PUBLIC COMMENTS SUBMITTED IN RESPONSE TO THE JULY 23, 2013 ENERGY STORAGE WORKING GROUP MEETING

(Deadline for comments = August 5, 2013)

Kenneth J. Lutz, Ph.D.
Managing Partner, AMR Strategies LLC:

Thank you for giving me the opportunity to make some comments on the initiatives taken by the BPU. I would first like to say that the BPU should be commended for embarking on a program to understand how this new energy technology can best be used to promote our energy future.

Some specific comments:

Item d. Application criteria and process

In my opinion, this is the most important aspect of this initiative because selecting successful projects will help ensure that the initiative will be continued. I think we all agree that that it is the of the utmost importance that this initial effort be widely seen as a success. I think the most critical factors in deciding whether or not to fund a specific project in this program are (1) the probability of its being successful within one year and (2) the impact the project will have on renewable energy in New Jersey. Although both the one-year time frame and the level of funding requested must be taken into account for determining whether or not a project should be considered, these two criteria should be threshold factors, not decision factors. In my opinion - and I have worked on many projects to demonstrate the efficacy of new technologies - three primary project criteria should be evaluated:

1. Reproducibility - if the project is successful, can it be replicated many times in New Jersey, with the same benefits accruing? Projects that are just one-time solutions should not be considered.
2. Scalability - can the project be made larger, with increased benefits? For example could a project for firming the output of a single wind turbine also be used for firming the output of an entire wind farm? A project that does not scale should be given a low score because its overall benefits would be limited.
3. Extensibility - is the project one that anticipates future growth and new capabilities without drastic modifications? Can the project's applicability be broadened in the future or is the project limited in its scope? For example, could a project for firming the output of a wind turbine also have applicability for solar farms.

I think that the only way projects can be judged fairly on these criteria is to tell the applicants ahead of time that these are evaluation criteria and must be addressed in the application they submit for funding.

a. Eligible technologies

I think that the Energy Storage Program should have some broad requirements, such as being related to renewable energy as was emphasized at the meeting, although personally I find this too restrictive. The program requirements could specify, for example, that both the input and the output be electrical if you wanted to eliminate thermal storage (e.g., ice storage and hot-water heaters) from the program. In my opinion, however, the program would potentially jeopardize the future of energy storage in New Jersey by limiting what technologies are acceptable. In my experience I have never met non-practitioners who have known technologies better than practitioners; I cannot believe that the people developing requirements for this program are knowledgeable enough to be able to specify every possible energy-

storage technology that might be beneficial. I have first-hand experience with such shortsightedness in recent dealings with the U.S. Department of Energy.

I would be glad to elaborate on any of my comments and to answer any questions you might have.

Todd Olinsky-Paul
Project Director, Clean States Energy Alliance (CESA):

Comments on New Jersey Energy Storage Program

a. Eligible technologies

The biggest issue appears to be the proposal to restrict electric energy storage devices funded under this initiative to the storage of renewably generated electricity. In other words, the system could be grid connected but the energy storage device could not be charged from the grid or from other, on-site fossil fueled generators. This rule may impose both technical and economical limitations on the project proposals NJ BPU will receive.

The economic limitations were discussed at the 7/23 meeting. These include the fact that some revenue streams will be precluded under this rule, such as those offered by electricity arbitrage.

The proposed rule may also have technical implications for system size, design, and feasible applications that should be investigated and understood before the rule is finalized.

In connection with the above, it will be important to define how long a renewable/energy storage system is required to be self-sustaining during a grid outage. For example, does New Jersey intend to support very small renewable/energy storage systems intended only to act as a bridge to keep critical systems online during the short time between a grid failure and the arrival and/or startup of on-site dispatchable resources, such as diesel gensets? Or does the state want to support larger renewable/energy storage systems that could island and support critical services at a facility for days or weeks during a prolonged grid outage, with no onsite fossil fuel generation? This will have a large bearing on the type and cost of systems proposed. Larger systems will be more expensive and there will be more pressure for these systems to take advantage of all available revenue streams, including those afforded by the storage of grid-purchased or fossil fuel-generated electricity; however, these larger systems will also provide greater utility and necessitate less fossil-fueled generation during a grid outage, and will provide grid-wide benefits while the grid is functioning.

Regarding the definition of “public and critical facilities”:

“Public and Critical Facilities would be public facilities including federal, state, county or municipal and could include private hospitals or communication centers. The public and critical facilities would include police stations, fire and rescue facilities, hospitals, shelters, schools, nursing homes, water supply and waste treatment facilities, and other structures the community identifies as essential to the health and welfare of the population and that are especially important following a disaster. The public and critical facilities would be able to provide shelter and sustenance 24/7 during and after an emergency.”

It appears that the only private facilities included in this definition are hospitals and communications centers. This would exclude such private facilities as gas stations, supermarkets, cell towers (unless included under communications centers), pharmaceutical storage facilities, private prisons, etc. all of which perform critical functions. Perhaps the list of eligible private facilities be expanded? Another option would be to define critical public *services* that could be provided by private facilities, rather than the types of facilities that could provide them.

Regarding the line, "The public and critical facilities would be able to provide shelter and sustenance 24/7 during and after an emergency." Many critical facilities, such as police stations, water supply and waste treatment facilities, gas stations, communications centers and facilities, supermarkets, etc. are not designed to provide shelter and sustenance; nevertheless, they serve important functions that would be critical during an emergency. Shelter and sustenance are extremely important, however, this is a fairly narrow definition that excludes other services important to both the effected population and first responders.

Regarding the line, "and other structures the community identifies as essential to the health and welfare of the population and that are especially important following a disaster." It is not clear what is meant by "the community," nor is it clear how the community is intended to identify these structures. Perhaps "community" could be more clearly defined as a municipality. A process could then be provided for the identification of essential structures (e.g. declared as such by the municipal board) and guidelines or requirements for eligible structures could be provided.

Finally, the NJ BPU should retain the right to disqualify any proposed critical facility or structure (see NYSERDA CHP and large fuel cell guidelines for critical infrastructure eligibility).

In addition to the above comments, Mr. Olinsky-Paul submitted a recent report he wrote for CESA on the use of RPSs to promote critical infrastructure energy resiliency. He notes that while the NJ initiative is not being structured within the state's RPS, there is information on other state energy resiliency programs in this report that may be helpful to the NJ BPU as it structures this program. The report may be viewed at the following link:

http://www.cleanenergystates.org/assets/2013-Files/RPS/Using-State-RPSs-to-Promote-Resilient-Power-May-2013.pdf

Samuel A. Wolfe, Vice President, Law & Public Policy
Viridity Energy, Inc.:

Viridity Energy, Inc. appreciates the opportunity to comment on the New Jersey Clean Energy Program's planned solicitation for energy storage projects.

The Clean Energy Program and the Energy Storage Technology Advancement Partnership seek to accelerate the deployment of electricity storage technologies. Viridity respectfully suggests that storage technologies will be deployed more quickly by identifying innovative applications of those technologies that can be economically self-sustaining.

One such application of storage technology is already operational outside of New Jersey. An 800 kW/420 kWh battery installed at a Southeastern Pennsylvania Transportation Authority (SEPTA) substation has provided SEPTA with a tool capable of increasing energy efficiency, reducing the cost of electricity supply, protecting voltage quality, and earning revenues from the PJM regulation market. The battery captures electric energy from regenerative braking by SEPTA subway trains - energy that had largely been routed to a resistor bank and been dissipated as heat before the battery made it possible to store the energy.

New Jersey offers new and different opportunities to expand the use of electricity storage in mass transit applications. For example, two busy regional train stations in northern New Jersey sit at junctions of multiple rail lines. Either or both of those stations could build on the experience of the SEPTA subway system and apply it to longer-haul regional rail lines.

As the discussions of an energy storage solicitation continue, Viridity requests that the Clean Energy Program and stakeholders consider including in the solicitation a category for mass transit applications of electricity storage.

Eva Gardow
FirstEnergy Technologies:

On behalf of JCP&L/FirstEnergy, I am pleased to offer comments on the Energy Storage Program design for New Jersey.

JCP&L/FirstEnergy is very interested in utility energy storage application and has demonstrated different technologies in New Jersey to assist in the development of product offerings. FirstEnergy has a leadership role in energy storage development and has been a Board Member in the national Electricity Storage Association for the past 6 years. We appreciate this opportunity to support the Board Staff with comments on the developing consumer energy storage program design.

In the Energy Storage Working Group meeting held in Trenton, NJ on July 23rd, it was made clear that this is a consumer based incentive program to add energy storage to customer owned renewable energy systems, such systems which are not yet cost effective to be deployed without incentives. Customer renewable systems in the 250-500kW size range represent attractive opportunities for an initial energy storage program to have a positive impact in New Jersey.

JCP&L has 225MW of solar systems interconnected with our circuits and energy storage could reduce the variability impacts of the installed renewable generation. To further support deployment of energy storage, JCP&L/ FirstEnergy suggests that the Board Staff also consider a demonstration program for utility energy storage systems to further the development of safe, reliable, and cost-effective energy storage systems.

Christopher Cook, President & General Counsel
Solar Grid Storage:

Solar Grid Storage, a new company providing a financed storage solution for distributed and other commercial sized solar installations, is pleased to have the opportunity to comment on the proposed

storage incentive plan for New Jersey. Solar Grid Storage believes that storage combined with solar will become an essential component to reduce the net effective cost of solar while increasing the value of solar to the grid and end use customer.

We are providing our comments on the following topic areas:

A. Eligible technologies
B. Incentive structure and caps
C. Solicitation structure, timing and frequency
D. Application criteria and process

A. Eligible technologies

Solar Grid Storage is a technology agnostic company and will use any storage technology that meets our financing criteria which includes a requirement that the system function for at least 10 years. At present our plans are to deploy lithium-ion battery storage as we have found that to be the best combination of cost, performance and reliability. Solar Grid Storage does not believe the storage plan for its initial design should be limited to any particular technology but the applicants for funding should demonstrate how their selected technology can meet cost and reliability targets. There are many high cost storage technologies that will never become cost effective and the BPU would be wise to avoid demonstration of these technologies. Solar Grid Storage would suggest to the BPU that the limited funds available not be used for research and development of storage technologies as the US Department of Energy and its associated labs have undertaken this function. The BPU funds are better used demonstrating deployment and value to the grid and for solar and other renewable energy customers.

B. Incentive structure and caps

To start the program, and in light of the limited funds available, an incentive based on rebates is best. Parties requesting a rebate should submit a proposal to the program manager for a case by case approval. If this initial program is successful, follow on incentives for storage can be more market based. Solar Grid Storage would underscore that the focus of program should be on deployment of systems that have the potential for commercialization and broad application.

Solar Grid Storage would suggest rebate targets: $0.35 to 0.50 per Watt-hour of storage with the maximum rebate amount for any storage project set at $0.75 per Watt-hour (it is our opinion that projects needing greater incentive than that level will have little likelihood of ever achieving cost effectiveness). This amount is based on the full rated capacity of the storage system, not energy in or out. Our recommendation for this first funding round would be a maximum total per project rebate of $500k. Qualified projects should be required to provide backup power to a solar customer (host) and be operational with the solar system (or other renewable generation) during short and extended grid outages with automatic transfer to off grid operational mode.

Storage systems should have the ability to provide a minimum of one-half hour of full power backup to the solar (i.e. with no solar power input) based on the peak rated solar output of the system. Storage in excess of 3 full hours will likely be rare when systems are commercialized, therefore Solar GS also recommends the Board establish a system cap at 3 hours of storage for each system seeking a rebate.

Systems should allow the host customer to make full use of the solar energy generated during grid outages with the capability to fully recharge the storage device during the next day of sunshine (in the case of solar). It is important to note that while customers may seek to replace the full capacity of their grid service with solar and backup storage, it is extremely rare than any customer ever reaches its full

rated load capacity. In the vast majority of cases, customers only use a small percentage of their rated grid load capacity and can therefor function, albeit with restrictions, on a solar plus storage system that is only a fraction of their grid rated full load. Therefor the BPU should encourage systems that are only a percentage of the full rated grid load of a customer and should be skeptical of proposals that seek to provide the same level of capacity to the customer during outages as they have from their rated grid supply. The latter systems are likely to be significantly oversized on the solar energy production (and would not fit into a net metering design).

Qualified projects must be distributed generation solar installations that qualify for net metering. Grid support operations (capacity, ancillary services, etc.) from the storage during times when the grid is up should be encouraged (properly designed solar storage systems can switch seamlessly from grid support to off-grid backup mode and are allowed to operate in each mode under standard IEEE 1547.4) Storage projects that provide other customer and/or local benefits (peak demand savings, demand response, etc.) should also be encouraged.
Solar Grid Storage agrees that public and governmental buildings/locations with solar should be priority recipients for rebates but also private locations that can demonstrate an important function during extended grid outages (e.g. private schools that serve as shelters; gas stations; grocery stores; locations providing infrastructure support like fuel depots; transit services; and pipelines).

Solar Grid Storage would encourage the BPU to consider DC metering for SRECs (with a set reduction ratio to reflect AC output) on systems with storage. This will ease the installation and metering of systems that combined storage and solar through a single inverter.

C. Solicitation structure, timing and frequency & D. Application criteria and process
Solar Grid Storage would recommend a single initial round of applications wherein the applicant identifies the project, a completion date before the end of year 2014; demonstrated ability to complete the project; an amount per kWh requested; and total rebate amount. As the timing is quite constrained between application, rebate award and project completion, Solar Grid Storage would suggest an evaluation and notification of award within 2 weeks of the application deadline. A quick turn around on the projects will be key to seeing success in 2014.

Solar Grid Storage recommends that the projects with the lowest requested per kWh rebate amount be given greater weight for award than those seeking higher rebate levels.

A second round of applications for rebates could follow within 2 months of the initial round if a) there were insufficient applications in the initial round for the funds available and/or b) certain awardees from the initial round were not meeting milestones towards completion of their projects.

Solar Grid Storage appreciates the opportunity to submit these comments and looks forward to working the Board and Staff to implement a successful energy storage program in New Jersey.