Testimony of Brian McLean
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before the House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment

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Thank you for the opportunity to testify on behalf of the Environmental Protection Agency concerning clean energy and wastewater treatment. My name is Brian McLean and I am Director for the Office of Atmospheric Programs within EPA's Office of Air and Radiation, the office that oversees EPA's clean energy programs. With me today, is Caterina Hatcher, ENERGY STAR National Manager for the Public Sector, who manages our energy efficiency work with local governments and wastewater utilities and can answer the technical questions relating to this work.

Overview

Fostering sustainable wastewater management is a priority at EPA and is all the more important given the increased investments in water infrastructure expected from an economic stimulus package. Many factors contribute to sustainable wastewater management. EPA's Office of Water is actively promoting asset management, green infrastructure, water efficiency, and energy efficiency at these facilities. My office works in partnership with the water office on clean energy issues. To help expand understanding of these important opportunities, the Office of Water and the Office of Air and Radiation recently signed a Memorandum of Understanding providing for close cooperation between the two offices on this critical topic.[1]

Today, I have been asked to speak about clean energy, which I define as energy efficiency and renewable energy. Both of these areas are fundamental to sustainable wastewater management and are extremely timely as our nation is poised to invest billions of dollars in infrastructure that will benefit many generations over the coming years. I will share with you how EPA's ENERGY STAR and Combined Heat and Power (CHP) programs, working with EPA's Office of Water, have been helping to promote clean energy in the wastewater industry

I would like to start by outlining some facts about energy use in the water and wastewater industry.

- Water and wastewater treatment facilities require significant energy to power pumps, aeration systems, and other operations.
- Combined, drinking water and wastewater services account for an estimated 3% of national energy consumption, equivalent to between 56 and 75 billion kilowatt hours

[1] http://www.epa.gov/water/climatechange/docs/ccow-oarmou/pdf

(kWh) and about $4 billion in annual energy costs.[2]

- Wastewater treatment plants are typically the largest energy consumers within local governments, accounting for 30 to 40% of the total energy consumed.[3]
- These facilities are significant sources of greenhouse gas emissions, contributing approximately 45 million tons of greenhouse gases to the atmosphere annually[4]
- Many facilities are facing operating deficits and these deficits are expected to increase as operations and maintenance costs increase due to aging infrastructure, population shifts, and increased need for treatment[5]

Clean energy, including biogas, can reduce energy use, energy costs, and greenhouse gas emissions at wastewater treatment facilities and offers cost-effective opportunities to do so. Numerous audits have identified that 10 to 20 percent savings are available through process optimization and equipment modifications.[6] They also include clean energy options such as methane capture and utilization, combined heat and power, as well as solar and wind energy.[7,8] Many energy efficiency improvements at water and wastewater treatment facilities can have good rates of return

The Office of Water recently published a strategy addressing climate change and water issues, and identified opportunities for reducing greenhouse gas releases from wastewater treatment plants through improved energy efficiency and water efficiency as well as power production using methane and other resources.[9]

Energy Efficiency

The significant potential in this industry for cost-effective clean energy technologies and practices has not routinely been considered as part of infrastructural improvements. In order to help overcome the traditional barriers to clean energy, such as lack of information, expertise and funding, EPA has been developing tools and resources to help local government and wastewater utility managers learn about the benefits of clean energy, act on those opportunities, and measure results.

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[2] EPA, GETF, Jan. 2008, p. 4. *Ensuring a Sustainable Future: An Energy Management Guidebook for Wastewater and Water Utilities.*
http://www.epa.gov/waterinfrastructure/pdfs/guidebook_si_energymanagement.pdf

[3] EPA, CPPD, Mar 2008. "Water and Energy: Leveraging Voluntary Programs to Save Both Water and Energy," viii.

[4] Based on an average mix of energy sources providing the energy for water and wastewater facilities. Methane (CH4) and nitrous oxide (N2O) are also emitted from wastewater treatment facilities but are not included in these estimates The source for the emissions estimate is EPA, 2008.
http://www.epa.gov/waterinfrastructure/bettermanagement_energy.html

[5] EPA, CPPD, Mar 2008. "Water and Energy: Leveraging Voluntary Programs to Save Both Water and Energy," 3-4.

[6] Based on audits of over 200 facilities through EPRI's Water and Wastewater program

[7] EPA. http://www.epa.gov/chp/markets/wastewater.html

[8] Santa Clara Valley Water District, June 2007. *From Watts to Water: Climate Change Response through Saving Water, Saving Energy, and Reducing Air Pollution,* p. 33.
http://www.valleywater.org/conservation/media/Documents/WUE%20Water%20Energy%20Report.pdf

[9] http://www.epa.gov/water/climatechange/index.html

EPA's energy efficiency efforts build on our successful ENERGY STAR program. In 2007, this program identified energy savings of 180 billion kilowatt-hours (kWh) -- estimated to be associated with savings $16 billion on consumers' and business' utility bills.[10]

As part of the ENERGY STAR program, EPA has worked to provide important energy management tools to many decision-makers to help them assess the efficiency of their facilities, target investments, and track the results for their efforts. Providing key energy and environmental information to the right audiences has been an important part of EPA's ENERGY STAR program for commercial buildings since the late 1990s.

Better information on the energy used by buildings and facilities and how they compare to one another is critical to fulfilling the energy efficiency potential. Energy use information is often not available. Moreover, even when energy information is available, it can be hard to understand and compare to other similar facilities. Since you can't manage what you don't measure, EPA created a national energy performance rating system. This may not seem to be a major innovation, but for the first time it is possible for buildings and facilities to receive a ranking on a scale of 1-100, similar to a miles per gallon rating on vehicles, and for decision-makers to develop investment strategies based on this standardized, objective information.[11]

A good example is provided by EPA's recent work with school districts across the country. Since 2000, EPA has provided an energy performance rating for school buildings. Since then, we estimate that nearly 25% of the nation's schools have been assessed using this rating.[12] And many school districts are using this information to improve operations, make upgrades and measure results. Through our ENERGY STAR partnerships with hundreds of school districts we have seen dramatic reductions in the energy used in their school buildings. For example, more than 40 school districts have reduced their energy bills by 10 to 20 percent or more. Leaders, such as the Lieutenant Governor of Wisconsin, are challenging their school systems to achieve and track energy savings using EPA's tools.[13]

The EPA energy performance rating system is bringing similar management information and performance tracking to other building areas as well, such as hospitals, office buildings, retail stores and more.

With wastewater treatment, we have developed a facility-level energy performance rating system by working with many leading industry parties over the last 3 years.

A study of 54 wastewater facilities that helped test the ENERGY STAR benchmark indicated that the EPA performance scores ranged from 1 through 99, with an average score of 58. In fact, one facility in the study provided data from both before and after a

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[10] EPA, CPPD, "ENERGY STAR® and Other Climate Protection Partnerships 2007 Annual Report," 2008

[11] http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager

[12] Ibid, p. 26.

[13] http://www.energystar.gov/index.cfm?c=leaders.bus_leaders

series of facility renovations designed to improved energy efficiency. These improvements included the installation of premium efficiency motors, the addition of variable frequency drives to pumps, and an upgrade to the aeration system. There was considerable improvement in the rating of this facility; it started at a 69 in 2004 and moved to a 99 in 2007. These improvements resulted in source energy savings of about 2.3 kBtu/gallons per day.[14] This demonstrates the utility of the tool in tracking wastewater energy performance.

More than 100 wastewater facilities have already used EPA's rating system and this is growing. We expect that our strong partnerships with the utilities and local governments will bring important tools and information to help achieve significant energy savings. To help them find specific savings, an energy management guidebook and opportunities to network with other wastewater utilities have provided concrete examples of how to make cost-effective improvements.

Combined Heat and Power

EPA also has a CHP Partnership program to work closely with energy users, the CHP industry, state and local governments and other clean energy stakeholders to facilitate the development of new projects and to promote their environmental and economic benefits. Highly efficient combined heat and power systems provide multiple benefits in terms of improving energy performance and reducing greenhouse gas emissions.

EPA estimates that if the over 500 wastewater treatment plants where CHP would be feasible would install it, 340 MW of clean electricity would be generated and 2.3 million metric tons of CO2 would be offset annually, which is equivalent to cutting CO2 emissions from 430,000 cars.[15] This assessment is based on technical feasibility. Treatment plant managers would need to perform a site-specific cost-effectiveness analysis to determine the economic feasibility of investing in a CHP system at their particular facility with site-specific digester, heating, and electric loads. Working with the Office of Water, we have targeted analysis, technical resources (e.g., case studies) and outreach efforts to increase awareness and adoption of CHP in wastewater treatment facilities.

Next Steps

In 2009, EPA will continue to promote the benefits of clean energy. We will also enhance and expand EPA's energy performance ratings to meet the needs of water and wastewater utilities. Through our network of states and local governments, we have a ready avenue to make this information available to commercial and industrial energy users.

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[14] WEFTEC, October 2008. "Benchmarking Wastewater Facility Energy Performance Using ENERGY STAR Portfolio Manager", http://www.cee1.org/files/WEFTEC2008Session981130Manuscript.pdf

[15] "Opportunities for and Benefits of Combined Heat and Power at Wastewater Treatment Facilities," http://www.epa.gov/chp/documents/wwtf_opportunities.pdf.

As more attention is focused on improving the nation's water and wastewater infrastructure, I thank you for the opportunity to discuss how EPA can help achieve clean energy goals at the same time. This concludes my testimony. Caterina and I would be pleased to answer any questions the Members of the Subcommittee may have.