one or more of the NYISO's wholesale markets it may participate, regardless of type. The physical limitations of particular resource types, however, impact the markets in which they can participate. With respect to the resource types identified in the NYISO's response to Question A.1, while ELRs are eligible to participate as sellers in all three of the

[15] Services Tariff Section 2.3 ("Curtailment Services Provider: A qualified entity that can produce real-time, verified reductions in NYCA Load of at least 100 kW in a single Load Zone, pursuant to the Emergency Demand Response Program and related ISO procedures. The procedure for qualifying as a Curtailment Services Provider is set forth in Section 3 below and in ISO Procedures.").

NYISO's wholesale markets,[16] LESRs are limited to selling only Regulation Service in the Ancillary Service market.

Of the three demand response products described in the NYISO's response to Question A.1, (i) EDRP resources are only eligible to provide Energy, (ii) SCRs are only eligible to provide Energy and Capacity, and (iii) DSASP Resources are only eligible to provide Ancillary Services.[17] These restrictions apply to all resource types participating in the specified programs, and are not specific to resources that incorporate ESRs.

3. To the extent that electric storage resources are *ineligible* to qualify as sellers in the capacity, energy and ancillary service markets for a resource type, please explain why.

NYISO Response

As explained in the NYISO's response to Question A.1, ESRs are eligible to participate in the NYISO's markets as an ELR or as a LESR. They may also participate as a component of a Demand Side Resource in the NYISO's demand response programs.

4. When electric storage resources are eligible to participate in the capacity, energy, and ancillary services markets, are there different rules for different types of electric storage resources? For example, are there different qualification or performance requirements for batteries versus pumped storage resources? If so, please state these rules and explain the distinctions they draw for the participation of different types of electric storage resources.

[16] The NYISO is in the process of determining whether resources using inverter technology may supply synchronous reserves. *See supra*, note 4.

[17] Demand Side Resources may participate in one reliability-based demand response program (*i.e.*, the SCR program or EDRP) and one economic-based demand response program (*i.e.*, the Day-Ahead Demand Response Program ("DADRP") or the DSASP) if they can satisfy the requirements of both programs.

NYISO Response

The NYISO's rules for participation of ELRs and LESRs in the Capacity, Energy and Ancillary Service markets do not draw a distinction based on resource type; the NYISO's rules permit participation by any resource that is able to meet the applicable obligations to provide the service. The NYISO draws a distinction between resources (whether ESR or "traditional" Generators) that are behind the meter or in front of the meter, but that distinction is not related to whether the resource is an ESR or a "traditional" Generator.

5. Can electric storage resources set the price in the capacity, energy, and ancillary service markets? If not, please explain all circumstances under which electric storage resources are not eligible to set the market-clearing price.

NYISO Response

Supply offers of ESRs that participate as ELRs can set the price for Capacity, Energy and Ancillary Services; LESRs can set the price for Regulation Service. SCRs and EDRP resource energy offers do not directly set the price. When these resources are dispatched, the NYISO's scarcity pricing rules are triggered in the zone(s) in which the demand response resources are activated and may alter Energy and certain Ancillary Services prices.[18]

B. Qualification Criteria and Performance Requirements

OEPI Questions

[18] *See, e.g.*, Services Tariff Sections 4.4.2.7, 15.3.5.1 (Rate Schedule 3), 15.3.5.2 (Rate Schedule 3), 15.4.6.2 (Rate Schedule 4) and 17.1.2.2 (Attachment B) regarding the NYISO's current scarcity pricing logic. Notably, the Commission recently accepted the NYISO's proposed enhancements to its scarcity pricing rules. The NYISO currently anticipates that its revised scarcity pricing logic will become effective on or about June 30, 2016. *See* Docket No. ER16-425-000, *New York Indep. Sys. Operator, Inc.*, Proposed Revisions to Services Tariff and OATT to Implement Improved Scarcity Pricing (Nov. 30, 2015); and *New York Indep. Sys. Operator, Inc.*, 154 FERC ¶ 61,152 (2016).

1. What are the minimum capacity requirements and minimum offer sizes to sell capacity, energy, and ancillary services?

NYISO Response

The minimum requirements are as follows:

Resource Type/Program	Eligibility	Minimum Offer MW	Minimum Incremental Offer (above min. offer MW)
ELR	Capacity, Energy, Spinning Reserve, 10-Minute Non-Synchronized Reserve, 30-Minute Reserve, and Regulation Service[19]	1.0 MW	0.1 MW
LESR	Regulation Service	1.0 MW	0.1 MW
DSASP	Spinning Reserve, 10-Minute Non-Synchronized Reserve, 30-Minute Reserve, and Regulation Service[20]	1.0 MW (in aggregation by zone)	0.1 MW
SCR	Capacity[21]	0.1 MW (in aggregation by zone)	0.1 MW
EDRP	N/A[22]	0.1 MW	0.1 MW

2. What are the technical qualification criteria for each type of resource eligible to participate in the capacity, energy, and ancillary service markets, as applicable?

[19] The NYISO is in the process of determining whether resources using inverter technology may supply synchronous reserves. *See supra*, note 4.

[20] DSASP Resources that use a Local Generator to reduce Load may not provide Spinning or 30-Minute Synchronized Reserve The NYISO is currently in the process of determining whether resources using inverter technology may supply synchronous reserves. *See supra*, note 4.

[21] SCRs are not eligible to be dispatched through the Energy market, but are eligible for energy payments based upon demand reduction response in NYISO-initiated tests and/or called events.

[22] EDRP resources are not eligible to be dispatched through the energy market, but are eligible for energy payments based upon demand reduction response in NYISO-initiated tests and/or called events.

NYISO Response

The technical qualifications are as follows:

Resource Type/Program	Minimum Run Time Obligation	Metering Requirement	Performance Obligation	Response Time
ELR	4 hours (consecutive)	real-time metering capability with telemetry (for dispatch); interval metering (for billing)	Mandatory if scheduled	5-minute base point signals (Energy and Reserves); 6-second Automatic Generation Control signals (Regulation Service)
LESR	15 minutes	real-time metering capability with telemetry (for dispatch); interval metering (for billing)	Mandatory if scheduled	6 second Automatic Generation Control
DSASP	1 hour	real-time metering capability with telemetry (for dispatch); interval metering (for billing)	Mandatory if scheduled	6 second Automatic Generation Control
SCR	4 hours (consecutive)	interval metering (for billing)	Mandatory for NYISO-initiated events	2 hours[23]
EDRP	None	interval metering (for billing)	Voluntary for NYISO reliability event	2 hours[24]

3. What are the technical performance requirements for providing capacity, energy, and ancillary services in NYISO's markets, as applicable?

[23] SCRs receive day-ahead notification as well as a 2-hour in-day notification of test and event initiation. Each SCR is obligated to be at its Declared Value at the start of the test or event, and to remain at that level for the duration. If the SCR is not at its full commitment at the start of the event, its performance factor (an EFORd equivalent) may be reduced.

[24] EDRP Resources, like SCRs, receive a day-ahead notification as well as a 2-hour in-day notification of test and event initiation.

NYISO Response

Please see the NYISO's response to Question B.2.

4. What are the bases for these qualification and performance standards (e.g., North American Electric Reliability Corporation (NERC) reliability standards)? Please provide the technical and operational justifications for these qualification and performance standards, with citations if possible.

NYISO Response

The NYISO's tariffs and manuals describe the qualification and performance standards applicable to ELRs and LESRs participating in the Energy, Capacity and Ancillary Service markets. The qualification and performance standards applicable to ELRs and LESRs are, to the greatest extent possible, aligned with the qualification and performance standards applicable to other Generators. Qualifications and performance standards for all Generators are developed by the NYISO, and are in accordance with standards set by the NPCC[25] and NERC.[26]

C. Bid Parameters for Electric Storage Resources

OEPI Question

1. What are the required bid parameters for each defined resource type to sell in the capacity, energy and ancillary service markets? Are there additional bid parameters that each defined resource type may submit? Are there any bid parameters unique to electric storage resources in each market?

[25] *See, e.g.*, Northeast Power Coordinating Council, Inc., Regional Reliability Reference Directory No. 5: Reserve, https://www.npcc.org/Standards/Directories/Directory_5-Full%20Member%20Approved%20clean%20-GJD%2020150330.pdf.

[26] *See, e.g.*, North American Electric Reliability Corporation, United States Mandatory Standards Subject to Enforcement, http://www.nerc.com/pa/stand/Pages/ReliabilityStandardsUnitedStates.aspx?jurisdiction=United States.

NYISO Response

The bid parameters for each type of transaction in each market are found in Section 7 of the NYISO's Market Participant User Guide.[27]

ESRs participating in the NYISO's Energy, Capacity and Ancillary Service markets are largely subject to the same bid parameters as other resources participating in those respective markets. LESRs providing Regulation Service, however, do exchange a "state of charge management" signal[28] with the NYISO in order to help effectively use the LESR's capability to provide Regulation Service. Unlike other Generators, LESRs are not required to provide a Regulation Capacity Response Rate, Normal Response Rate ("NRR"), or Emergency Response Rate ("ERR") with their Regulation Service bids. LESRs may bid their full Regulation Capacity up to their Upper Operating Limit.

ESRs that are a component of a DSASP Resource may only submit one NRR (traditional generators may submit up to three) and it must equal the ESR's ERR.

D. Distribution-Connected and Aggregated Electric Storage Resources

OEPI Questions

1. Are there opportunities for electric storage resources connected to the distribution system, or a subsystem thereof, to participate in the capacity, energy, and ancillary service markets? If so, please describe those opportunities (i.e., in which markets, as what type of resource, and subject to what tariff provisions may such electric storage resources participate?).

[27] The NYISO's Market Participant User's Guide (Dec. 2015) is available at: http://www.nyiso.com/public/webdocs/markets_operations/documents/Manuals_and_Guides/Guides/User_Guides/mpug.pdf.

[28] See, New York Indep. Sys. Operator, Inc. Presentation to the Price Resposnive Load Working Group, *Limited Energy Storage Resource (LESR) Market Integration Update* (Apr. 27, 2009), http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_prlwg/meeting_materials/2009-04-27/LESR_PRLWG_Presentation.pdf.

NYISO Response

Generators and Demand Side Resources may participate in the NYISO's wholesale markets, regardless of where on the NYS Transmission System and/or the interconnected New York distribution system they are located, if they meet the requirements to provide a particular wholesale service. The NYISO's tariffs do not distinguish ESRs from any other Resource for this purpose.

2. Are there opportunities for aggregated electric storage resources to participate in the capacity, energy, and ancillary service markets? If so, please describe those opportunities (i.e., in which markets, as what type of resource, and subject to what tariff provisions may such electric storage resources participate?).

NYISO Response

Aggregated resources can participate in the EDRP, DADRP, DSASP, and SCR program. Aggregated ESRs may be used to effectuate demand reductions in those programs.

3. If electric storage resources are providing services to the wholesale market and to another entity (e.g., a distribution utility), and if there are tariff provisions that permit or penalize potential deviation from the RTO/ISO economic dispatch signal in that circumstance, please provide them.

NYISO Response

Generally speaking, the NYISO's tariffs do not permit a Supplier (including ELRs and LESRs), except certain Demand Side Resources, that sell Energy, Capacity or Ancillary Services

to the NYISO's wholesale markets to simultaneously provide a service (from the same Supplier) to a distribution utility.[29]

E. When Electric Storage Resources are Receiving Electricity

OEPI Questions

1. Under what circumstances would an electric storage resource submit bids to buy energy in the wholesale markets (i.e., when would an electric storage resource be a wholesale buyer under NYISO's market rules/tariff)?

NYISO Response

ELRs obtain the energy required for charging through negative MW value generation offers submitted to the NYISO. While a negative generation offer is not a traditional "bid to buy" energy, like the bids submitted by a Load Serving Entity ("LSE"), it serves the same function. ELRs pay the Locational Based Marginal Price ("LBMP") at its location for the period in which charging. A LESR providing Regulation Service is charged the average wholesale energy price for the hour in which it is directed to absorb energy from the system.

Demand Side Resources participating in the SCR program, EDRP, DSASP or DADRP do not submit bids to buy energy in the wholesale markets unless the resource is a direct customer of the NYISO (*i.e.*, a LSE) in which case the resource purchases its entire Load from the NYISO

[29] The NYISO's tariffs permit Demand Side Resources to participate in local demand response programs in addition to the NYISO's wholesale demand response programs. The NYISO's performance and/or penalty calculations account only for the Demand Side Resource's performance in the NYISO's programs.

pursuant to the rules applicable to LSEs.[30] A Demand Side Resource may submit price responsive load bids in order to take advantage of off-peak prices to charge its ESR.[31]

2. If electric storage resources must bid to buy electricity from NYISO's market, what are the minimum load obligations, minimum bid sizes, or other minimum parameters to buy electricity in each market? For example, is there a minimum consumption limit to be eligible to pay the locational marginal price (LMP) for energy or a minimum charging duration that must be met to be a wholesale buyer?

NYISO Response

ESRs are not required to bid to buy electricity from the NYISO's market. However, ESRs, like any Load, have the option of bidding into the Day-Ahead Market as a Price Cap Load Bid.[32] The minimum size for a Price Cap Load Bid is 1.0 MW (bid in one hour blocks), and a LSE or direct customer may aggregate multiple individual Loads in a single load zone in order to meet the minimum bid size.

Additionally, ESRs that participate in the LESR program do not provide bids to buy, but nonetheless must buy electricity at wholesale from the NYISO's market as described in the answer to question E.1.

3. Do electric storage resources participating in the capacity, energy, and ancillary service markets always pay LMP for the electricity they receive, and if not, under what circumstances do they not?

NYISO Response

[30] Demand Side Resources that are not direct NYISO customers and are served by a distribution utility (or Energy Service Company) are subject to charges assessed by the distribution provider pursuant to its retail tariffs.

[31] The Demand Side Resource will be charged either a wholesale or a retail rate depending on whether it is a direct customer of the NYISO, or is served by a retail Load Serving Entity.

[32] Services Tariff Section 21.1 (Attachment F).

ELRs using ESR technology and LESRs will pay the wholesale LBMP for the electricity they consume to meet a Regulation Service schedule or to charge the Resource if the Resource is either in front of the meter (a Generator), or a direct NYISO customer (a LSE). If the Resource is behind the meter and served by a separate LSE, then it would pay the LSE's retail rates.

4. Are there circumstances when an electric storage resource receives energy but is not considered load and therefore does not pay for its consumption? For example, if an electric storage resource provides frequency regulation and is asked to receive energy (i.e., provide regulation down) is that considered consumption or provision of frequency regulation, and is the resource charged a wholesale rate for this action?

NYISO Response

ESRs that are ELRs are not considered "Load" by the NYISO. These Resources bid into the market as negative generation and are scheduled by the NYISO to store energy. As an ELR is paid the LBMP at its generator node when it is injecting electricity onto the grid, an ELR pays the LBMP at its generator node when it consumes electricity to replenish its ESR. LESRs responding to a Regulation Service dispatch may either inject electricity or consume electricity depending on the signal. When the LESR is providing Regulation down (*i.e.*, consuming electricity) it is not considered a Load. LESRs that are net consumers in an hour will pay the average of the hourly wholesale price for electricity in the hour for the energy consumed. Demand Side Resources are not permitted to inject electricity onto the grid and are considered "Load" by the NYISO.

F. Potential Changes to the Rules Affecting Electric Storage Resources

OEPI Questions

1. Are there any forthcoming or pending proposals or on-going stakeholder processes that could change or contemplate changing the rules by which electric storage resources can sell into NYISO's markets? If so, please describe the proposals or stakeholder processes briefly and provide citations to any relevant websites or public documents.

NYISO Response

The NYISO's market rules permitting the participation of ELRs were designed and drafted to accommodate large-scale pump-storage facilities, not small-scale storage (including battery storage). The NYISO is currently evaluating Demand Response and Distributed Energy Resource participation in the NYISO's markets, including reviewing the potential for additional energy storage in the wholesale markets. The NYISO also intends to review the participation and performance measurement criteria for short-term energy storage in the Energy and Capacity markets. The NYISO presented an overview of current ESR participation in NYISO markets to stakeholders in March 2016,[33] and presented feedback received from that presentation in April.[34] The NYISO intends to continue evaluating possible modifications to these programs throughout 2016.

2. Are there any forthcoming or pending proposals or on-going stakeholder processes that could change or are contemplating changing the rules by which electric storage resources buy electricity from NYISO's market? If so, please describe the proposals or stakeholder processes briefly and provide citations to any relevant websites or public documents.

[33] New York Indep. Sys. Operator, Inc. Presentation to the Market Issues Working Group, *Energy Storage: Market Integration and Optimization* (Mar. 1, 2016), http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_miwg/meeting_materials/2016-03-01/Energy%20Storage%20-%20Market%20Integration%20and%20Optimization%20MIWG.pdf.

[34] New York Indep. Sys. Operator, Inc. Presentation to the Market Issues Working Group, *Energy Storage Integration: Feedback Update* (Apr. 18, 2016), http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_miwg/meeting_materials/2016-04-18/Energy%20Storage%20Integration.pdf.

NYISO Response

The NYISO currently has a proposal before its stakeholders for the development of a Fuel Constrained Bidding design that would allow resources with fuel limitations to explicitly reflect the constraint(s) in its day-ahead offer. The Security Constrained Unit Commitment (SCUC) algorithm would then optimize the limited fuel over the day. In this design concept a storage unit could potentially reflect its limited storage (*i.e.* fuel) capability and other operating limits and allow the SCUC to select the optimal hours to withdraw and inject energy in the day.[35] In addition, the NYISO is working on a DER Roadmap, which will review demand response and distributed energy resources discussed above in response to Question G.1 and will include a review of the rules by which ESRs buy electricity from the NYISO's wholesale market.

May 16, 2016

[35] *See*, http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_miwg/meeting_materials/2016-03-23/agenda%208%20Fuel%20Constrained%20Bidding%20%20MIWG%2032316.pdf.