

The Hidden Costs of Pure, Clean Water

**Why we will all soon be paying more for the most basic necessity of Life...
and what *you* can do about it!**

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Water is essential. Throughout history, water has been a vital resource for all human endeavors. Without water, there can be no life, no farming, no communities, and no industry.

But on a planet that is 70 percent covered with water, only 2.5 percent of the Earth's water is fresh...and this fresh water must be treated to be safely consumed.

With modern utilities making safe, clean, inexpensive water available at the turn of a spigot, it's been easy for most Americans to take it for granted. It's hard to realize that, according to some estimates, *over 1 billion people in the world do not have access to safe drinking water – and this figure is expected to increase globally in the coming years!*

And even if you live where pure, safe water is cheap and plentiful now, you are likely to be feeling a sharp pinch in your budget every time the tap is turned on, in the not-too-distant future.

Why?

Standards of Water Safety

There are three standards for water use in municipal, agricultural, and industrial settings:

- Water that is considered safe, or *potable*, is pure enough for drinking.
- *Wastewater, or sewage*, is discharged from human activities, including agricultural, industrial, and domestic sources.
- *Gray water* can be collected from non-toilet sources in our buildings (e.g., showers, sinks, laundry). This water can be used in various ways, such as irrigation, depending upon zoning requirements.

Potable water comes from various sources, which need to be treated or processed for human consumption:

- *Groundwater* supplies some of our municipalities and many rural areas.
- *Rivers and reservoirs* provide significant amounts of water, especially for suburban and urban areas.
- In areas with little surface or groundwater, *rainwater* can be collected for use.

A Brief History of Water Treatment

In the past – and even today, in areas that do not have modern water treatment facilities - human population centers have faced serious challenges in securing safe drinking water.

Early solutions involved filtration and boiling. With the invention of the microscope, scientists were able to observe the condition of the water and to make the association between cholera

outbreaks and water supplies. Between the seventeenth and nineteenth centuries, cities developed various types of sand filtration systems to provide potable water for the inhabitants.

About 100 years ago, water treatment systems began to use chlorination to purify water. Even today, the overwhelming majority of water treatment plants use this process, though the potential negative aspects of chlorine as a sterilizer are causing this procedure to be reviewed.

Modern treatment facilities consist of three stages: collection, filtration, and disinfection. Wastewater treatment facilities use physical, chemical, and biological processes, depending upon local regulations and available budget. Septic tanks are typically used in more rural settings where a centralized plant is cost prohibitive.

The Cost of Safe Water

The cost to process potable water varies depending upon the region and quality of the source, and utilities use various methods to determine the cost for the end user:

- Some municipalities use a *declining block rate* in which the more water you use, the less you pay per unit. This is the traditional 'economy of scale' model, which definitely does not promote conservation.
- An *increasing block rate* is becoming more common: as you use more water, you pay more for it. This method rewards conservation.
- Other municipalities use a fixed usage scale with a *minimum usage fee* and a per-unit cost for additional usage.

For residential users, the fee for water consumption and sewer service is usually bundled and calculated based on total water consumption. Water use is only measured entering the household, and billing is based on the assumption that the same amount enters the sewer system. If you use most of your water to wash the car, for example, you are charged for the same amount that would have gone to the sewer system. For larger-scale users, water is metered both entering and leaving the building.

Compared with bottled water, utility-supplied water is still very inexpensive. For example, in Baltimore City the total cost for water consumption, sewage services, and a Chesapeake Restoration fee is fixed for usage of 0 to about 7,500 gallons per billing cycle.

Figure that the typical Baltimore home with traditional fixtures uses about 74 gallons per day or just over 2,000 gallons per month for indoor uses only. That's within the fixed usage range, and equates to a charge of about \$11 per 1,000 gallons. Once that household passes the maximum point of 7,500 gallons, they're charged only \$6 per 1,000 gallons. There is no reason for the average household to conserve water because they actually pay less per unit to use up to the 7,500-gallon threshold, at which point the unit cost actually drops.

Despite the low costs for homeowners, the operation of the water and wastewater treatment facilities and distribution systems is very expensive. The majority of U.S. systems are public facilities, and the current pricing structure does not cover their true operating costs, including the depreciation of the capital assessment. Private facilities, on the other hand, typically charge enough to cover their true costs. For this reason, many studies are analyzing the U.S. utility structure against that of nations which use privatized water.

How is Potable Water Used?

Whether a household's potable water is treated with costly purification processes and delivered through municipal systems, or collected from a private well, it is used for many purposes. Some of these require highly purified water for public health reasons; some don't. Here's just a sampling of the ways we use potable water every day:

- drinking
- cooking
- showering and bathing
- flushing toilets
- washing dishes, clothes, and cars
- irrigating lawns and gardens.

In houses with standard fixtures, toilets use the most water, followed by clothes washers and showers. Lawn and garden usage represents, on average, about 40 to 70 percent of a single household's water usage, depending upon the region. Larger consumers of water, including agricultural and industrial facilities, also use potable water for their needs. However, in many regions, such facilities are using a lower, less costly grade of water, which lessens the demand on the infrastructure.

The Rising Cost of Pure Water – And What You Can Do About It

Due to the increasing demands from population growth and quality issues from contamination, the delivery of potable water is becoming increasingly expensive and volatile.

This issue is just as important in the United States as it is throughout the world. The consumption of water in the United States mandates new attitudes in water usage.

The easiest and most cost-effective solution is through changing our daily water habits:

- Turn off water supplies when they are not needed. Not leaving the water running while washing the car or brushing your teeth can save hundreds of gallons of water over the course of the year.
- Run the dishwasher only when full. Dishwashers actually save more water than washing by hand.
- When waiting for the hot water to reach the faucet, use a bucket to capture this running water for plants.

Using water-conserving fixtures is also very cost effective. Low-flow toilets, faucet aerators, and low-flow showerheads greatly reduce water consumption.

When replacing appliances, look for more efficient, EnergyStar-approved, models that save both water and energy. Less hot water means less energy is needed.

You can save water in the garden as well, by using plants that are suited for your region's climate and rainfall. Find the lowest, wettest spot in your yard and put a rain garden there. Or think about turning your whole yard into a garden...the typical suburban lawn, with high-maintenance, non-native grass species, uses enormous amounts of potable water.

By using rain barrels and other collection devices, you can store rainwater to use in your garden and landscaping. Under certain conditions, you can even rig up connections from your house to re-use graywater.

Potable water is a precious resource. As safe drinking water increasingly becomes a luxury, we all need to reconsider our water usage. Yes, agricultural and industrial consumers have a considerable impact on water usage - and have been addressing efficiency issues - and residential consumers can also make a significant reduction in overall water usage.

Many of our water treatment plants are in need of expensive repairs and updates; delivery systems need intensive maintenance and upgrades as well. Water costs will have to reflect the true cost of treatment and delivery to make this possible.

By changing our habits and by using water-conserving fixtures, we all can lessen our water consumption. It's a choice that will become more important as time goes by.