



Directions

WINTER 2010-2011 ISSUE | VOLUME 18 | NO. 3

Trash or Treasure?

REUSING LANDFILL SITES FOR SOLAR POWER GENERATION

Closed landfills have traditionally been a vastly underutilized resource, which can have a negative impact on the local tax base or be seen as a business liability. Municipalities and private industries with closed landfills now have an opportunity to capitalize on this untapped resource by siting revenue-generating, clean, renewable energy facilities on these properties.

on landfills in the Northeast, said, "Incentives for solar projects have evolved to create a revenue stream, lower utility costs, and reduce a municipality's maintenance costs by eliminating or transferring the maintenance to the solar facility developer."

Benefits and Barriers

While the primary advantage of developing a solar installation on a landfill is bringing an underutilized land resource into productive use, there are many other benefits. Incorporating solar facilities into the landfill closure process can reduce closure costs, offset the expense of post-closure maintenance and monitoring, and, most importantly, create a new, direct revenue generator. Other benefits of siting solar on landfills include:

- reduced public concern over aesthetics because the sites are typically in locations where a solar installation will impact fewer residents;

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The large, open spaces where landfills are located often have the right characteristics for a solar array project, including good sun exposure. The most attractive sites are near urban areas where

the infrastructure to deliver energy economically is either already in place or easily accessible. These sites usually have very few, if any, abutters that would oppose a solar project.

As Alan Benevides, PE, Senior Vice President at Woodard & Curran, who is currently involved in a number of solar development projects



When to LEED and When to Follow

The Pros and Cons of LEED Certification

Achieving Leadership in Energy and Environmental Design (LEED) certification is a great accomplishment for a property. LEED-certified buildings are more environmentally friendly than conventional buildings, and studies have shown that the value, return on investment, and occupancy and rent ratios of a building increase and operating costs decrease when green building is part of the equation. For these reasons, many high-profile projects are committed to achieving LEED certification, and well over 20,000 buildings are either certified or pursuing certification through the U.S. Green Building Council.

On the other hand, while LEED ensures a building project is environmentally responsible, it can carry a higher price tag. Applying LEED standards can be more expensive than using traditional options in many areas, including design, materials, and the cost of the certification process itself, which can all add up to a premium over conventional projects. In an uncertain economy, high upfront costs can be difficult to justify despite the long-term benefits of improved efficiency and healthier work and living environments for occupants. For those committed to LEED certification, there are

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Down the Drain Pharmaceuticals in Wastewater Part II

In the last issue of Directions we discussed the changing rules of pharmaceutical disposal for healthcare facilities. In this issue we focus on what communities are doing to address pharmaceuticals and personal care products' (PPCPs) impact on water resources.

The challenge that PPCPs pose for municipalities is complex. The diversity of chemicals arriving at municipal treatment plants is staggering, and removing all of these compounds from wastewater is beyond the

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- better use of an otherwise low-demand land type that is not appropriate for residential or commercial zoning;
- availability of funding assistance, financial incentives, and tax credits;
- long-term, potentially low-priced electrical supply; and
- reduced community carbon footprint.

Tremendous environmental and financial benefits can be realized by using closed landfills to capture solar energy, however, the reality is that the cost of regulatory compliance, installation, and system monitoring can be high. Technical challenges including settlement, cap impacts, vegetation impacts, and site stability (especially where the south-facing slopes are steep) are all important considerations for this type of project.



Policy and Funding Support

In October 2010, the EPA's Office of Solid Waste & Emergency Response released a draft plan on "RE-Powering America's Land and Advancing the Development of Renewable Energy on Potentially Contaminated Lands." The plan continues the work of the initiative that was originally launched in 2008, and further assesses the feasibility of developing renewable energy production on closed landfills as well as Superfund and Brownfield sites. Reducing the green space taken up by development projects, decreasing greenhouse gas emissions, and providing health and economic benefits

(including job creation) to local communities are the key drivers of this continued effort.

In addition, at the start of 2010, 16 states implemented programs that specifically incentivize solar projects. These provisions vary regionally, but many states set targets that will support significant solar development, including New Jersey (3,500 MW by 2016), Massachusetts (400 MW by 2020), and Delaware (3.5% of all generation). Solar programs are gaining momentum and are generally funded from utility bills so they are not subject to political influence or discretionary funding.

Options for other programs that assist municipalities with the cost of developing a solar project on a landfill range from solar power purchase agreements with third parties, to state-specific grants, to ARRA funding. Benevides notes, "Federal and state government agencies are offering tremendous financial incentives to encourage development of all types of renewable energy projects, including those sited on landfills. Regulators at these agencies are simultaneously streamlining the permitting process at closed landfill sites to encourage these projects to become a reality." In Massachusetts, a combination of incentives can cover almost all of the capital costs for solar-on-landfill projects. Other states, such as New Jersey, have Solar Renewable Energy Credit (SREC) programs that can be worth up to \$600 per MWh of power output.

Where to Start?

Communities and businesses that have closed landfills and are interested in using this resource for potential solar projects can begin by assembling a team of experts to analyze the technical considerations of the potential site. The process will typically include feasibility analysis of permitting, procurement, net-metering, and evaluating SREC and other funding opportunities. Once the initial analysis is complete and funding is identified, the work of designing a solar installation tailored to the specific site begins, and a community is well on its way to creating renewable energy in its own back yard. ▲

tax rebates, zoning allowances, and other incentives in many cities and towns that can significantly offset the costs of obtaining LEED certification.



In the face of the high costs, and without a lot of competing green building certification standards, many project owners have opted to follow the intent of the LEED system, without pursuing certification. While LEED standards require projects to address a full range of environmental factors, a project owner can still benefit from increased value and reduced operating costs by focusing resources on improving environmental impact and building performance in areas that best suit an individual project. Engineers, architects, and builders were producing energy efficient buildings long before LEED existed, as Devon Carter, PE, a LEED AP at Woodard & Curran, reminds us. "LEED is bringing people back to the way things used to be built. We still know where the sun rises and sets," he said, referring to working with nature for lighting and heating purposes.

The focus on good design also applies to project elements that are beyond the scope of the LEED certification process. The LEED standard typically applies to the "shell" of a project – the site, the building structure, and the immediate vicinity. The occupancy of the project is typically not included. For high-intensity occupancies, such as manufacturing facilities, incorporating well-designed and efficient process can also result in significant long-term cost savings and improved environmental performance.

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plants' capabilities. "It's important that people understand," explains Woodard & Curran Senior Vice President Joe Shea, PE, who leads the firm's Sanitary Wastewater Service Line, "that the treatment processes municipalities have in place are not focused on removing PPCP chemicals from wastewater. It is possible that they are accomplishing some level of treatment for these compounds, but the plants are designed and operated to remove other compounds."

Despite being able to remove some PPCPs from municipal wastewater, there are many compounds that flow through the treatment system and out into the environment. In Acton, MA, Director of Public Health Doug Halley tells this story: "We were part of a Johns Hopkins study a few years ago looking at medications in the sewers and determining if they were coming out in the treated effluent. By and large our facility was removing the compounds, but there are so many chemicals that it's nearly impossible to tell if you're removing all of them."

Prevention, Education the Most Cost-effective Solutions

Addressing this issue through upgraded treatment systems would be an extraordinarily expensive undertaking and would take decades to complete. A far quicker and more cost-effective solution is to keep PPCPs from getting into wastewater in the first place.

Many communities, organizations, and regulatory agencies have launched efforts to educate people about the dangers of flushing unused medicines down the drain and have organized take-back days where unwanted pharmaceuticals can be turned in for safe disposal. The largest initiative is the U.S. Drug Enforcement Administration's "Take Back" campaign, which held its first collection day in September 2010 with more than 4,000 sites and nearly 3,000 state and local law enforcement agencies participating.

Individual cities and towns are also running their own programs, either with support from an interested organization or agency, or on their own initiative. A recently launched take-back day program in Acton was very successful. According to Halley, "We opened up our two annual hazardous waste collection days to accept pharmaceuticals. Feedback is very positive; people are very happy to have this program available. We collect both sharps (hypodermic needles) and medications and we are finding a lot of sharps are coming in, and a wide assortment of drugs. Usually small amounts of controlled substances, but substantial quantities of uncontrolled drugs, are turned in."

Education and drug take-back programs are just the first step in what will certainly be an extended effort to reduce or eliminate PPCPs in wastewater to protect human health and the environment. Even completely eliminating pharmaceutical flushing would not solve the whole problem. As Halley said, "We can't really control the quantities that pass through people's bodies. We need to better understand what percentage is entering the waste stream and whether the treatment systems are capable of handling that." ▲



Photo courtesy of Mary Michelman, Acton Citizen's for Environmental Safety and Acton Stream Team.

The complexities of green building and LEED certification require a professional project team that understands green building issues, has a flexible approach, and understands the complexities of modern project design. There are many options for incorporating green building principles into a project, which impact multiple project components and design disciplines. Trade-offs need to be analyzed to produce the right cost-benefit outcome for each project. Although the LEED certification process is often, though not always, led by a project architect or specialty consultant, engineers are a critical part of the process. As Woodard & Curran's Steve Robbins, PE, LEED AP, notes, "It is important to have engineers on your project who understand LEED, whether or not they are LEED-Accredited Professionals, in order to work fluidly with the rest of the project team to achieve the client's green building intent." ▲



An Ounce of Prevention Proactive Emergency Preparedness on College Campuses

Though the uproar over the H1N1 flu has quieted, emergency planning has become increasingly essential for colleges and universities across the country. Hazards faced by campus communities are more complex and widespread, ranging from natural disasters, pandemic diseases, and non-violent crime, to large-scale calculated acts of violence and terrorism. In response, campuses have begun to reassess their approach to emergency preparedness and many have made the decision to take

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Navigating Through FOG

Fats, oils, and grease (FOG) seem like benign byproducts of cooking, but when they are poured down the sink drain they can cause major problems. By solidifying as they cool they can stick to the inside of pipes, building up and creating clogs. This can be a very costly problem for both municipal treatment systems and private residents.



Woodard & Curran has teamed up with the Cities of Dallas and Royston, GA to combat this potentially catastrophic sewer problem. The firm worked with the cities to develop a FOG brochure for the public, outlining the hazards of pouring grease down the drain and offering alternatives to keep it out of drain lines and sewer pipes, such as putting it in a tin can until it cools and throwing it away with the garbage.

The cities have mailed the brochures along with water and sewer bills to each resident. "We send the brochure and a letter from the City explaining the importance of the FOG program," said Tina Clark, Public Works Director for the City of Dallas. "It is important for our residents to understand what they can do to help." ▲

EMERGENCY PREPAREDNESS *(Continued from p3)*

action before it is too late. In addition to keeping students and staff safe during a crisis, effective improvements in emergency planning and workplace health and safety provide overall value by engaging staff to minimize costs associated with accidents and incidents while ensuring continuity of campus operations.

Woodard & Curran has been developing emergency management plans and providing emergency response guidance to colleges and universities for over 10 years, and is currently working with the Fashion Institute of Technology (FIT) on emergency management planning. FIT chose to develop a comprehensive emergency response plan, which integrates the State University of New York (SUNY) model plan with applicable state and federal emergency response requirements, as well as policies and procedures that were identified during a hazard analysis, though it was not required to do so.



The plan was developed through close collaboration with FIT, including interviews and planning workshops with key representatives from each administrative office. In addition, Woodard & Curran is providing emergency preparedness and response advisory services, which include

establishing an Emergency Preparedness and Response Planning Group whose purpose is to recommend and implement emergency mitigation measures and coordinate planning for emergency situations affecting FIT.

The initial comprehensive plan is primarily for the campus emergency response team, and Woodard & Curran will go on to develop a public emergency response plan for students, faculty, and staff as well as an emergency response "users guide" to be posted around the campus. According to Woodard & Curran Vice President and Project Manager MaryKristin Ivanovich, "One of the key components to a strong emergency management program is communication. Effective communication between school officials, staff, faculty, and students helps the campus work together smoothly in an emergency situation."

FIT is a great example of a university that took the initiative to reform its emergency procedures as a proactive measure. Taking into account the events that have affected New York City and college campuses across the country in recent years, FIT chose to develop a plan that would prepare the campus for a vast range of events. As Ivanovich explains, "The overall complexity of college and university campuses, whether they are in rural or urban settings, makes it necessary to put together well thought-out emergency plans, because you never know what will happen or who it will impact." Because the repercussions of being unprepared can be severe, taking the extra step to reassess emergency preparedness should be on every college and university's agenda. ▲

PLANT PROFILE

University of New England Wastewater Treatment Plant

In 1993, the University of New England's (UNE's) wastewater treatment capacity was limiting the growth of its campus in Biddeford, ME. The campus was served by a used package plant donated by a local company and installed in the late 1980s, which wasn't meeting the campus' needs. UNE hired Woodard & Curran to help and, after determining that the best course of action was to build a new treatment plant, the University asked the firm to design a sequencing batch reactor (SBR) that would allow UNE to expand its facilities and

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Projects

Woodard & Curran was hired by the **Town of Easton, MA** to design a 50,000-GPD wastewater treatment plant to serve a portion of the North Easton Village sewer area. The treatment plant process will include membrane treatment and UV disinfection of the treated effluent to meet anticipated groundwater discharge permit limits.

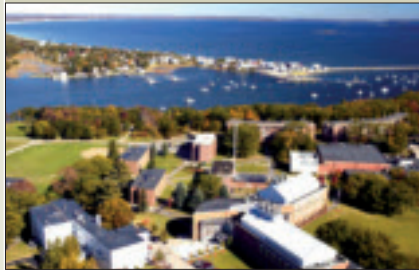
Primus Builders hired Woodard & Curran to design a nitrogen removal system to treat animal waste at **Kreider Dairy** in Pennsylvania. The system is based on a proprietary technology from BION Environmental and is used to reduce the quantity of nitrogen in animal waste before land-spreading operations. The project is driven by the massive effort to reduce nutrient loading in the Chesapeake Bay Watershed. It will be the first full-scale implementation of the technology and it is expected to be operational by mid 2011.

The **Town of Billerica, MA** hired Woodard & Curran to perform a sewer system infiltration/inflow (I/I) analysis, which will conform as closely as possible to MassDEP I/I guidelines. The project will include developing sewer mapping and developing and implementing a metering program that will consist of installing up to 40 continuous-monitoring depth and velocity sensor meters, installing and maintaining two rain gauges, and maintaining the meters for 10 weeks.

Woodard & Curran was hired by a **confidential Fortune 100** firm to manage the remedial activities at a 435-acre site in New Jersey. The services include site security, operation and maintenance of the groundwater extraction system, an on-site RCRA Subtitle C landfill, stormwater pumping systems, wastewater pre-treatment system, and flood control berms.

The **City of Ellsworth, ME** hired Woodard & Curran for engineering design and construction administration services for the replacement of approximately 2,260 feet of original, cast iron water main on Water Street, which has been an area with higher than average main breaks. The existing sidewalk will also be replaced with a new sidewalk system constructed of granite

welcome more students. Following completion of the plant, UNE hired Woodard & Curran to provide contract operations, and the firm has operated the plant ever since.



The plant sits beside the Saco River and was initially designed to handle 60,000 gallons per day (GPD), but now has a capacity of 150,000 GPD. "Since the plant came on line," said Tim Baker, Plant Manager at the facility, "Woodard & Curran has completed a number of upgrades to keep up with the growth of the University and make sure the facility runs well and stays within permit limits."

The first upgrade took place in 2000 and included completely new instrumentation and controls as well as updated electrical systems, increasing plant capacity to 100,000 GPD. The new systems replaced a proprietary controller that operated on outdated computer systems and had become unreliable.

In 2006, UNE was growing rapidly and adding new facilities. With the treatment system running at maximum capacity, Woodard & Curran implemented an extensive upgrade of pumps and blowers, added capacity to the SBRs, and updated the controls systems to match the new equipment. This expanded capacity to 150,000 GPD without increasing the plant's footprint, which could have restricted views of the Saco River and changed the character of the campus substantially. It also added on-site thickening capabilities, which saved money by avoiding the need to install additional sludge holding tanks, and continues to save UNE by reducing the cost of shipping the sludge.

"The partnership between Woodard & Curran and UNE has been a good one for everyone," said Baker. "The facility has grown with the University and continues to meet all the campus' wastewater treatment needs." ▲

curb and a combination of concrete and bituminous surface.

Woodard & Curran was awarded a 10-year contract to operate, maintain, and manage the water and wastewater utilities for the **Township of Maple Shade, NJ**. The water utility consists of five water supply wells and two groundwater treatment plants – the Main Street plant with a 3.4-MGD capacity and the Kings Highway plant with a 2.0-MGD capacity. The wastewater utility consists of a facility with a 3.4-MGD capacity. The wastewater system includes nine pumping stations and 55 miles of collection lines.

Woodard & Curran has secured a contract from the **City of Dallas, GA** to extend the sewer system to service the Paulding County Airport. The project calls for approximately 19,000 linear feet of gravity sewer line from the airport to the City. The City will provide sewer service to the airport and any future industry in the service area, expanding Dallas' service

area and providing an extra source of revenue for the City.

Woodard & Curran assisted **Maine School Administrative District (MSAD) #29** in evaluating the financial benefits of a woodchip biomass boiler. Based on positive results and successfully securing \$910,000 in grant funds, Woodard & Curran assembled a design/build team to install the new boiler and provide woodchip storage. The project involves renovations to house the woodchip storage and boiler, and the connection of the new system to the existing hot water distribution system in the high school and adjacent vocational school. Woodard & Curran helped MSAD #29 and the Forestry Department select auxiliary emissions equipment that will allow the new system to operate in compliance with proposed EPA emissions standards. The project is scheduled for completion by early 2011 and the contract provides performance-based guaranteed savings through reduction in petroleum-based fuel use.

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People



Rodriguez

Paul Rodriguez, PE, Vice President, has been elected President of the Maine Wastewater Control Association. His 1-year term will begin in January. As President, Rodriguez will be responsible for coordinating and overseeing the activities of the Association and its Executive Board, as well as coordinating with state agencies and other organizations on issues of mutual interest, in addition to other duties.

Awards



Dombrowski

The Water Environment Federation presented Woodard & Curran Vice President **Paul Dombrowski, PE** with the Morgan Operational Solutions Award, which recognizes valuable contributions to

the in-facility study and solution of operational problems in water and wastewater treatment facilities. Dombrowski was nominated by the New England Water Environment Association for an operating protocol he developed to improve plant performance at facilities retrofitted from secondary treatment to nitrification without expensive reactor or clarifier tank construction. The protocol has been successfully implemented at 21 facilities around New England.

Woodard & Curran is among the top engineering and environmental firms according to two industry lists. On *Engineering News Record's* list of the **Top 200 Environmental Firms**, Woodard & Curran ranked 79th. The ranking is based on work completed in 2009, and this marks the 16th consecutive year Woodard & Curran has been included on the list. On *The Zweig Letter Hot Firm 2010* list of the 150 most successful architecture, engineering, and environmental consulting firms in the U.S. and

Canada, Woodard & Curran ranked 60th. The list is based on percentage revenue growth as well as absolute dollar revenue growth over a 3-year period.



Woodard & Curran has been named one of the **Best Places to Work in Maine**. The list is produced by the Best Companies Group, and is based on a number of factors including an extensive employee survey, company policies, benefits, and employee-focused events. ▲

