



It's only water, right?

Written by Bob Tremain, VP Marketing, Smart Labhood Solutions

I've heard it said that you don't really miss something until it is gone. Let's hope we never have to say that about water. Unfortunately, the scarcities faced around the world and even in our own backyard are bringing us to that cold reality. Drought is becoming more and more common place with every passing day.

I often think about a mission trip I took to South Sudan some years back. Being from the Midwest, water scarcity was never really top of mind. After all, I live in the land of 10,000 lakes, (Minnesota for those of you not current with our tag line). The harsh reality I discovered in South Sudan was that water is NOT a resource you take for granted. The people in the area treated each drop as though it was their last. I was hit with the stark reality that without water, all we have is H2O_h!



Alfred and me in Yei, South Sudan

Since returning from Africa, I've become more cognizant of this valuable natural resource. It's not just water, it's life as we know it. Water scarcity is becoming more and more a reality in the United States as an estimated 53 million people are living in drought-affected areas. This is and will continue to have serious implications for economic, environmental and social aspects of our society.

As a consumer, we can think of multiple ways to reduce our water consumption. For example, shorter morning showers, limited lawn sprinkling if any, fewer car washes, etc. But what of industrial, commercial and governmental applications? For the purpose of this article, I am going to focus on one specific area which can overlap all three of the applications. That being, single pass cooling in a fume hood. For the common observer, single pass cooling may be insignificant as it relates to water consumption, but when you actually do the math, there is significant as well as financial implications.

For example, a renowned university in the US estimated that their consumption of water related to single pass cooling amounts to hundreds of thousands of gallons of water per year per fume hood. I found this astonishing so I felt inclined to do the numbers. Below is the scenario I worked out based on current Los Angeles and Boston water and sewer rates. Note that Los Angeles, along with many municipalities measure consumption by hundred cubic feet (HCF) units. One HCF = 750 gallons. Boston calculates their rates based on 1,000 gallon increments.

Rates

Los Angeles

- Water: \$8.98 per HCF (748 gallons)*
- Sewer: \$8.35 per HCF (.93 X \$8.98)*

Boston

- Water: \$7.97 per 1,000 gallons**
- Sewer: 10.85 per 1,000 gallons**

A day in the life of a fume hood: single pass cooling

Gallons of water per minute	2
Gallons of water per hour	120
Hours operated per day	10
Days used per week (labs)	3
Weeks operated per year	40
Gallons of water per year deposited into hood drain	144,000/192 HCF

Cost of doing business

Not considering all of the other implications of water usage, lets focus on the financial aspect related to single pass cooling.

Location	HCF Used	HCF Rate (Water)	HCF Expense (Water)	HCF Rate (Sewer)	HCF Expense (Sewer)	Total Expense Per Year
Los Angeles	192	\$8.98	1724.16	\$8.35	\$1603.20	\$3327.36
Boston	192	\$7.97	1530.24	\$10.85	\$2083.20	\$3613.44

For the sake of consistency, the Boston expenses were derived using 750 gallons multiplied by their rates versus 1000 gallon units.

A closed loop option for fume hoods

As a means to essentially eliminate the water waste involved in single pass cooling, Smart Labhood Solutions offers a closed loop option for fume hoods called the **EcoDenser**.



Fits seamlessly in the lab hood.



Back side of EcoDenser with hood panel removed

The EcoDenser provides 3 key benefits over a traditional single pass cooling process:

- **Water conservation.** Virtually no water is wasted through the closed loop process.
- **Elimination of hood drains.**
 - There is no need for a hood drain. If a connection on the condenser comes loose, the most water that will leak into the fume hood pan is about 20 oz. of water.
 - 20 oz. of water in the hood pan can easily be contained – no flood risk.
- **Flood Avoidance.** It is not inconceivable that a hood drain becomes plugged and the hose line detaches, causing the hood pan to fill and overflow.

Utilizing a primary and secondary plumbing system, cold water flows in and out of a heat exchanger on the EcoDenser while a separate water supply, (approximately 20 oz.) flows through the condenser, then returns into the heat exchanger where it is cooled and sent back through the condenser.

Return on Investment

As with any investment, the cost needs to be weighed against the benefit. Unlike equipment such as a fume hood or other lab equipment, the EcoDenser actually has a measurable return on investment. Considering the cost of water and sewer usage as represented earlier, the EcoDenser can typically pay for itself within 1 year, based on usage and rates. Below is a cost recovery analysis for the EcoDenser:

Cost Elimination W/EcoDenser: New Fume Hood Fit-up

- Access panel w/cut-out for faucet (\$75.00)
- Drop-in sink (\$35.00)
- Goose Neck faucet (\$215.00)
- Fee to plumb water lines to hood (\$1500.00)
- Fee to plumb drain (\$1500.00-2,500.00)

Total estimated cost eliminated: \$3,325.00-\$4,000.00

Note that there would be a cost incurred to tap into the existing chilled water line for the EcoDenser. Estimating \$1500.00, (likely less, if a portable chiller was available) the adjusted cost savings would be \$1825.00 (conservative estimate).

Financial Comparison

Without EcoDenser

With EcoDenser

Location	Total Expense Per Year	Fume Hood Fit-up	Total Expense w/o EcoDenser	EcoDenser Plus Plumbing and Supplies	Savings Year 1	Follow-On Annual Savings
Los Angeles	\$3327.36	\$3325.00	\$6652.36	\$5000.00	\$1652.36	\$3327.36
Boston	\$3614.44	\$3325.00	\$6939.44	\$5000.00	\$1939.44	\$3614.44

The calculations above are based on estimated rates, pricing and usage.

In summary, The EcoDenser's closed loop process is an efficient, ecologically sustainable and cost-effective alternative to traditional single pass cooling applications within a fume hood. For more information, please visit our website at: smartlabhood.com

Water and sewer rates were obtained from the following:

*Los Angeles: LADWP website. Derived from Schedule C – "Commercial, Industrial and Governmental" rate scale. Tier 2.

**Boston: Boston Water and Sewer Commission website. Business rates.