

**A PROPOSED MICRO GRID  
FOR THE  
WEST WINDSOR TOWNSHIP MUNICIPAL COMPLEX**

**Questions and Answers (January 27, 2017 Supplement)**

Since the January 13 distribution and posting of Questions and Answers regarding this conceptual proposal, several additional questions have been offered. The following is a supplemental set of answers to the new questions offered.

**Q - Can someone answer the important question as to whether the township is signing a contract with PPS (Princeton Power Systems), PSE&G or someone else?**

**A –** Any contract for this project would be between West Windsor Township and PSE&G, subject to approval by the Township Council. The Township has not entered into any agreements with anyone regarding this project to date.

PSE&G will consult with Princeton Power Systems to design, build and maintain the system.

**Q - Is someone from PSE&G going to be present at the council meeting to answer questions? The person who made presentation at the last meeting was not best suited to answer technical questions.**

**A –** No, PSE&G representatives will not be participating in the presentation on January 30<sup>th</sup>, but a representative will be in attendance. At this meeting, representatives from Princeton Power Systems will make a brief presentation targeted to answer technical questions about the conceptual aspects of a solar array, battery back-up, micro grid system as well as prospective details regarding a potential system for West Windsor Township. Princeton Power Systems has the experience and expertise to design and implement these types of systems, and thus best answer technical questions.

**NOTE: Answers regarding questions about the electric demand of Township facilities and the back-up electric energy supply that could be available from this micro grid system were offered with the January 13 questions and answers. Clarifications about this aspect of this type of system can be offered as part of the presentation on January 30<sup>th</sup>, to help everyone better understand how this system would function during regular periods with uninterrupted power distribution, as well as periods when the power distribution is interrupted, and emergency back-up power to municipal facilities is required. The following is a more detailed analysis of this aspect of this proposal at this conceptual stage:**

It is helpful to note that the batteries and battery inverters are sized to meet the peak power (in kW's) of the facility. The solar array will not directly support the loads, so the kW rating does not need to match the power needs of the facility. The proposed solar array has a nameplate of 500 kW, so it will generate about 647,108 kwh per year, but to your point this would not affect the ability of the battery system to carry the full facility power. However, the lease payment from PSE&G is correlated to kWh's, so the larger array will result in larger payments to the town.

The battery inverters will be rated at 250kW, and the battery can provide full rated kW output even at lowest states of charge. The goal of the battery is to provide instantaneous, seamless backup power for the facility in the event of an outage but as you noted it will only last a few hours. The micro grid will be connected to the Police, Fire, and FEMS building which totals 98.8kW average load (2,373kWh per day/ 24 hours = 98.8kW). Applying the same methodology you have outlined for peak load by doubling average load, you end up with 197.6kW peak load across all three building. Thus, at its worst case scenario the battery alone will be able to sustain peak load for 2-4 hours.

The micro grid will also include the interconnection of the existing diesel generators that will be automatically started if the battery state of charge gets low. In addition, if sunlight is available, the solar array will continue to produce during grid outages, reducing the likelihood of requiring the generators to turn on and reducing fuel use.

The benefits of this configuration are many. First, the transition to backup power using batteries is nearly seamless and much faster than generator start-up. Second, backup generators are notoriously unreliable and often fail to start when needed. Having a battery provide 2-4 hours of immediate backup provides time to service and start the generator without affecting the facility. Since the battery covers peak power, the generator(s) can be sized to cover the energy usage of the facility (kWh's) rather than the full kW's, resulting in less generator usage. Finally, the generators will run for shorter periods of time at their peak efficiency, so fuel use will be 30-40% lower when in use. All of this is automatically controlled by the software control system provided with the micro grid.

In general, the concept of the micro grid is to have multiple redundant power sources that all operate in an off-grid situation, rather than a "monolithic" backup generator. The trade-off for these benefits is that micro grids are traditionally very expensive; so this program from PSE&G is a unique opportunity to get the benefits of an advanced multi-source backup system without the typical cost.

**END.**