

Bulk Energy Storage Scheduling and Dispatch Rights Request for Proposals

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APPENDIX C3

All projects must meet all applicable Central Hudson Gas & Electric (Central Hudson) and Governmental Authority requirements for deliverability and permitting, as well as other requirements that will enable Central Hudson to receive all market participation revenues as defined in relevant NYISO Tariffs.¹

Please provide the following Project information in the order requested. Indicate if a question is not applicable and do not leave responses blank. Please mark all confidential information accordingly. Responses to these questions will be used to score project technical feasibility and reasonableness of the Project timeline.

1. System Design

1. Please provide the following Project documents:
 - 1.1 Expected site layout with location of major equipment labeled²
 - 1.2 Single line diagram to the Interconnection Point³
 - 1.3 Communications equipment schematic (single line diagram) including connection to Owner Network Operations Center (NOC) and Central Hudson system with key equipment labeled, expected communications protocols defined, and data sample and reporting rate
 - 1.4 List all Institute of Electrical and Electronics Engineers (IEEE) and Underwriters Laboratory (UL) certifications for key equipment including storage modules, power conversion system (PCS), and/or integrated product certifications.
2. Please provide the following system information:
 - 2.1 Energy storage inverter(s) rating (kW)
 - 2.2 Energy storage capacity (kWh)
 - 2.3 Maximum station service import for HVAC (Heating, Ventilation, and Air Conditioning) and auxiliary loads (kW)
 - 2.4 Maximum import for charging from utility (kW)
3. Describe and provide equipment specifications of the proposed energy storage facility, including Original Equipment Manufacturer (OEM), model, number of devices anticipated, and key ratings for the following:

¹ <https://www.nyiso.com/regulatory-viewer>

² Site layout should be consistent with Appendix C1 information.

³ Single line diagram should be consistent with Appendix C2 information.

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- 3.1 Storage modules
- 3.2 Power converter, please include integrated system ratings/curves for both MW and MVAR
- 3.3 Meters
- 3.4 Communications equipment
4. Provide a description of project Station Use loads including HVAC, fire suppression, and data collection and control equipment. Please specifically describe the power supply for each component and any backup power supply.
5. Provide information relating to the availability of and Bidder's access to the equipment⁴ and components utilized / proposed for construction and operation of the project, including:
 - 5.1 Equipment availability
 - 5.2 Purchase lead times
 - 5.3 Anticipated time to clear US customs (if applicable)
 - 5.4 Total shipping time
6. Will the storage system include any components from the following companies - Huawei, ZTE Corp, Hytera Communications Corp, Hangzhou Hikvision Digital Technology Co., Dahua Technology Co.? If yes, please specify the exact component and provide a short description of its intended use. Any and all components must be listed.

2. Operational Parameters⁵

1. List any restrictions on energy storage use based on operating or warranty conditions, including:
 - 1.1 Min. / max. runtime per charge and discharge
 - 1.2 Maximum daily, monthly, annual, and lifetime Cycles, including any restrictions around depth of discharge, Notification time requirements to perform, including expected communications latency and equipment response rate, from the time to dispatch instruction
 - 1.3 Required maintenance Cycling
 - 1.4 Restrictions on at-rest Usable State of Charge that the energy storage facility must average over a year, month, or 24-hour period
 - 1.5 Changes to Charging / Discharging Response Rates (ramp rates) as the system approaches 0% or 100% Usable State of Charge, etc.

⁴ E.g. storage modules, Balance Of System (BOS) equipment, Power Conversion System (PCS)

⁵ Operational Parameters will not exclude Bidder from meeting Performance Guarantees.

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- 1.6 Annual Capacity Degradation, as well as any additional information on System Efficiency Degradation. Please show as curves with description of assumptions on use and how the project will maintain the required Dispatchable Capacity over the Term.
- 1.7 Ambient temperature and/or elevation restrictions
- 1.8 Maximum charge and discharge Response Rates (ramp rates), and full power swing rate⁶
2. List which end points will be available and the sampling and reporting rate for system monitoring and control.
3. Describe seasonal changes, if any, to the Dispatchable Capacity at the delivery point. If applicable, provide an example calculation of any changes in Dispatchable Capacity at the delivery point and transformer losses for both a typical winter and summer day.
4. Provide details on whether the inverter(s)/converter(s) have any intrinsic grid support functions, such as autonomous or interactive voltage and frequency support. If they do, please describe these functions and default settings.
5. Indicate if the energy storage system is symmetrical or asymmetrical (e.g. charge magnitude equivalent to discharge magnitude)? Provide proposed inverter(s) power factor operating range and anticipated operational set-points in the context of the expected two-quadrant or four-quadrant operation.

3. Maintenance Practices

1. Please provide a copy of all original equipment manufacturer warranties, suggested maintenance schedules, and spec sheets.
2. For the energy storage and power conversion system, provide an estimated average number of off-line maintenance hours per month. Please also detail any maintenance hours expected to be performed while the system is not offline or is de-rated.
3. Provide a description of the useful life of the energy storage and power conversion system equipment and long-term replacement or shuffle plan.
4. Provide a description of how the Bidder will maintain the MW and MWh ratings of the proposed system during the Term.

4. Safety

1. Provide the following documentation from the Bidder and associated contractors for the previous three years (2016-2018)
 - 1.1 Occupational Safety and Health Administration (“OSHA”) 300 Form
 - 1.2 Signed copies of the OSHA 300A Form

⁶ Switching from 100% charge to 100% discharge

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- 1.3 Experience Modification Rate, preferably via a letter from the Bidder's insurance company
2. Provide a description of Bidder's experience and awareness of National Fire Protection Association ("NFPA") 855. Please identify the steps, design choices, and schedule Bidder will employ to ensure NFPA 855 compliance.
3. Please provide the following information for the proposed facility:
 - 3.1 Health and Safety Plan
 - 3.2 Site-specific Health and Safety Plan
 - 3.3 Community outreach plan to educate local Governmental Authorities and emergency services including local Fire Departments. Please also include a description of any signage that may be utilized on site.
 - 3.4 Education and outreach activities that have already been done with local Governmental Authorities and emergency services including local Fire Departments.
 - 3.5 Response plans for first responders on the scene (in case of an energy storage system failure).
 - 3.6 Decommissioning plan that details the decommissioning, transportation, and disposal of the system (in accordance with applicable United States Department of Transportation (US DOT) hazmat regulations and other applicable laws, rules and regulations) during end of life or post fire event.
4. Provide a specific action plan of both automated and manual measures to mitigate a thermal runaway event, if applicable.