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August 08, 2014

Via email (deckels@nyiso.com)

New York Independent Systems Operator  
Attention: Ms. Debbie Eckels  
10 Krey Boulevard  
Rensselaer, NY 12144

**Re: NECHPI Comments on NYISO Draft DER Report**

Dear Ms. Eckels:

This letter contains the Northeast Clean Heat and Power Initiative's ("NECHPI") comments on *A Review of Distributed Energy Resources (DRAFT)* ("draft report") as prepared by DNV GL for the New York Independent System Operator and released on July 18, 2014. NECHPI is a 501(c)(6) non-profit organization that promotes policies and practices conducive to the deployment of clean combined heat and power (CHP) applications where high overall efficiency and economic and environmental benefits will be achieved. It is active in the seven Northeastern States. It is active in the Public Service Commission's Case 14-M-0101 Rethinking our Energy Vision (REV). If Demand Response initiatives, including CHP, were to become a major result from that proceeding and with NYISO's concurrence and support, NECHPI believes that the FERC would accept a unique DR solution for New York State.

Thank you,

Ruben S. Brown, M.A.L.D.  
NYISO Management Committee Representative for NECHPI  
Member, NECHPI Board of Directors

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As stated in previously submitted comments, NECHPI believes it is in the best interest to focus on supporting and leveling the playing field amongst all distributed-energy resources in Organized Wholesale markets, with a focus on support for both the general class of distributed generation (DG) assets as well as those for CHP specifically. To this end, NECHPI believes the current draft report falls far short of adequately addressing the fair and equitable treatment of DG and CHP in New York's organized energy markets. The report provides an overview of the current and insufficient rules governing DERs without considering ways to improve these rules in the future. Additionally, the draft report, in some instances, neglects to consider the thermal generation displacement benefits of CHP, prejudicing CHP.

Attachment A contains the 24 findings and observations submitted to NYISO by NECHPI's Policy and Regulatory Committee on February 7, 2014. NECHPI believes that the current draft report does not adequately cover these issues and that it will be significantly improved if these finds and observations are more fully addressed in the final report.

### **DG and CHP participation in capacity, energy, and ancillary services markets**

The draft report does not adequately address the economic inequality of DG and CHP in the organized energy markets. As currently written, the draft report outlines DER participation in organized energy markets within NYISO and other RTOs (i.e. PJM, ERCOT, CAISO), which is valuable information. However, only outlining current DER participation overlooks additional opportunities for DG and CHP participation that can help reduce the NYISO's unwarranted favoritism towards traditional centralized energy. For example, the draft report states that NYISO and PJM place severe restrictions on the use of on-site generation for reliability programs. In the NYISO, DG and CHP cannot sell incremental capacity in excess of the metered load into such markets. The draft report fails to explain the significance of these restrictions and does not present any examples or analysis (either real or hypothetical) of the benefits of allowing DG and CHP to be compensated for generation beyond the metered load in the energy markets. The report should consider these market alterations and explicitly address them.

Additionally, the draft report does not adequately address the inability of DG and CHP to be fairly compensated for the energy, capacity, and ancillary services benefits of DG and CHP. NECHPI believes the NYISO should consider a new mechanism to recognize the capacity benefit of baseload CHP, recognizing that it cannot participate in the existing ICAP market. CHP is firm capacity and can contribute to resource adequacy, however, that is not addressed in the report.. The concept is that such resources should qualify for capacity payments as CHP capacity represents new on-grid system power plant capacity that would otherwise be built. The report should address this possibility even if there may not be mechanisms currently employed by other RTOs.

As more DG resources are being added to the grid, ISO/RTOs are beginning to allow participation by these resources in capacity and ancillary services markets. CHP systems with

appropriate metering and design can provide these services at the transmission or distribution level.<sup>1</sup> Entry into this market would be further accelerated if the ISO/RTOs worked with the industry to develop participation requirements that recognized the unique operating characteristics and system wide benefits of CHP.

CHP participation in energy, capacity, and ancillary services markets is at an evolutionary point. Despite being able to provide real benefits to the system, CHP participation in these markets is very limited due in part to the lack of vision, the complexity of the rules and requirements, and a perceived mismatch between CHP operating characteristics and system requirements. Growth potential for CHP participation is generally perceived to be significant. For example, approximately 1,500 MW of CHP capacity has been built in New York State over the last quarter century (25 years). These existing resources cannot be ignored. Over 120 MW of additional capacity is to be built over the next four years, without considering any new microgrids that might be deployed. Foresight is required if the NYISO is to benefit from these resources.

ISOs can recognize some values from CHP. ISO-NE provides financial incentives to aggregators who in turn reach out to the commercial and industrial sectors for demand resource measures that include CHP. Integration of distributed generation and storage technologies continues to be a focus of FERC and NYS as they seek to promote robust competitive markets for the provision of energy, capacity, and ancillary services from a variety of sources.

Turning a blind eye to the opportunity of these resources at the NYSIO is a disservice to the market participants, both existing and potential market participants.

NECHPI believes that in an era moving to enhance distributed resources in New York State and across the continent, it is very important that the NYISO endeavor:

1. To create and recognize opportunities for these resources going forward and
2. To address existing underutilized values and recognize new ones.

There is substantial unrealized CHP technical potential (2/3) in New York State in commercial buildings, education, multi-family housing, and other commercial applications. Some of the existing NYISO stakeholders are from these sectors. CHP potential by industrial customers is more fully realized and they are more fully reflected in the existing NYISO stakeholders. The NYISO should endeavor to enhance the value streams of/to these resources to permit markets to function for other stakeholders with CHP potential. NYISO rules should evolve to permit greater CHP participation in these markets. The benefits could accrue to the markets, the grid, the CHP facility, and all ratepayers.

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<sup>1</sup> CHP could more easily participate in ancillary services markets if operational flexibility is designed into the system and recognized by the ISO/RTOs (e.g., the CHP system is sized with single or multiple prime movers that provide excess capacity when needed or the system can operate during times when the thermal load is predictably

## Accounting for CHP's thermal energy generation displacement

Section 4.4.3 of the draft report provides a hypothetical comparison of the emission rates of a 1MW CHP system and the average emissions profile in New York State. While it is understandable that the comparison does not incorporate relatively complex parameters such as the “spatial and temporal distribution of emissions and resulting atmospheric chemistry and transport”<sup>2</sup>, NECHPI believes that this section could benefit from a couple additional clarifications.

First, the CHP technology assumptions listed in Figure 4-35 shows the emission reductions of CHP versus central generation. As the report states, the reductions include the benefit from displacing thermal generation, however, no information is provided on the type of thermal generation displaced. The report should clearly state the assumptions made regarding displaced thermal generation, because as stated later in the draft report, the environmental benefit of thermal production displacement is dependent on the characteristics of the original device producing thermal output. Including these assumptions will provide the reader with a better understanding of the CHP emission reductions example.

Second, the study states that a “CHP unit cannot compete with this modern central generation source” [i.e. new, efficient natural gas fired combined cycle unit] on a strictly lb/MWh basis.<sup>3</sup> NECHPI believes this statement is not correct. While the study notes that the CHP unit displaces thermal production, it does not include this displacement in determining the CHP unit's overall emission rate for this particular comparison as the report does for the comparison with New York State's emissions profile. NECHPI strongly believes that the inclusion of the emission benefits resulting from thermal production displacement by the CHP installation is vital for all comparisons between CHP and central generation. Due to economies of scale, the emission reduction potential of CHP relies on its ability to displace thermal demand with essentially “emission free” waste heat from electricity production. The emissions comparison between the natural gas fired combined cycle unit and CHP unit should at a minimum include the displaced thermal production using the same assumptions as the New York State emissions profile comparison.<sup>4</sup> We urge the consultant to review this issue and correct the report. Without this additional analysis, the reader/policymaker does not receive the entire picture regarding centralized versus distributed generation.

Finally, the emission reductions potential of CHP is much greater than the hypothetical example given in the draft report. Attachment B provides the results of the EPA's CHP Emission Calculator (the same tool used in the draft report) for a more representative CHP system. The

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<sup>2</sup> A Review of Distributed Energy Resources (DRAFT). Page 57.

<sup>3</sup> A Review of Distributed Energy Resources (DRAFT). Page 59.

<sup>4</sup> However this could be misleading. A more accurate representation would address the emissions characteristics of the thermal production displaced, e.g. the oil boilers being more tightly regulated in New York City represent an emissions target that is dramatically bettered by clean highly efficient heat and power.

results show that CHP can provide reduced emissions across all categories compared to the New York State emissions profile.

### **Challenges for Application of DERs in Electric Markets**

Section 6.1.4 describes a host of challenges for the application of DERs in electric markets. While NECHPI does not dispute that the rapid deployment of DERs will change the underlying dynamics of the electric grid, we do point out that the potential problems are commonly overstated. The introduction of the Regulatory Assistance Project's *Teaching the "Duck" to Fly* report states the issue of integrating DER well:

*"Fundamentally, this issue is no different from the problem utilities have addressed for over a century: adapting the supply of energy to match changing consumer demand. The difference is that daily and seasonal usage patterns and the resources that have historically served that pattern have evolved gradually over the last 125 years, while the renewable energy revolution is creating new challenges in a much shorter period of time. Fortunately we have technologies available to us that our great-grandparents did not."*

NECHPI believes that New York is well suited for addressing any issues that may arise from the integration of DERs into the electric system and that potential barriers should not be used as excuses to delay and create inequities for DER deployment.

### **Critical Infrastructure and DERs**

The draft report mentions only in passing the value DERs can provide for critical infrastructure resiliency. While NECHPI recognizes that critical infrastructure resiliency is not within NYISO's mandate, we believe that this issue still deserves additional attention from NYISO to ensure efficient coordination between other State initiatives exploring DERs for critical infrastructure resiliency. NECHPI believes that cohesion between these related programs and efforts will be critical to leveraging entirely the full suite of benefits DERs, such as CHP, can provide.

Recent Federal and state actions have recognized the important role that CHP can play in supporting critical infrastructure:

- In response to Executive Order 13632, in August 2013, the Federal Hurricane Sandy Rebuilding Task Force published a Hurricane Sandy Rebuilding Strategy that describes how CHP played a successful role in keeping a number of college campuses, multifamily housing, critical medical facilities, sewage treatment plants and other facilities running during the storm and its aftermath. The strategy offers two recommendations to bolster CHP, district energy and other forms of clean distributed generation, including "ensuring that Sandy recovery energy investments in critical infrastructure are resilient" (Recommendation 12), and also "encourage

Federal and State cooperation to improve electric grid policies and standards” (Recommendation 14).

- In early 2013, New York Governor Andrew Cuomo announced that a \$20 million investment will be made towards clean energy projects (including CHP), specifically those aimed at providing continuous power and heat during grid outages. This investment is based on recommendations made by NYS 2100, one of the three commissions Governor Cuomo created in the aftermath of Hurricane Sandy to improve the State’s emergency preparedness and response to natural disasters.
- More recently, New York City issued “A Stronger, More Resilient New York,” building on the original 2007 PLANYC, which is a comprehensive plan that contains recommendations for rebuilding the communities impacted by Sandy and increasing the resilience of infrastructure and buildings citywide. The Plan discusses CHP, including the city’s plan to improve building and other codes to enable increased use of CHP for emergency power.
- Pending legislation in NYS has been percolating for over a year recognizing the societal benefits of CHP at Facilities of Refuge (Bill S1617-2013, Bill A1044A-2013).

NYISO should be consciously aware and engaged with current and future efforts to utilize DER for critical infrastructure resiliency.

Thank you for the opportunity to provide and your consideration of these comments.

Sincerely,

Ruben S. Brown, M.A.L.D.  
NYISO Management Committee Representative for NECHPI  
Member, NECHPI Board of Directors

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## **Attachment A:**

NECHPI's Policy and Regulatory Committee extracted a group of findings and observations regarding the interests of its members and associate and provided to the NYISO in February of this year. They are repeated here.

1. NECHPI feels it is in its best interest to focus on supporting, and leveling the playing field amongst, all distributed-energy resources, with a focus on support for both the general class of distributed generation ("DG") assets as well as those for combined heat and power ("CHP" and/or "Clean Heat and Power") specifically during this critical development period.
2. The results of the PSC's reformation of utility regulation, including active load management, active load bidding and expanded ancillary markets to recognize a fuller value of local resources, will necessarily effect and help shape the NYISO's evolving missions with distributed energy resources, including CHP.
3. To fully implement the PSC's vision, the NYISO/bulk system may require new tariffs and/or dispatch models, in order to integrate and value load optimization. Action by FERC may be required. Direct tariff changes will be further needed to accommodate demand response ("DR") and distributed generation ("DG"), including various configurations of CHP and microgrids. Will further changes be needed indirectly to adjust to a less volatile bulk system? Will the system be less or more volatile with the greater interaction of distributed resources with loads, with each other and with the bulk power system?
4. NECHPI strongly supports the efforts of State Policy as implemented by NYSERDA to facilitate CHP and believes that the NYSERDA could provide a substantial resource to the NYISO as it addresses DER resources retail and wholesale market changes to ensure that policies, rules and regulations are aligned and maximized to support the integration of DERs into the generation, transmission, distribution and behind-the-meter infrastructure in a safe, reliable manner. NECHPI supports clear lines of communication between and among the NYISO, NYSERDA and the DPS/PSC.
5. We at NECHPI believe that the focus going forward in both wholesale and retail markets should be on establishing the specific costs and benefits of each DER and on developing and implementing market rules, tariffs and regulations which target a appropriate energy-resource mix to support a distributed future. CHP is a key resource in that mix, and incentives, rules and regulations should provide a means for it to take its proper place in the power system of the future. This is a brave new world of energy resources, which are distributed in nature, and how they are rolled out, integrated into the electric grid and supported by both wholesale and retail markets

- will be critically important to the grid's long-term health, resiliency, reliability and power quality.
6. The electricity system of the future is likely to encompass an increasingly diverse and interconnected set of actors, with widely varying assets, behaviors, and motivations. The conversations are just beginning about how to integrate storage and microgrids, for example, and we believe that it is in NECHPI's interest if we recommend an approach that helps NYISO and the State of New York accommodate the full array of distributed-energy resources while we achieve our own goals along the way.
  7. We believe a customer/load-centric approach to grid management will be needed to ensure power reliability, security and revenue streams to support a future of significant levels of DERs. The growing complexity of DERs, on a stand-alone basis or in combination, being installed directly in front of and behind the meter are providing both challenges and opportunities to the marketplace: challenges in monitoring and optimizing the wide array of resources into a single, smart digital energy network and opportunities for solving grid reliability and peak-demand contingencies at local distribution and grid-node levels to boost system efficiency and maximize returns on investment for DER assets.
  8. In NECHPI's view, smart-grid platforms, such as microgrids, responsive-demand solutions and virtual power plants, are being developed to improve performance of critical DER assets to support business up-time, combat high and increasing energy costs, boost reliability of electricity service, realize significant responsive-DR potential and resolve generation capacity – customer load mismatches. Ultimately, we believe that integrated, end-to-end bidirectional information/communications technologies (“ICT”) solutions, using logic-based, big-data grid analytics and advanced predictive technologies, will be key to the success of the 21st century power system. In particular, combining the different and complementary characteristics of distributed generation such as CHP and/or solar with energy storage, demand response and distributed intelligence will be essential in increasing the value of variable output generation in the energy market. Both wholesale and retail markets must adapt to these innovations, not only for individual DERs but also for their many likely combinations.
  9. NECHPI believes that wholesale and retail electricity markets are converging as a result of the increasing presence of DERs on the grid.
  10. NECHPI believes that CHP and energy storage represent DERs that have the most difficulty finding their established places in both retail and wholesale markets, though for very different reasons. CHP has a history, most particularly with utilities, which has not been altogether positive, and we believe this on-going issue has resulted in low participation rates in wholesale markets and has negatively affected how it is compensated in both wholesale and retail markets. Coupling Energy Storage with



CHP (both thermal and electric) offers new opportunities that should not be rejected out of hand because “we don’t do that.” We further believe that this is the proper time to reassess the tariffs, market rules, regulations and policies that have accreted over time, are misaligned and have resulted in a diminished access to capital, functioning as deterrents to growth in spite of the numerous positives and glowing reports of CHP’s renewed role in a resilient, flexible, and reliable grid as critical infrastructure.

11. Thus, NECHPI fully realizes that given each DER’s unique characteristics, there will likely be no single approach to integrating DERs into market design. Instead, local contextual and site-specific factors will figure prominently in market designs that result in the coordinated deployment of centralized and distributed energy resources, as well as in the treatment of hybrid market actors such as microgrids, which represent a combination of DERs, including CHP.
12. NECHPI’s Policy/Regulatory Committee has evaluated various approaches to valuing the costs and benefits of DERs and has found the DER definition of Rocky Mountain Institute (“RMI”), as a third- party independent evaluator, very useful.
13. In NECHPI’s estimation, RMI’s approach is an excellent justification as to why CHP should be treated on an equal footing with other DERs and even given precedence in some cases (e.g., for critical infrastructure and resiliency).
14. NECHPI believes that this confluence of factors will likely drive increased adoption of the full spectrum of renewable and distributed resources, including CHP, requiring a detailed understanding of DERs’ benefits and costs in the context of a changing system. From this point, rational pricing structures and business models can be better aligned, enabling greater economic deployment of DERs and lower overall system costs for ratepayers.
15. We also recognize the significant set of regulatory tariff issues being discussed by the Regulatory Assistance Project at NARUC’S Winter Meeting February 11. While targeting at State regulation they also should apply to NYISO-level and FERC jurisdiction.
16. We view NYISO’s role as helping to facilitate the dialogue between the Public Services Commission and utilities in the state to begin the evaluation of these alternatives in order to ensure that the underpinnings for the rollout of distributed energy resources are properly valued, supported and integrated with all of the policies and regulations in place or being revised, updated or considered for implementation. In addition, given the convergence of retail and wholesale markets because of the emergence of DERs and a grid driven by customer-driven resources, NYISO and the state’s PSC will need to work closely together to ensure that rules and regulations are aligned and function smoothly together to support a rapidly evolving grid.

17. NECHPI believes that many existing plants can be retrofitted with technologies to improve operational flexibility performance, including some CHP plants. In addition, other DERs, such as large pools of aggregated demand response, especially when combined with storage options, can provide low-cost, bi-directional flexibility on the demand side that can also be valuable in integrating variable renewable energy, particularly when compared to traditional, centralized generation.
18. NYISO is currently not an attractive wholesale market for CHP. NECHPI is very concerned about this. Enormous amounts of existing and potential CHP remain under-utilized.
19. CHP participation in NYISO wholesale markets has decreased over the last three years because of changes in certain market rules, (e.g. the ICAP program), and NECHPI feels strongly that the ability to participate in the range of wholesale markets could greatly increase CHP's attractiveness to financing sources, in addition to the ability to receive Green Bank support.
20. NECHPI believes that A-06 Operating Reserve Criteria substantially limits the ability of CHP to participate in and derive financial benefits from the ancillary-services market and needs to be reviewed.
21. NECHPI recommends market mechanisms that support new approaches to CHP plant designs, flexibility in contracts and concrete recognition of the contribution of CHP resources to grid system stability and reliability.
22. We urge the development of policies that allow the design of "oversized" CHP generation for a more dispatchable resource, as an example, and of possibly supporting utility joint ownership with third parties that are in designated locations where the benefits of CHP can be optimized. We believe this will be necessary if the role that CHP plays in the electric grid is to grow. Additionally, CHP sites serve as preferred locations to add any NYISO required peaking or black start resources, in that these sites are a more cost effective placement of these assets in that they are continuously active with close supervision and afford avoidance of duplicated siting, permitting, staffing, grid interconnection and other costs.
23. In addition, NECHPI recommends that NYISO's policymakers work with the State of New York to help enable the PSC to accomplish the following:
  - a. Expand resource design to include aggregation of multiple locations and zones into a single resource within reasonable limitations.
  - b. Allow behind-the-meter wholesale-market participation for CHP, when it is an on-site energy resource.
  - c. Establish a workable mechanism for CHP in resource adequacy and long-term procurement processes. As with utilities, NYISO does not include CHP in its

loading order or its resource-adequacy and long-term planning processes. This economically disadvantages CHP in a significant fashion.

- d. Going forward, take advantage of FERC's market-driven stances related to DERs and support the development of new market formulations for improved reliability and efficiency and energy/reserve procurement. A new market formulation under development by Sandia Laboratories represents energy and reserve products in terms of standardized contracts whose terms cover a broad range of system service needs, including power increments, ramp rates and energy capacity. These contracts are designed to provide transparent financial instruments for the pricing and procurement of energy and reserves in forward markets as well as blueprints for the physical deployment of energy and reserves in real time. To ensure a level playing field, all resources capable of satisfying system service needs, including CHP, can and should submit supply offers for the provision of these needs, regardless of their physical forms.
- e. Establish a criteria to account for the efficiency of natural gas utilization, i.e., to avoid the use of natural gas in separate heat and power (SHP) generation where no more than 60% is converted to useful energy, and motivate the natural gas to be used in CHP where it can be converted to as much as 90% useful energy. This ought include an accounting of the CO<sub>2</sub> emissions from the combustion of the natural gas (and the credit for the avoided CO<sub>2</sub> from separate heating or cooling fuel as well).

NECHPI believes that these changes are not as far in the future as one might suspect. It must happen sooner rather than later. The level of uncertainty in both generation and load is increasing rapidly. The provision of reserve will increasingly involve participation from both the supply and demand sides of the market. Not only will demand-side participation increase, but some resources, such as energy storage systems, will also blur the boundaries between supply and demand.

Further, the uncertainty of generation is increasing as a function of intermittent renewable-energy penetration. The uncertainty of load is increasing as a result of the emergence of demand-response resources. Taken together, this will entail new market designs that are standardized, transparent, and driven by market requirements, including those that are localized. CHP has a critical role to play in the emergence of this new market design but can only do so if it is integrated into NYISO's resource-adequacy and long-term planning processes.

- 24. NECHPI believes that if the right contracting mechanisms are in place, projects could in theory be custom-built to provide the services of greatest need to the procuring entity and tailored to the operating environment and operational needs of the utility and RTO/ISO.

**Attachment B:**

Using the EPA’s CHP Emission Calculator, NECHPI estimated the emission reductions based of the specifications of Ener-G Rudox’s ERM2150GM2 Natural Gas CHP Unit with NOx emission controls. The calculation makes similar assumptions as the DER study where applicable (e.g. operating 5,840 hours per year, providing heating only), and it makes its own assumptions where information was not provided in the draft report (e.g. replacing existing residual oil thermal energy). 2013 New York emission rates were also used.

*Calculator inputs/assumptions:*

CHP Technology	Reciprocating Engine – Lean Burn
Total CHP Capacity	2,189kW
Operation	5,840 hours per year
Heat Rate	8,050 Btu / kWh HHV
Total Fuel Consumption	102,903 MMBtu / year
Total CHP Generation	12,784 MWh / year
CHP Thermal Output (Heating)	40,017 MMBtu / year

*Calculator results:*

<b>Annual Emissions Analysis</b>					
	CHP System	Displaced Electricity Production	Displaced Thermal Production	Emissions /Fuel Reduction	Percent Reduction
NO <sub>x</sub> (tons/year)	0.64	5.81	4.82	9.99	94%
SO <sub>2</sub> (tons/year)	0.03	11.11	1.16	12.24	100%
CO <sub>2</sub> (tons/year)	6,015	8,645	3,932	6,562	52%
CH <sub>4</sub> (tons/year)	0.11	0.361	0.16	0.407	78%
N <sub>2</sub> O (tons/year)	0.01	0.092	0.03	0.113	91%
Total GHGs (CO <sub>2</sub> e tons/year)	6,021	8,681	3,945	6,606	52%
Carbon (metric tons/year)	1,487	2,138	972	1,623	52%
Fuel Consumption (MMBtu/year)	102,903	122,391	48,213	67,701	40%

The following figure shows the percent reduction in emissions and fuel consumption. As can be seen, CHP can significantly reduce NO<sub>x</sub>, SO<sub>2</sub>, CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O emissions.

