

# THE ENERGY OBSERVER

Energy Efficiency Information for the  
Facility Manager

Quarterly Issue – January 2003

## Water Conservation

**The Energy Observer** summarizes published material about proven energy technologies and practices, and encourages users to exchange experiences with generic energy products and services. This quarterly bulletin also identifies informational sources and energy training for facility managers and staff. **The Energy Observer** is a service of the **Energy Office, Michigan Department of Labor & Economic Growth.**

The United States uses approximately 4.8 billion gallons of water every day to flush waste. Toilets and urinals account for nearly one-third of building water consumption making the potential for water savings very high. In addition to reducing water and sewer bills, savings can also be obtained by reducing the amount of energy (pumping and heating) required to provide hot water for sinks and showers. There are a wide variety of retrofit and new installation devices available for showers, faucets, toilets and urinals. Water Savings of up to 70% can be achieved with these devices.

### TOILETS

Prior to 1980 toilets were produced that used either 7 gallons per flush (gpf) or 5 gpf. After 1980, 3.5 gpf toilets became the standard. In 2002 the federal standards for new



commercial and residential construction are 1.6 gpf toilets and 1 gpf urinals. Replacing older fixtures with new 1.6 gpf toilets and 1 gpf urinals can ease the load on the utility while reducing facility costs.

Flush quality of water-efficient toilets has improved since the first models were introduced. Many early models functioned poorly, with a reduced tank but a standard bowl. New toilets rely on an efficient bowl design and

#### Install a 1.6 gpf toilet and save!

| Current | savings |     |
|---------|---------|-----|
| 7 gpf   | 5.4 gpf | 77% |
| 5 gpf   | 3.4 gpf | 68% |
| 3.5 gpf | 1.6 gpf | 54% |

increased flushing velocity, instead of extra water. Both gravity-operated models and models that pressurize the flush water are available in 1.6 gpf. Pressure-assisted toilets generally perform better than gravity-flush toilets, but tend to be more expensive.

Retrofitting or rebuilding the flush valve is another alternative to replacement of fixtures. "Sloan"-type flush valve rebuild kits are available which reduce the amount of the flush in existing toilets to 1.6 gpf. For toilets and urinals without Sloan valves, flushometer valve replacement kits also are available. Retrofitting is a second choice to installing

new fixtures, but is sometimes necessary due to budgetary constraints. Some toilet fixtures were not designed to operate with less water and this may lower the quality of the flush. Only complete replacement of porcelain fixtures ensures that the water quantity can perform efficiently and effectively.

### SHOWERS/LOCKER ROOMS

Reducing your showerhead flow rate is a very practical way to reduce water consumption. Given the relatively low cost of low-flow showerheads, this method of water conservation has a very short payback period, often as short as a few months. Cost of low flow showerheads range between \$15-\$30 each and they are easily installed.

### LAUNDRY FACILITIES

ENERGY STAR labeled clothes washers use superior designs that require less water to get clothes thoroughly clean. These machines use sensors to match the hot water needs to the load, preventing energy waste. Energy Star washing machines are available in two types, vertical axis and horizontal axis. Commercial and residential models are available, for more information on these and other appliances visit: [www.energystar.gov/products](http://www.energystar.gov/products).

### Example water faucet savings:



#### Assumptions:

- Current faucet: 2.2gpm
- Replacement faucet: 0.25gpm (gallon per cycle style)
- \$0.40 per therm is the federal average gas price in the US.
- combined water and waste-water price is \$4.00/1000 gallons.
- (30) faucets operated 30 minutes per day, 195 days per year

### TOTAL SAVINGS PER YEAR:

**\$1,530**

### AUTOMATIC FAUCET CONTROLS

Faucet flow can be metered either mechanically or electronically. Metered valve faucets are available that deliver a pre-set amount of water and then shut off automatically. A more accurate method of metering the flow is through electronic faucet controls, which shut off water flow when the user moves away. Electronic controls can be retrofitted or installed as new fixtures to produce water savings (up to 70%). This type of on-demand system also produces proportional savings in water heating energy, water treatment and sewage. A 10-second hand wash, typical of an electronic faucet, will consume only 0.6 liter (1 pint) of water.

Some manufacturers estimate a payback period of less than 6 months when replacing a conventional fixture with an

electronic fixture, including cost savings in water and energy.

### FAUCET FLOW RESTRICTORS/AERATORS

For manual-valve faucets, two available conservation options are flow restrictors and aerators. Flow restrictors are washer-like disks that are installed in the faucet heads, and limit the flow of water from 0.5 to 2.5 gpm. Faucet aerators replace the faucet head screen, lowering the flow by adding air to the water stream, increasing the effectiveness of the flow and reducing water use. High-efficiency aerators can reduce the flow from 2-4 gpm to less than 1 gpm at a fraction of the cost of replacing faucets.

### FOR MORE INFORMATION ...

Visit the DOE website for procurement information on water-saving devices:

[www.eren.doe.gov/femp/procurement/](http://www.eren.doe.gov/femp/procurement/)

Calculate your facility's potential "WATERGY" can help estimate potential water and associated energy savings. The free software, provided by the U.S. Department of Energy, is available at:

<http://www.eren.doe.gov/femp/techassist/softwaretools/watergy>

Visit the Energy Office website for information on current programs, services, past issues of *the Energy Observer* and grant information.

[www.michigan.gov/energyoffice](http://www.michigan.gov/energyoffice)

If you have experience or data that you would like to share on this topic or if there is a topic that you would like to see discussed in a future issue of *The Energy Observer*, please contact Brandy Minikey (contact information below)

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