



November 1, 2017

Re: NYISO Market Integration Working Group, Market Assessment with 50% Renewable Generation

Key Capture Energy (KCE) is an Albany-based energy storage development company with a focus on utility-scale battery storage projects in the northeastern United States. We select project sites, secure all necessary permits, procure full battery systems and oversee construction to move battery storage projects into operation.

Responding to the October 16, 2017 MIWG committee meeting on the presentation: Market Assessment with 50% Renewable Generation, KCE has the following comments:

Concepts for new energy market products:

a) Separate products for regulation up and regulation down

KCE will need additional time to study other markets on what separate products for regulation up and down mean for the overall frequency regulation market, and whether these products could be better structured as other reserve products (such as 10-minute spinning reserves).

We are concerned if products for just up or down frequency regulation become uneven that Limited Energy Storage Resources (LESRs), defined as storage products with under 1 hour of charge and who can only participate in the frequency regulation market, will be negatively affected with revenues compared to traditional generators (such as hydro or natural gas) who have full access to the energy and reserves markets – and thus other potential revenue streams.

b) Ramping product to cover forecast error

CAISO has gone through a stakeholder process for flexible ramping products due to hourly uncertainty from net forecast errors from demand VER forecasts. As New York continues to increase its Distributed Energy Resources, while simultaneously moving to 50% renewables (often intermittent), a ramping product should be considered.

The question for New York is how this product would be used differently than the current market structures (frequency regulation, 10 and 30 minute reserves). CAISO had a clear need with their ramping requirements based on their market construct (namely, uncertainties between supply/demand after binding Real-Time dispatch – which are then having to be solved through regulation services, creating market inefficiencies).

KCE encourages NYISO to go through similar analysis that CAISO did¹ to determine where the market inefficiencies currently are, and where they expect for them to go as additional intermittent generation comes online. The potential locational benefits of these ramping services further downstream should be considered (ie. relieving congestion leading to negative LBMPs) and factored into the compensation for providing these services.

Regarding energy market products or rules that could be modified or enhanced:

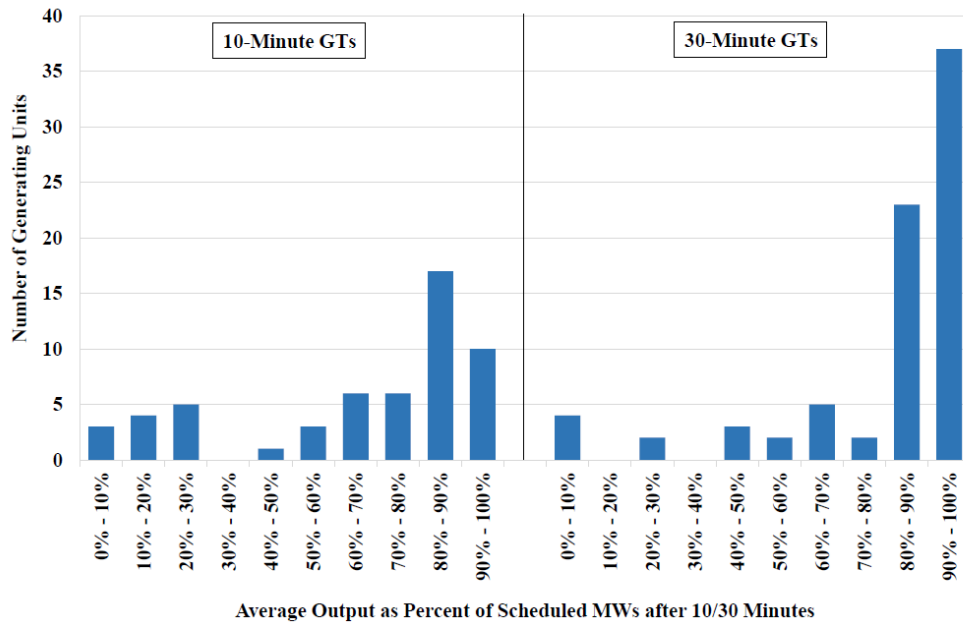
¹ CAISO Flexible Ramping Product.

<https://www.caiso.com/informed/Pages/StakeholderProcesses/FlexibleRampingProduct.aspx>

i) *Revisions to offline fast start pricing*

NYISO’s 2016 State of the Market Report looked at the performance of operating reserve providers and indicated while there is a wide range of performance of individual units that they are paid the same regardless of performance. Additionally, performing reserves help relieve congestion and increase transfer flows but are not paid for it²:

Figure 13: Average Production by GTs after a Start-Up Instruction
Economic RTC Starts, 2016



KCE encourages the examination of performance in the ancillary services market, and for additional remuneration for congestion relief (similar to a frequency regulation capacity and a frequency regulation mileage breakout).

ii) *2. More dynamic ancillary service requirements and shortage pricing levels*

As additional intermittent renewables come online, there will be an increased need for ancillary services; KCE supports continued analysis of the evolution of NYISO’s needs.

Specifically regarding frequency regulation, Limited Energy Storage Resources (LESRs) have limited options for bidding strategies due to only being allowed to bid into frequency regulation. As other generators (namely natural gas and hydro) have other potential revenue sources (energy and reserves), their bidding strategy into frequency regulation capacity and mileage markets will take these into account. This has two effects on the behavior of LESRs:

- (1) Provides uncertainty for new LESRs to enter into the market as cost-recovery over time is uncertain as it is unknown what happens to frequency regulation pricing when enough LESRs are online to be over the Regulation Requirement (as little as 150 MWs)

² NYISO 2016 State of the Market Report. Page 77. Figure 13.



- (2) Potentially causes LESRs to use a bidding strategy to always be a price-taker to ensure they clear in the day-ahead market rather than bidding in to cover marginal costs of production.

On the second point, NYISO’s Regulation Movement Market Price continues to underpay mileage. Bidding strategies allow generators to bid in Regulation Movement bids of \$0.00 (and in 2016 the frequency regulation market cleared at \$0.00 1% of the time and \$0.01 or below 13% of the time). As LESRs, which are prohibited from market rules from participation in energy, capacity or other ancillary services, bid into the market, if the movement clears at \$0.00 or \$0.01 for movement, this clearing price does not cover the additional cost of movement to the operator. NYISO should consider if its current Bid Production Cost Guarantee (BPCG) provides enough certainty for LESRs to recover their marginal costs of production.

2016 Real-Time Day-Ahead Movement Prices (percentage of time)

Mileage (\$)	Count	Total	Percent of Time in Range	Cumulative Percent
\$ -	1,158	106,388	1.1%	1.1%
\$ 0.01	14,097	106,388	12.2%	13.3%
\$ 0.05	15,497	106,388	1.3%	14.6%
\$ 0.10	16,495	106,388	0.9%	15.5%
\$ 0.15	21,142	106,388	4.4%	19.9%
\$ 0.20	26,600	106,388	5.1%	25.0%
\$ 0.25	45,834	106,388	18.1%	43.1%
\$ 0.30	106,004	106,388	56.6%	99.6%
\$ 0.35	106,004	106,388	0.0%	99.6%
\$ 0.40	106,004	106,388	0.0%	99.6%
\$ 0.45	106,269	106,388	0.2%	99.9%
\$ 0.50	106,274	106,388	0.0%	99.9%
\$ 5.00	106,388	106,388	0.1%	100.0%
		Total	100.0%	

To provide alternative revenue streams – thus allowing each market participant to truly bid in their marginal cost of production, NPCC Directory #5 Reserve Section 5.13 (i.e. be sustainable for at least 1 hour from the time of activation) could be revised to less than one hour to allow LESRs to participate in the 10-minute spinning reserve market – giving an alternative revenue source

Additionally, LESRs should be compensated for both reactive power and blackstart if they are able to provide it, instead of being prohibited from participating in these functions.

Finally, KCE encourages NYISO to continue to move to intra-hour trading for ancillary and energy services, and to allow for negative generation and state of charge parameters. While NYISO has begun the market concept re-design, they should accelerate the efforts to analyze non-discriminatory bid parameters (storage modeling, optimization, dispatch and settlement) for advanced storage technologies.