

# what about water?

by Adam Neugebauer



“When talking about ‘efficiency,’ how important is water compared to gas and electricity?”

In my industry, when you talk about improving the efficiency of buildings, water only sometimes enters the picture. And when it does, it’s third on the list behind attention-hogs electricity and natural gas. Even when the discussion is about ‘green’ efforts, where water will assuredly come up, it still doesn’t receive the same consideration and respect as the aforementioned energy resources. And we’re in California! A state where water resources are so limited (especially with our current streak of yearly droughts) that we are largely supported by water from the Colorado River . . . which is promptly used to turn our deserts into gardens and golf courses.

California clearly needs to make water conservation a solid part of the day-to-



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day business (and the currently-voluntary California Green Building Standards Code is a step in that direction). But what about places with sufficient water resources? Do they need to worry that much about conservation? YES! Not only because ‘plentiful’ doesn’t mean ‘limitless,’ but also because water is in many ways another energy resource, just like gas and electricity. The reason for this is because so much energy goes into capturing, treating, and distributing the water. This is known as the embedded (or embodied) energy of water. To get an idea of how much embedded energy is in your water, letting the faucet run for just 5 minutes is estimated to be roughly equivalent to leaving a 60-watt light bulb on for 14 hours! So, in a way, you could look at your typical faucet as a 10,080-watt light bulb. That’s one bright faucet!

In “Energy versus Water: Solving Both Crises Together,” Michael Webber (2008) describes how a crisis with energy will likely lead to a crisis in water and vice versa. The reasoning is that it takes a lot of energy to create potable water (depending on the source of the water and the method to clean it) while a large amount of water is used to generate energy (depending on the energy source). This is yet another reason to make sure that water is not an afterthought in the green revolution.

So, now that we agree that a concerted effort must be made to reduce the water footprint of our buildings, where do we start? Two primary water loads that ‘green’ programs typically target are landscaping and bathrooms.

There are two primary ideas behind improving landscaping. First, look into ‘zeroscaping’ (a.k.a. xeriscaping); instead of artificially-sustained emerald green lawns and lush gardens, try drought-resistant plants and minimized lawn areas. If the local environment cannot keep it alive, you’re basically keeping it on life support. Then, after minimizing the water needs of the landscape, manage its needs in a responsible manner. Instead of having a sprinkler system that doesn’t know not to run during a rainstorm or in the middle of a hot summer day, switch to drip or sub-surface irrigation connected to timers. Better yet, install weather- or sensor-based controllers to ensure watering is only done when and as much is needed. Basically, strive towards Frank Lloyd Wright’s philosophy of organic architecture: create a building environment that fits naturally into the local ecosystem.

And now for what I really wanted to talk about — bathrooms. But more specifically . . . toilets! Low-flow shower-heads and high-efficiency faucet aerators (which can readily save 90%

over the wasteful '10.8 kW faucets') are pretty common upgrades. Their cousin — the low-flow toilet — however is still limping back from their initial PR belly flop in the mid-'90s. The 1994 U.S. mandate for 1.6 gpf (gallons per flush) toilets led to an onslaught of compliant, but poorly-designed options being rushed to the market. Since little to no effort was initially put into ensuring performance, there was a Prohibition-like public backlash, which reportedly included an actual black market for 'high-flow' toilets. Thereafter, in the mind of the public 'low-flow' became synonymous with 'low-quality.'

Manufacturers, however, have not given up. Lessons have been learned and a variety of high-efficiency, high-performance toilets are now on the market. Beyond the standard style of flush toilets, there is my current favorite — the dual-flush toilet. Such a great concept: one button for liquid waste (<1.0 gpf) and another for solid waste (~1.6 gpf). I believe I first saw one of these toilets during a trip abroad and I couldn't understand why these weren't everywhere. I even asked about them during the interview for my current job. Since then, I've begun to see them installed in restaurants and public bathrooms and on display at construction trade shows.

Once I'm in the market for a toilet, I know this is what I'm going to buy.

The Environmental Protection Agency (EPA) has also stepped up to help consumers make sense of today's toilet technologies. Similar to their ENERGY STAR program for electronic devices, they have developed the WaterSense® program to certify water-efficient products including toilets, faucets, showerheads, and irrigation equipment. For toilets, the WaterSense® label represents both a certification of efficiency (no more than 1.28 gpf or, for dual-flush toilets, an average of 1.28 gpf) and of performance (must be able to remove at least 350 grams of solid waste per flush). In other words, you can entrust both your water and your waste with a WaterSense® toilet.

So just remember, next time you are looking to 'green' up your facility, don't simply consider energy-efficiency. Think more broadly about resource-efficiency.

## References

Webber, M. (2008, October). "Energy versus Water: Solving Both Crises Together." *Scientific American: Earth* 3.0. Available at <http://www.sciam.com/article.cfm?id=the-future-of-fuel>.

Future installments of the Going Green series will review some of the 'green' certification programs out there. If you have questions or topics that you would like to see discussed in future Going Green articles, send them along to [GreenNeugebauer@gmail.com](mailto:GreenNeugebauer@gmail.com).