Richard G Lubinski

From: Buildings [esubscriptions@buildings.com]
Sent: Wednesday, November 18, 2009 2:40 PM
To: rick@think-energy.net
Subject: Water Conservation - The Third Utility

BUILDINGS Energy
Helping Facilities Professionals Make Smarter Decisions

Home | Contact | The SOURCE | Case Studies | Video

November 2009 ♦ Vol. 6, Issue 11

Water Conservation – The Third Utility

By Richard G. Lubinski

While energy-management programs start with electricity and natural gas (fuel) savings, the third utility that needs your attention is water/sewer expenses. Major advancements in the technology and reliability of water equipment in the last 10 years have made the investment in water conservation very cost effective. While water and sewer rates vary, the process is worth your time for a variety of reasons:

- Water conservation is an investment with attractive ROI potential.
- Water rates are increasing.
- Sewer rates are increasing dramatically due to higher EPA mandates on municipal sewer plant operators (100 percent to 400 percent over the past 10 years).
- Droughts are requiring water conservation for businesses, or you face major water cost increases. Atlanta required a 10-percent reduction or a charge of an extra 25 percent.
- Water conservation and sewer plant operations benefit from water conservation since it directly impacts billion-dollar capital investments to address peak loads (like electricity).
- Some cities have demand-side management (DSM) rebates to incentivize water-conservation investment.
- Fresh water is a major element in our lives and the viability of our communities and, ultimately, the earth.

U.S. Drought Monitor
November 3, 2009

Released November 5, 2009

U.S. Seasonal Drought Outlook
Valid Nov. 5, 2009 - January 2010

Released November 5, 2009

Precipitation Required to End Current Drought Conditions in Three Months

October 2009

View Larger

Featured Sponsor

LLUMAR® ENERGY SAVING FILM

A cost-effective alternative to window replacement, LLumar Energy Saving Window Film increases window efficiency and may lower your energy costs by as much as 15%. Because of its strong solar performance, LLumar offers an average payback time of less than 3 years. Plus, using LLumar may help you qualify for LEED® credits. To pre-qualify your building for energy efficiency and savings with window film, take the One Minute Challenge™ at oneminutechallenge.com

To learn more, visit our Web site: oneminutechallenge.com.

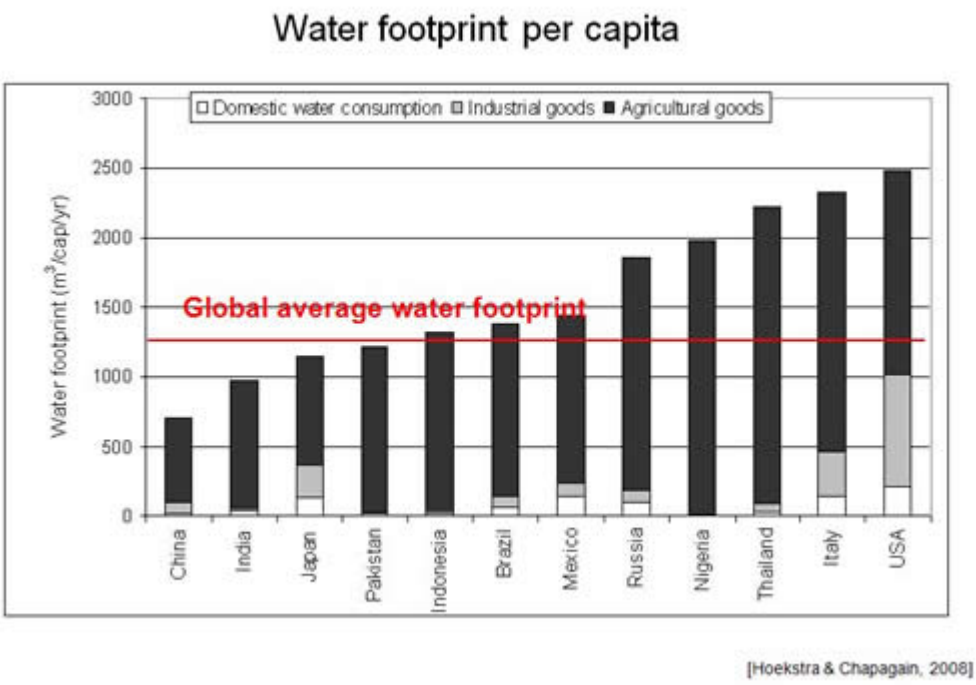
Since we appear to have an unlimited supply of water (like air), we have historically taken it for granted. Since water/sewer costs used to be cheap, very few people thought about the need for conservation. In industry, water is used and reused several time before it's discharged. In some buildings, (city) water was so cheap that it was used purely as a cooling method for some HVAC systems and then immediately dumped into the sanitary sewer system for treatment.

In third-world countries, many buildings use grey water from showers and toilets to water outdoor plants. In some third-world countries, islands, and new LEED buildings, grey water is reused for

toilets and urinals after minor cleaning and being dyed blue. Using grey water for toilets, urinals, and outdoor plants has been a common practice on islands for many years. So, what seems like a new LEED idea is only the application of an old practice from island nations.

Some parts of the country are blessed with ample supplies of fresh water, such as the Great Lakes region. Other parts are less fortunate and have a growing problem with water shortages and, subsequently, ever-increasing water/sewer rates to force water conservation.

The U.S. government alone owns or leases 500,000 buildings that use 350 million to 500,000 million gallons of water per day. Water-conservation efforts in federal buildings have produced savings of more than 30 percent with no cutbacks in operations or service levels. These water-conservation projects have included high-efficiency toilets (HETs), high-efficiency urinals (HEIs), and other improvements. The HEIs are available with 0 gallons per flush (GPF) and 0.25 GPF. These HEIs are commonly found in public restrooms and all U.S. Department of Defense facilities.



[Hoekstra & Chapagain, 2008]

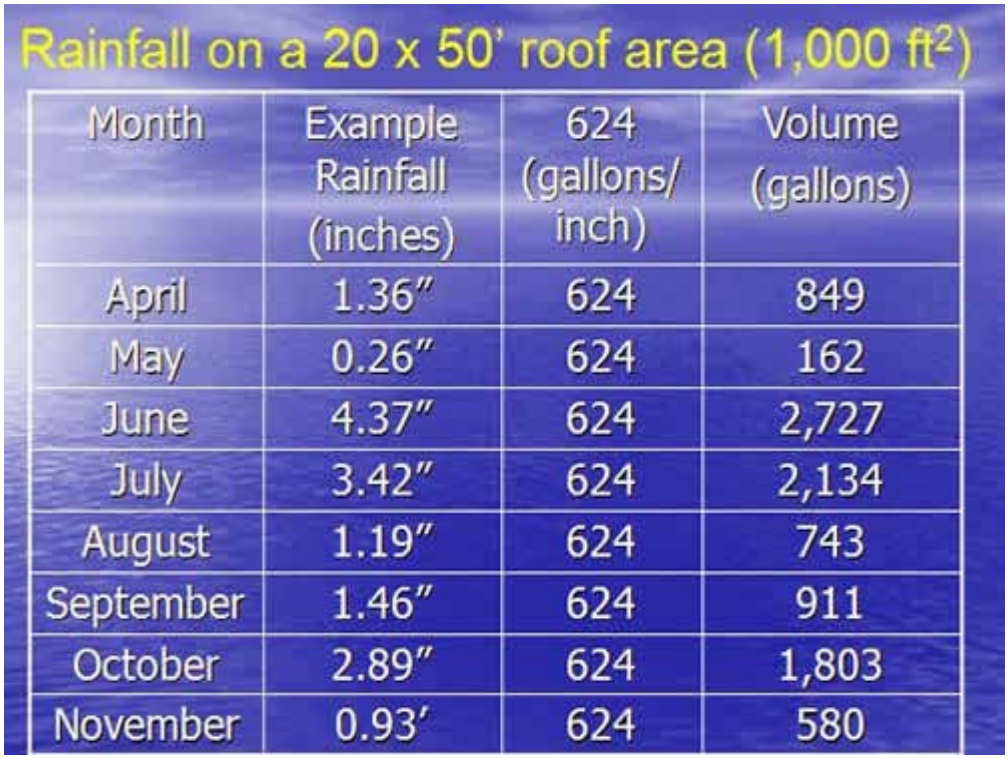
View Larger

Old toilets used 5 GPF, and the most common type is 3.5 GPF. New codes establish 1.6 GPF toilets; the state-of-the art HETs are 1.28 GPF, and they often work better than the old toilets they replace. One of the most effective HETs is power-assisted toilets with a tank inside a tank. The technology is now fully developed and is proven to reduce service calls in commercial buildings, hotels, etc. Some facility managers replace toilets for better performance and enjoy the fact that the improvement is actually an investment with a reasonable ROI.

A common starting point for an energy/utility improvement project is an energy/water audit. A trained engineer evaluates the present equipment, alternative equipment available, and water and cost savings, and determines the project's ROI. Since restrooms are often a common-area expense, there's a direct cost/benefit for a building owner with or without tenants to invest in water-conservation projects.

Innovative facility managers may consider *rainwater collection* for cooling tower make-up water or other uses. Some forward-thinking facility managers actually collect air-conditioning *condensate* to reuse in their buildings. Many buildings recycle water in commercial laundry operations. The newest commercial robotic laundry system uses less water and produces more pounds of cleaned laundry per hour. These new, state-of-the-art systems can be programmed for the proper

treatment of towels and high-end linens.



Newer toilets, urinals, showerheads, and washing machines may have the U.S. EPA WaterSense label. For example, front-loading washers use only a small fraction of the water used by top-loading models.

DEPENDING ON AGE	USE	OLD MODEL	NEW MODEL	SAVINGS
Shower	10 min.	60 gallons	20 gallons	66%
Toilet*	4/day	14 gallons	5 gallons	78%
Faucet		3 GPM	1.5 GPM	50%
Washer		41 gallons	28 gallons	32%
Dishwasher		15 gallons	6 gallons	60%

* Toilets made before 1978: use 4 to 8 GPF
* Toilets made 1978-1993: use 3.5 GPF

When you reduce water consumption, your reduce sewer charges. Sewer charges can be one-third to two times the cost of the water, depending on local rates. When you reduce hot-water use in showers, dishwashing, and clothes washing, you're also reducing your natural gas or electricity bill since the volume of hot water needed has been reduced.

In 1992, Congress passed the first Energy Policy Act (EPAct). This includes the move to more energy-efficient water equipment. The EPAct was updated in 2005, covering a wide variety of water- and energy-conservation issues, and provided tax incentives for some energy improvements. *HR 2454* (also called the Cap-and-Trade Bill) passed by the U.S. House of Representatives included a new water-conservation act that had been stalled in Congress for

battle is settled.

Water conservation is more cost effective for the building owner and the water/sewer utilities than treating the drinking water and again treating the sewer water. This fact, and avoiding major capital improvements to handle short-term peak loads, has lead many water/sewer utilities providing demand-side management rebates to help building owners conserve water. One California water utility provided free 1.28 GPF high-efficiency toilets to its customers.

Low-Cost/No-Cost Improvements
The good news is that many water-conservation projects can be do-it-yourself projects and cost-effective contractor projects. The starting point is to fix water leaks in your buildings and reduce the waste of water by employees. People see leaking facets every day and fail to notify maintenance. Some kitchen employees turn on running water as a way to defrost frozen foods. Some commercial dishwashers run when they're empty (because they weren't shut off after doing a load).

Just because a toilet is rated at 3.5 GPF (an old and wasteful standard) doesn't guarantee that it actually uses 3.5 GPF. Studies by water-conservation engineers found some 3.5 GPF toilets leaking and others using 5 GPF due to poor design or maintenance. Once the maintenance department starts changing the guts of the toilet, the device likely no longer meets the original manufacturer's water-use standard.

Watering outdoor plants and lawns can be done more scientifically to reduce water consumption. Water sub-meters can be installed on outside water use and on cooling towers to track water used, but not sent to the sewer system for treatment. As a result, you get a reduction on the sewer part of your combined water/sewer bill or via a separate sewer bill with proper communications with your utility company.

While it may seem simple, it's important to pay water and other utility bills on time each month. Many water/sewer utilities charge late fees equal to a 12-, 18-, 24-, or 36-percent annual interest rate. Utility companies are a poor source for cash flow since late payments are effectively an expensive loan.

If you call your water utility, it can provide a 12- to 24-month detailed consumption and billing history. This free report will provide you with an executive summary of your monthly water consumption and point to seasonal differences. You may find that the water utility only reads your water meter every other month, or worse (I've seen water utilities in some cities "estimate" the monthly water bills 10 out of 12 months in a year). If possible, you need your utility to read the meter every month or permit your staff to read it and call or fax the monthly meter reading.

Now is a good time to review this third utility bill and look for opportunities to reduce monthly costs. This process may lead to a professional water audit that can outline where water is being used (water balance), what water-conservation opportunities exist, and the expected ROI for the investment. A bonus for this process is getting new and better plumbing equipment, thereby reducing maintenance headaches and costs.

back to top

*Richard G. Lubinski is president of **Think Energy Management LLC**, an energy consulting firm. He is president of the Northern Ohio Chapter of the Association of Energy Engineers and holds national professional certifications including Certified Energy Manager, Certified Energy Auditor, Certified Demand Side Management Professional, Certified Sustainable Development Professional, Certified Energy Management Systems Contractor, Certified Business Energy Professional and Certified U.S. Green Lights Survey Ally.*

He was named Energy Engineer of the Year 2009 (AEE Region III), Energy Manager of the Year 2006 (AEE Region III). He writes and speaks regularly on a wide array of energy management topics. In 2009 one of his national clients won the AEE International 'Corporate Energy Management Award'. www.think-enery.net

PAST ISSUES

How to Save on Your Electricity Rate
How to Lock In Today's Low Natural Gas Prices
What's Inside the Cap-and-Trade Bill
Energy Investments in the Middle of a Recession?
Watts Up? The Math of Energy Management
Benchmarking: You Can't Control What You Don't Measure
Cap & Trade Taxes Created
Demand-Side Management: Now More than Ever
Low-Cost Energy-Conservation Measures
Energy Management, CFO Style

EXCLUSIVE ONLINE CONTENT

Buildings > @ the Moment | Weekly newsletter of topical issues for facilities professionals.
Buildings > Security | In-depth security information for facilities professionals.
Buildings > Roofing News | In-depth roofing information for facilities professionals.
Buildings > Energy | In-depth energy information for facilities professionals.
Buildings > Greener Facilities | Understand the explosive growth and acceptance of green buildings.

Stamats Business Media
Commercial Buildings Group
Buildings
615 5th Street SE
Cedar Rapids, IA 52401
(319) 364-6167