Sustainable Biopower Working Group Meeting Notes
September 28, 2015
Rutgers Eco-complex, Bordentown, NJ

I. Welcome and Introductions (Ron Reisman, Market Manager Team)

Mr. Reisman called the meeting to order at 1:00 pm and asked the participants in the room and those on the phone to introduce themselves. A sign-in list is attached.

II. Update on NJCEP Programs and Budget (Scott Hunter, BPU Office of Clean Energy)

Mr. Hunter explained the annual budgeting process for clean energy programs and the role of the Comprehensive Resource Analysis (CRA) in establishing program funding levels. He emphasized that funds raised through the Societal Benefits Charge can only be used to provide incentives to projects utilizing Class 1 renewables, although Class 2 renewables may enter into the discussion at this meeting.

He said Staff recommended through the CRA that the Board approve a $3 million budget for sustainable biopower incentives, which they did at their June agenda meeting. He added that the Board also approved Honeywell's Compliance Filing at that meeting, which detailed the process of developing a sustainable biopower program for FY2016. Mr. Hunter said Staff was aiming to present a program plan to the Board at its November 16 agenda meeting and "hit the ground running in December with a fully fleshed-out program to spend the $3 million." He cautioned that the program budget was in a "use it or lose it position", with the possibility that unspent funds could be siphoned off by more successful NJCEP programs. He also briefly discussed the upcoming transition to a new NJCEP program administrator.

In answer to a question, Mr. Hunter said that the biopower program would not be impacted by a market assessment study of the NJCEP's Renewable Electric Storage and CHP/Fuel Cell programs that the Board has contracted for with the Rutgers Laboratory for Energy Smart Systems (LESS).

III. Report on "Assessment of Biomass Energy Potential in New Jersey – Version 2.0, July 2015" (Serpil Guran, Director, and Dave Specca, Associate Director, Rutgers Eco-complex)

Dr. Guran explained that the 2015 study is an update of a study originally performed in 2007 with funding from the Board. She said that not all biomass is the same; there are many different types of feedstocks and conversion technologies. She noted that while the working group focused exclusively on biopower, the report also looked at using biomass for transportation fuels, chemicals, lubricants and other possibilities.

The report states that New Jersey produces slightly more than seven million dry tons of biomass annually, with nearly three-quarters of that produced directly by the state's population in the form of solid waste (agriculture and forestry account for most of the remainder). About 58% of the biomass could ultimately be available to produce energy in the form of electricity, heat or transportation fuels.

This includes up to 654 MW of power **or** 230 million gallons of gasoline equivalent in an ideal scenario in which all the available biomass is fully utilized.

Mr. Specca said the first step in "getting a handle on what types of technologies make sense in New Jersey" is understanding the state's biomass supplies, i.e., what are they and where are they located. He said the report identifies 42 specific types of biomass feedstock within five basic categories and their locations throughout the state. The report provides county-by-county data on the volumes available for each of the five categories. He pointed out that the concentration of waste products vary by region, with forestry waste most prevalent in the northwest quadrant, solid waste in central and northeast sections and agricultural waste in southern New Jersey. He pointed out that New Jersey is 17 times the national average in waste generated per square mile.

Mr. Specca noted that landfills are currently using only half of the available biogas for power generation, although power is also generated from the approximately 33% of solid waste that is incinerated in the state's waste-to-energy plants. He noted that a major challenge in biomass conversion is feedstock transportation, since biomass tends to be bulky, difficult or expensive to transport and may be far from the site (i.e., forest waste in northwest New Jersey). He said Rutgers has developed an online calculator tool that developers and other interested parties can use to identify categories, quantities and locations of specific feedstocks along with the appropriate conversion technologies.

Dr. Guran presented a series of policy recommendations and next steps on accelerating the penetration of bioenergy; establishing the capacity for achieving the state's bioenergy goals; and developing conversion technologies that can help capture the state's biomass energy potential. However, she cautioned against "overpromising" and setting unrealistic targets.

Dr. Guran responded to several participants' questions about the impact of tipping fees on a biopower project's economic viability and the source separation of waste in various municipalities.

IV. Siloxane and Sulfide Removal Systems (Subra Iyer, President, Nrgtek, Inc.)

Dr. Iyer said his company has the technology for removing contaminants from gases with a process using liquid scrubbers – one with a physical solvent and one with a chemical solvent. Once the contaminants are removed, the process converts them into a benign form that can be reused as "a value-added species".

He said that siloxanes – which are found in detergents, shampoo and other consumer products – along with hydrogen sulfide and organo-sulfides are the leading contaminants of landfill gas. He noted that micro-turbines are particularly susceptible to siloxane contamination and pointed out that siloxane removal "is the key to successful power generation." He said his company has patents for siloxane removal in both the US and the EU.

Dr. Iyer described a diagram of the siloxane and hydrogen sulfide removal system he had proposed to Rutgers for the purpose of restarting a 250 kW CHP system near the Eco-complex that operates on landfill gas. The process would clean the gas while converting the siloxane into silicates and converting the hydrogen sulfide into organic elements of sulfur. He also discussed a project his firm is working on in Southern California to remove contaminants from landfill gas and bring it up to the quality of pipeline gas in terms of cleanliness, methane content and Btu value.

In response to a question from Mr. Reisman, Dr. Iyer said the proposed Rutgers system would cost approximately $150,000. He said the Rutgers system would be more expensive than similar siloxane cleaning projects because Rutgers has a micro-turbine which requires a higher level of gas cleaning.

V. Ridgewood DPW Biopower Project: 2-Year Performance (Paul Knowles, Natural Systems Utilities)

Dr. Knowles explained that the project represents a public-private partnership between his firm and the Village of Ridgewood, with NSU installing a 240 kW CHP system at the Village's wastewater treatment plant to generate electricity and thermal energy from the biogas produced by the plant's existing digesters. NSU also installed a facility that enabled the plant to accept fats, oils and grease (FOG) from the surrounding area to supplement the sewage sludge it was already receiving and processing. The power and heat produced by the CHP system provides nearly 100% of the plant's energy needs.

Dr. Knowles said the overall cost of the project was approximately $4 million, with about $1.6 million of the cost offset by government incentives (NJCEP's REIP program provided a $740,000 incentive, along with a 1603 grant). He estimated that the "various means of revenue generation" from this project gives it a four-to-six year payback period. He said the business model on which the Ridgewood project is based is replicable for hundreds of other small wastewater treatment plants throughout the country. He reported that the CHP system has produced more than 2,000,000 kWh since the start of operations two years ago, including nearly 110,000 kWh generated in July 2015, the last month for which data is available. Additionally, a solar system that is also part of the plant's clean energy agenda has generated more than 555,000 kWh since it began operating. Along with the energy and economic benefits, he said there are also environmental benefits to the project resulting from the removal of the FOG from the waste stream and a carbon offset of approximately 1,050 tons of CO_2 equivalent per year.

In response to a comment Dr. Knowles made regarding NSU's desire to "island" the project so the plant could keep operating during a power outage, Mr. Hunter said the Board encouraged the installation of islanding equipment at facilities like this and suggested that Dr. Knowles seek funding for the islanding through the New Jersey Energy Resilience Bank (ERB).

VI. Report on NJCEP Biopower Program Results and Discussion Topics for FY2016 Straw Proposal

Mr. Reisman briefly reviewed the history of the NJCEP biopower programs, noting that five projects totaling 22.65 MW received incentives through the Grid Supply and Renewable Energy Advanced Power (REAP) programs while an additional 14 projects totaling 8.505 MW received incentives through the CORE and REIP programs. A total of $14.97 million in incentives was awarded to these 19 projects. He also recapped the results of the 2012-13 open enrollment program (10 projects received incentive commitments; two projects completed, three remain under development, and five cancelled thus far) and the FY2014 and FY2015 competitive solicitations.

He then laid out the following discussion topics for stakeholder feedback:

- What can NJCEP do to encourage more biopower development?
- What are the critical obstacles to biopower development and how can they be overcome?
- How can the REIP be more responsive to the needs of potential customers?
- Which REIP program elements encourage or discourage greater participation?
    - Competitive solicitation versus open enrollment with prescriptive rebate
    - Timelines for applying for incentives or completing projects
    - Maximum incentive limits
    - Overly restrictive eligibility requirements
    - Excessive paperwork

In response to a question from a participant, Mr. Reisman noted that in addition to the incentive, sustainable biopower projects also produced revenue through the value of the electricity generated, the benefit of net metering and earning Class 1 RECs. Responding to a follow-up question from a participant on the future value of Class 1 RECs, Mr. Hunter said the cumulative average price of all the Class 1 RECs retired in EY2014 was about $10. He explained that because this number includes both spot market purchases and long-term contracts, it is difficult to quote a price that would provide an accurate forecasted value for these RECs.

A participant offered a suggestion that eligibility in the NJCEP biopower program be expanded to include non-generation uses of biogas, such as transportation fuel. Mr. Hunter responded by saying that funds for the biopower program come from a surcharge on utility bills (the Societal Benefits Charge) and must therefore be used for power generation to the benefit of ratepayers of the regulated utilities. He emphasized that the program had recently been expanded to allow for incentives on equipment that enhanced the performance or efficiency of an existing biopower project.

Another participant echoed the point about eligibility for biomass transportation projects, pointing out that New Jersey's Energy Master Plan (EMP) specifically identifies transportation fuels as a priority use for biomass. Mr. Hunter drew the distinction between what may be written in the EMP, which addresses the comprehensive sources and uses of energy statewide, versus what is allowed under the law regarding the use of Societal Benefits Charge funds collected from ratepayers of regulated gas and electric utilities.

Yet another participant questioned why New Jersey offers Class 1 RECs for electricity generated by biogas from solid waste that takes up time and space to decay in a landfill, but less valuable Class 2 RECs for electricity generated by solid waste that is gasified in a waste-to-energy facility. Mr. Hunter suggested that the participant petition the Legislature for a change in the law. He said it would be "above our pay grade to try to unwind the law" that was developed back in 1999. Dr. Guran suggested that the Class 1 and 2 RECs be merged into something called "BioRECs" that would offer an incentive for any organic material regardless of how it would be converted into energy.

VII. Facilitated Discussion on Straw Proposal Topics

Mr. Reisman reviewed some of the high-level recommendations that were discussed by Staff and the Market Manager in the development of a straw proposal for the FY2016 program. These included a return to an open enrollment program with a prescriptive rebate; eligibility for new projects, capacity additions to existing projects and performance or efficiency enhancing equipment; a maximum incentive of $1 million per project regardless of size; and a first-come, first-served application process.

One participant expressed a preference for the open enrollment program over the competitive solicitation, particularly because it allowed applicants to seek assistance from the Market Manager in the application process.

Mr. Hunter said he did not believe the incentive for performance or efficiency enhancing equipment should be based solely upon a calculation of 30% of total costs because this approach to providing incentive is "too loose and too subjective", making it open to abuse. He said basing the incentive on project cost doesn't encourage efficiency of design or cost effectiveness of the investment. As an alternative, he suggested basing the incentive on the amount of capacity recaptured or gained as a result of installing the equipment.

Another participant recommended that eligibility also be extended to measures that "make a project better, even if it doesn't increase capacity", such as the installation of storage tanks to hold additional quantities of feedstock.

Yet another participant asked about providing incentives for state of the art (SOTA) emissions technology that DEP mandates for CHP units. A representative of the DEP said that such technology would be required as a condition of receiving an incentive, since the unit would not be allowed to operate without it. Mr. Hunter said the SOTA air permit should be obtained before the applicant comes to the REIP program.

Mr. Hunter pointed out that the Board would soon be convening a CHP working group to address issues relating to barriers to statewide CHP development. He said that biopower has the many of the same issues as CHP as well as its own issues relating to feedstock security and conversion. He recommended that anyone interested in biopower market development issues also participate in the CHP working group.

VIII. Next Steps and Adjournment

Mr. Reisman said the straw proposal is expected to be issued within two weeks, with a public comment period to follow. This should allow sufficient time for Staff to place a program proposal on the Board's November 16 agenda.

Sarah Steindel of Rate Counsel asked to go on record to reserve the right to comment on the straw proposal once it's issued.

There being no further business, the meeting was adjourned at 3:40 pm. Following adjournment, a number of participants were given a tour of the Eco-complex's technology scale-up rooms and landfill gas filtration and delivery system.

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Sign In Sheet **Monday, September 28, 2015**

BIOPOWER WORKING GROUP MEETING

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