

Conserving H₂O: Going green in the restroom

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Whether retrofitting existing plumbing fixtures or helping with product selection for a new facility, it's critical to understand the facts about facilities' water challenges and be ready to provide "green" counsel.

Fewer available resources, declin-

ing quality, increased use and rising costs are just a few of the water problems facing commercial facilities in America. To meet growing demands and a declining supply, businesses and other sectors must incorporate green building design and find ways to reduce water consumption. Taking a closer look at restrooms is probably the best opportunity to save — billions of gallons are literally being flushed and rinsed down the drain each day.



Group handwashing stations have fewer plumbing connections than traditional lavs, and a tankless water heater can be concealed within a pedestal. Rather than heating an entire water tank, these fixtures only heat the water needed at the faucet.

Water shortage is a global problem, but the United States and other privileged countries are using ten times more water than poor nations. Globally, the demand for fresh water exceeds the world's supply by 17%, and the Water Environment Federation estimates that two-thirds of the world's population will experience some form of a severe water shortage in the next 25 years.

According to GreenBiz.com, a leading nonprofit information resource

for businesses, each day in the United States about 340 billion gallons of water are withdrawn from rivers, streams and reservoirs for residential, commercial, agricultural and recreational activities. It is estimated that commercial buildings account for about 9.5 billion gallons each day. These huge volumes of water are driving up maintenance and building operating costs and are putting a

Setting efficient standards

We cannot create more water but we can find better, more efficient ways to use our resources. For example, we know businesses and residences use the most water flushing toilets. The Energy Policy Act of 1992 mandated low flow water closets, shower heads and faucets — this action resulted in a savings of about 6.5 billion gallons of water each day.

In 1993, to take energy efficiency to the next level, the U.S. Green Building Council (USGBC) was founded to bring corporations, builders, universities, government and nonprofit organizations together to promote environmentally responsible and healthy places to live and work. The USGBC has created a voluntary Leadership in Energy & Environmental Design (LEED) Green Building Rating System as a national

standard for high-performance buildings. LEED seeks to accelerate the development of green building practices, define high performance green buildings using a common standard of measurement, promote efficient design practices, stimulate green competition and raise awareness for green building efforts.

Today, nearly 1,500 building projects are LEED-registered. A key benefit for businesses is that LEED-certified buildings have lower operating costs and are more efficient and comfortable for occupants. The initial cost of achieving LEED certification can be up to 10% extra, but the resulted savings will ultimately pay for these upgrades. A report, "The Costs and Financial Benefits of Green Buildings," issued in October 2003 by California's Sustainable Building Task Force found that a 2% increase in upfront costs for green design resulted in life-cycle savings of 20% of the total construction cost — that's more than 10 times the initial investment!

LEED and Water Efficiency

Building owners and architects striving for LEED building certification must earn a minimum of 26 points out of a checklist of 69 possible points covering six different categories of building standards. The LEED categories are: sustainable sites (14 pts); water efficiency (5 pts); energy and atmosphere (17 pts); material and resources (13 pts); indoor environmental quality (15 pts) and innovation and design process (5 pts).

While there are fewer points awarded for water conservation than some other categories on the checklist,

- Innovative wastewater technologies
- Water use reduction (20% reduction)
- Water use reduction (30% reduction)

Facilities calculate the reduction in water use by subtracting the green building's projected water use from the baseline that a normal facility meeting standard requirements would use.

Upgrading to green restrooms

Since restrooms and locker rooms consume a significant amount of water in commercial buildings, they should be a primary focus for facilities looking to obtain LEED credits or simply improve water efficiency. Based on the guidelines mentioned, you can see that a building must exceed the minimum federal requirements to meet LEED certification for water conservation.

Installing high-efficiency fixtures, occupancy sensors and reusing storm or gray water for toilet flushing are some of the ways buildings can maximize water efficiency in the restroom. Increasingly, product manufacturers are developing innovative technologies for toilets, faucets and other fixtures to help facilities earn LEED credits for water efficiency. Yet, upgrades need not be extensive or costly. In older buildings, retrofitting existing fixtures with newer, more efficient fixtures can be extremely effective.

Toilets for commercial buildings are required to use no more than 1.6 gallons per flush (gpf), a standard enacted in 1997. To put this in perspective, a few decades ago toilets used a whopping 5.0 or 7.0 gpf. For high-efficiency facilities, ultra-low flow toilets and waterless urinals are used to further reduce water use. Some sensor-activated flush meters can also increase savings by controlling the amount of water used during peak times.

Lavatories are another big drain on water use. Water use requirements vary from 2.5 gallons per minute (gpm) to 2.2 gpm depending on the

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water-saving strategies are often easy to incorporate. Here are the five possible water points — each of these items represents one point:

- Water efficient landscaping (reduce by 50%)
- Water efficient landscaping (no potable use or no irrigation)

plumbing or building code, but generally lavatories in public restrooms should use just 0.5 gpm. Be sure to check your local codes and water-use requirements.

Several manufacturers offer low-flow lavatory facets, as well as low-flow (Turn to Conserve, page 20.)

water conservation

Conserve

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showers, so finding a durable product is not a problem. Another popular water-saving option is to specify infrared sensors on faucets to ensure that water is running only while someone is washing their hands. The flow rate limit for metered faucets is 0.25 gallons per cycle (gpc), which is the

amount of water used during the time the faucet is activated.

Another new option is the tankless water heater. These on-demand devices are concealed within the pedestal of the lavatory system. Group handwashing fixtures with tankless water heaters are connected only to cold water and do not need hot water piping. While they do require electricity, a tankless heater allows just the water needed at the faucet to be heated, rather than the entire contents of a distant water tank.

Turning off the flow

In addition to using more efficient plumbing fixtures, buildings can reduce potable water use by collecting rainwater or using gray water for toilet and urinal flushing, landscaping or boiler systems. In wet climates, gray water collected from roof drains can yield a significant amount of water savings. Gray water can also be obtained from sinks and other sources. Note that this requires dual piping to route

awareness for these smart green strategies. For example, the Herman Miller Marketplace in Michigan conserves water by using landscape plantings that are drought tolerant



Using low-flow faucets and other water-conserving plumbing fixtures in the restroom can save facilities millions of gallons of water and help achieve LEED certification.

and indigenous to the area. As a result, they do not use any water for outdoor irrigation.

When Toyota Motor Sales built an addition onto its Torrance, Calif., headquarters, the company set out to use fewer natural resources and ultimately became a "gold" LEED project. The award-winning Toyota facility completed in 2003 uses recycled water from a special municipal pipeline for landscape irrigation, cooling towers and restroom flushing. Toyota estimates they have saved 30% in water costs over using potable water. Combined with other efforts to reduce consumption, the complex is expected to conserve more than 11 million gallons of drinking water a year, enough to supply about 68 homes annually.

The importance of water conservation and incorporating green building strategies in the restroom cannot be overstated. Conserving water to prevent critical water shortages will become the norm across the nation and around the globe. The USGBC's LEED-certification program offers a guideline for facilities to reduce water costs and create sustainable, efficient buildings. Understanding LEED and the restroom product technologies available positions you as a valuable partner and an important part of the product selection process. ■

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Circle 12 on Reader Reply Card

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LEED Version 2.1 Registered Project Checklist		
Y/N	F/NA	Points
Sustainable Sites 14 Points		
		Required
Y		Prereq 1 Erosion & Sedimentation Control
		Opt 1.1 Site Selection
		Opt 1.2 Development Density
		Opt 2 Brownfield Redevelopment
		Opt 4.1 Alternative Transportation, Public Transportation Access
		Opt 4.2 Alternative Transportation, Bicycle Storage & Changing Rooms
		Opt 4.3 Alternative Transportation, Alternative Fuel Vehicles
		Opt 4.4 Alternative Transportation, Parking Capacity and Capping
		Opt 5.1 Reduced Site Disturbance, Protect or Restore Open Space
		Opt 5.2 Reduced Site Disturbance, Development Footprint
		Opt 6.1 Stormwater Management, Rate and Quantity
		Opt 6.2 Stormwater Management, Treatment
		Opt 7.1 Landscape & Exterior Design to Reduce Heat Islands, Non-Roof
		Opt 7.2 Landscape & Exterior Design to Reduce Heat Islands, Roof
		Opt 8 Light Pollution Reduction
Water Efficiency 5 Points		
		Opt 1.1 Water Efficient Landscaping, Reduce by 50%
		Opt 1.2 Water Efficient Landscaping, No Potable Use or No Irrigation
		Opt 2 Innovative Wastewater Technologies
		Opt 3.1 Water Use Reduction, 20% Reduction
		Opt 3.2 Water Use Reduction, 20% Reduction
Energy & Atmosphere 17 Points		
		Required
		Prereq 1 Fundamental Building Systems Commissioning
		Prereq 2 Minimum Energy Performance
		Prereq 3 CFC Reduction in HVAC/R Equipment
		Opt 1 Optimize Energy Performance
		Opt 2.1 Renewable Energy, 5%
		Opt 2.2 Renewable Energy, 10%
		Opt 2.3 Renewable Energy, 20%
		Opt 3 Additional Commissioning
		Opt 4 Ozone Depletion
		Opt 5 Measurement & Verification
		Opt 6 Green Power
Materials & Resources 11 Points		
		Required
		Prereq 1 Storage & Collection of Recyclables
		Opt 1.1 Building Reuse, Maintain 75% of Existing Shell
		Opt 1.2 Building Reuse, Maintain 100% of Shell
		Opt 1.3 Building Reuse, Maintain 100% Shell & 50% Non-Shell
		Opt 2.1 Construction Waste Management, Divert 50%
		Opt 2.2 Construction Waste Management, Divert 75%
		Opt 3.1 Resource Reuse, Specify 5%
		Opt 3.2 Resource Reuse, Specify 10%
		Opt 4.1 Recycled Content, Specify 5% (post-consumer + 1% post-industrial)
		Opt 4.2 Recycled Content, Specify 10% (post-consumer + 1% post-industrial)
		Opt 5.1 Local/Regional Materials, 20% Manufactured Locally
		Opt 5.2 Local/Regional Materials, 25% Above, 50% Harvested Locally
		Opt 6 Rapidly Renewable Materials
		Opt 7 Certified Wood
Indoor Environmental Quality 10 Points		
		Required
		Prereq 1 Minimum IAQ Performance
		Prereq 2 Environmental Tobacco Smoke (ETS) Control
		Opt 1 Carbon Dioxide (CO ₂) Monitoring
		Opt 2 Ventilation Effectiveness
		Opt 3.1 Construction IAQ Management Plan, During Construction
		Opt 3.2 Construction IAQ Management Plan, Before Occupancy
		Opt 4.1 Low-Emitting Materials, Adhesives & Sealants
		Opt 4.2 Low-Emitting Materials, Paints
		Opt 4.3 Low-Emitting Materials, Carpet
		Opt 4.4 Low-Emitting Materials, Composite Wood & Agglomer
		Opt 5 Indoor Chemical & Pollutant Source Control
		Opt 6.1 Controllability of Systems, Pre-meter
		Opt 6.2 Controllability of Systems, Non-Pre-meter
		Opt 7.1 Thermal Comfort, Comply with ASHRAE 55-1982
		Opt 7.2 Thermal Comfort, Permanent Monitoring System
		Opt 8.1 Daylight & Views, Daylight 75% of Spaces
		Opt 8.2 Daylight & Views, Views for 50% of Spaces

LEED-certified building projects must meet a specific set of criteria covering six different categories. Buildings can earn up to five points for water efficiency.

the water — check your area plumbing codes because gray water requirements vary by state.

Many noteworthy LEED-certified projects are creating a greater