16 W. Lafayette St.
Trenton, NJ 08608
p: (609) 393-0008
f: (609) 360-8478
w: njfuture.org

COMMENT

Recommendations on Proposed Energy Master Plan

October 11, 2018

Contact: Gary Brune, Policy Manager, 609-393-0008 x 119

Green Energy Solutions for Water and Wastewater Systems
Recommendations for the Energy Master Plan

I. The Opportunity Presented by Integrated "Energy and Water" Projects

The modern water and energy systems that serve our needs are mutually linked: Water is a vital component of all phases of energy production and electricity generation, and large amounts of energy are required to treat and convey drinking water and wastewater. This interdependence, often expressed as the "energy-water nexus," provides opportunities to pursue joint projects that can unlock hidden benefits from both systems. As recognized by organizations such as the National Governors Association, states have an important role to play in advancing such projects. In that regard, the Energy Master Plan could highlight the need for a new state program that would maximize renewable energy and energy efficiency at water and wastewater treatment plants, thus lowering costs and reducing energy use and carbon emissions, and also bolstering resiliency through the construction of micro-grids in local communities.

According to a report from the Energy Power Research Institute (EPRI), water and wastewater facilities use nearly 4 percent of the nation's total electricity and future demand for electricity at these facilities is expected to increase by 20 percent. These costs can represent up to 40 percent of a typical municipality's total energy bill. Therefore, beyond the typical efficiency, resiliency, and environmental benefits, more aggressive implementation of energy saving initiatives could yield significant taxpayer relief.

Though energy and water systems are interdependent, they are typically regulated by separate agencies--energy by public utility commissions and water by environmental agencies. Since each organization naturally has a narrow focus, this arrangement is not ideal for advancing projects that yield mutual benefits. A reduction in energy-intensive pumping and aeration operations, which are common to both drinking water and wastewater systems, as well as the installation of energy-efficient equipment, benchmarking energy use to eliminate waste, water conservation, and on-site energy generation are just a few of the examples that are not presently maximized.

II. Examples from New Jersey

Camden County Municipal Utilities Authority. The Camden County Municipal Utilities Authority (CCMUA), which is well on its way to becoming 100 percent energy self-sufficient by 2020, offers a prime example of the type of cost savings that can be realized through this approach. Using low-interest loans provided by the New Jersey Environmental Infrastructure Trust (NJEIT), the authority pursued the following strategies:

- *Efficient Aeration*: Upgraded sedimentation tanks and aeration facilities to maximize gravity separation of solids, lessening reliance on energy-intensive pure oxygen aeration (25 percent energy savings to CCMUA);

- *Solar*: Solar arrays installed through a public-private partnership required no upfront investment by the authority. Through a power purchase agreement, a private firm that designed and constructed the panels will be paid over time with a portion of the electricity savings (10 percent energy savings to CCMUA);

- *Sludge Processing*: The biogas byproduct of the CCMUA's aggressive sludge management program will be converted to electricity in a new, on-site combined heat and power (CHP) plant, providing half of the energy needed to operate the authority's wastewater treatment plant by 2019;

- *Sustainability Loop*: The remaining energy savings will be generated by transferring electricity to the CCMUA from an adjacent local energy-from-waste incinerator. The second part of this project would send treated effluent from the CCMUA to the incinerator where it would be used as cooling water, eliminating the withdrawal of 800,000 gallons per day of water from a critical aquifer (30 percent savings to CCMUA).

When fully completed, the annual savings in energy and maintenance costs from these projects will exceed the CCMUA's debt service on the NJEIT financing.

Landis Sewerage Authority. The Landis Sewerage Authority (LSA) in Vineland returns 1.8 billion gallons of highly treated effluent to the ground, the highest volume in New Jersey. This strategy differs from most treatment plants, which typically release treated wastewater into rivers or the ocean, thus preventing a return to the original source. In contrast, LSA's policy of applying the effluent to land via infiltration basins and spray irrigation helps recharge the aquifer, which in turn supports the wetlands and base flow for the Maurice River. On the renewable energy front, LSA hosts solar power in partnership with the Vineland Municipal Electric Utility. Also, a waste-receiving station

collects food waste, fats, oils, and grease and processes them with an anaerobic digester, producing methane that is run through a clean-burning engine to produce electricity and hot water. On the whole, LSA generates more energy than it consumes.

Ridgewood. In 2013, the village of Ridgewood in Bergen County opened a renewable energy project at its sewage treatment plant. Through a 20-year public private partnership (P3) contract that involved no upfront capital investment by the town, the project powers the plant by renewable energy, significantly reducing the demand on the electric grid and cutting annual operating costs. Specifically, a biogas system produces electricity from methane, and that system is enhanced when food wastes such as fats, oils and grease are introduced into the process. Heat required for the wastewater plant's anaerobic digester is also generated from biogas, further increasing plant efficiency and reducing greenhouse gas emissions. (The renewable methane gas that is now captured was previously flared into the atmosphere.) Additional income is generated by selling renewable energy certificates (RECs) produced by the biogas operation and related solar projects. The entire facility is now powered with 100 percent renewable energy.

Since such energy efficiency projects are not unique, and since NJEIT financing and P3 contracts are available to all public wastewater plants in New Jersey, why aren't more facilities nearing "net zero" energy status?

III. Other Types of Projects

Microgrids. Autonomous, local microgrids that are not connected to the traditional power network can improve cost efficiency and bolster resiliency for key local facilities during heavy storms or power outages. A microgrid allows communities to be more energy-independent and, in some cases, more environmentally friendly. Large wastewater plants, such as the CCMUA, could play an expanded role in fueling microgrids, particularly if they are located in proximity to other large public energy users (e.g., hospitals). In a report issued in 2016, the Board of Public Utilities indicated that most of the 50 microgrids in New Jersey are fairly small facilities serving one building or campus.

Water Conservation Through Water Pipe Repair and Replacement. Due in part to the age of the state's water distribution system, studies estimate that up to 25 percent of treated drinking water is lost due to leakage. This implies a substantial waste of energy that is used to process that water. In some cases, the cost savings created by not losing treated drinking water can completely cover the capital cost of the pipe upgrades.

IV. Recommendations for the Energy Master Plan

The New Jersey Energy Master Plan should take advantage of the substantial energy savings, carbon reductions, and resiliency benefits that can be realized from New Jersey's water and wastewater systems.

Specifically, the Energy Master Plan should:

1. *Establish Measurable Goals*: Set specific short- and long-term targets for the water and wastewater sectors to reduce energy and water use and greenhouse gas emissions while increasing renewable energy sources. Include goals for low- or net-zero-energy wastewater treatment plants, and for water conservation through pipe upgrades.

2. *Build the Capacity of Staff and Stakeholders*: Through coordination between the BPU and the DEP, bring together public and private water/energy stakeholders to identify new ways to to integrate energy and water policy, by eliminating barriers to innovation (e.g., regulatory, financial, and technical), providing programmatic and technical assistance, and offering useful incentives.

3. *Facilitate Water Conservation*: Employ the existing DEP rulemaking process for the Water Quality Accountability Act to require water loss audits, state reporting of results, and publication of summary statistics. Require leak monitoring equipment, which is not presently in place across all systems, as well as the establishment of a "maximum allowable leak rate" or water loss standard. The latter measure could include a rapid rate recovery mechanism to enable utilities to recoup their investment quickly without submitting a full rate case. (Georgia and Tennessee implemented such systems in 2007 and 2010, respectively.) Water systems that exceed the standard significantly should undergo a formal review and implement solutions.

4. *Re-examine Energy Savings Performance Contracts*: Re-examine the role of public/private partnership contracts in providing upfront financing in exchange for long-term compensation from energy savings, including any impediments to their widespread use.

5. *Support Construction of Micro-grid Projects Fueled by Wastewater Treatment Plants*:

- *Legal and Regulatory Authority*

  Presently, municipal utility authorities (e.g., CCMUA) may sell energy to the power grid operated by the state's power utilities, but sewerage-only facilities (e.g., Passaic Valley Sewerage Commission) may not. To expand the pool of possibilities, the breadth of participation should be expanded.

  Legally, there is some question as to whether municipal utility authorities are authorized to sell electrical power (e.g., from a CHP plant) *directly* to other important infrastructure (e.g., hospitals) located nearby. Currently, wastewater facilities may sell energy at cost to the state's power grid through a lease arrangement. However, the state's power utilities apply a significant markup to that power before re-issuing it to others. Therefore, while the resulting rate is less than normal power charges, it is not as low as it *could be*. Allowing wastewater utilities to sell such energy at cost into a local microgrid would maximize property tax relief available through reduced energy costs.

It is possible to generate significant energy in a CHP facility by burning food waste. Such projects are actively under consideration in other states (e.g., Oakland, California.) In New Jersey, the resulting power from such a facility must be sold to the traditional power grid. While such projects must be analyzed on a case-by-case basis to verify their viability, current restrictions hamper widespread implementation.

- *Funding*

  While low-interest loans from the NJEIT currently may be used to support energy-related projects that serve the needs of a given facility (e.g., wastewater plant), they may not be used to construct microgrids that generate "excess" energy. For example, NJEIT financing could support the replacement of sewers in the area of the microgrid, and thus reduce expensive excavation costs, but cannot directly fund the microgrid project itself. Since low-cost financing is key to success, this restriction should also be revisited, either by expanding the mission of the New Jersey Infrastructure Bank or creating a like entity for energy projects.

6. *Evaluate the Potential for Financial Support for Water Reuse Projects*: Since the marginal cost of water is fairly inexpensive, the annual "savings" from water reuse projects is often far less than the projected annual debt service, even with low-cost NJEIT financing. Therefore, the water reuse segment of the CCMUA's Sustainability Loop project noted above, which realizes an important ancillary benefit of eliminating the withdrawal of 800,000 gallons/day of aquifer water, may not be viable without a supplemental fund source. Since financial considerations are often a key hurdle to implementation of water reuse projects that provide significant ancillary benefit, such as aquifer protection, the state should consider the expanded use of principal forgiveness, or possibly a new bond issuance, to address at least part of the cost. In the CCMUA example noted above, a one-time expenditure of $7.5 million would enable the authority to send treated effluent to the adjacent local trash-to-incinerator facility and eliminate permanently the need to draw 800,000 gallons/day from a sensitive aquifer.

Thank you for your consideration. For more information, contact Gary Brune, Policy Manager (609-393-0008 x 119 or gbrune@njfuture.org) at New Jersey Future.

New Jersey Future is a nonpartisan nonprofit organization that promotes policies and practices for sustainable growth and development in New Jersey.