TECHNOLOGY IN WATER CONSERVATION

WATER CONSERVATION & TECHNOLOGY CENTER
Securing Our Water Future

It is not unusual for individuals to describe water conservation as a behavioral exercise and urge for education to be used to change people's behavior. For example, people can be taught to save water by turning off the faucet while brushing their teeth or by operating their lawn sprinkler less. Successful water conservation, however, is just as dependent on technological factors.

The technology does not have to be complex to be important — consider high efficiency toilets and showerheads. These everyday appliances largely rely on simple technologies to increase the impact of rinsing and reduce water use. A homeowner who converts the plumbing in a typical pre-1992-built home to this technology can expect to save 22,000 gallons per year in water use without a drop in productivity. Secure 250,000 of these conversions, as San Antonio has over the last 15 years, and it reduces water needs by approximately 17,000 acre-feet every year.

Drip irrigation technology saves large amounts of water while improving horticultural results. It places water directly on the soil, above the feeder roots, instead of spraying it into the air or over the surface of the ground at high pressures and volumes. Water applied by drip irrigation is less subject to wind, runoff and evaporation. Drip irrigation can increase irrigation efficiency from 70 percent or even 50 percent to 95 percent.

Water reuse systems treat wastewater by various technologies including filtering, bioremediation and ozone exposure. These technologies can involve billions of gallons of wastewater — such as in a municipal recycling effort — or they can be small scale, such as in a self-contained toilet.

Some water distribution systems lose 25 percent of water between their wells or their treatment plant and their customers because of leaks. In a large, aged water distribution system, a leak can exist for years before it becomes visible at the soil surface. Leak detection procedures often rely on sound technology to find leaks so they can be repaired and the volume of water lost can be reduced. Some of these procedures involve walking over pipelines with simple amplification equipment, but the "hearing detection" can also be accomplished with instruments attached to pipelines at manholes. These devices "listen" to the water flow in the pipe; when they detect the characteristic sound of a leak, they report by radio to permanent or mobile collection points. Even a small leak can be detected.

Rainwater catchment may be a good way to replace water from other potable sources. In some situations, this involves using the simple technology of capturing rainfall runoff from a roof or another surface. In a hot, dry climate with erratic rainfall patterns, rainfall collection is impractical or requires a large, expensive storage capability. In such situations, condensate collection from air conditioners may be a more reliable, efficient technology to use. The Alliance for Water Efficiency estimates that the amount of condensate can range from three to 10 gallons per day for each 1,000 square feet of air-conditioned space.

As important as technology is in producing new water resources through water conservation, introduction of new technology does not automatically result in water savings. The new evapotranspiration-based irrigation controllers illustrate the point. A lawn's need for water is dependent on the weather conditions. The new controllers link operation of the sprinkler system to weather conditions collected on site or through an ongoing feed from radio- or web-based data. If businesses and homeowners are over-watering lawns, the technology could result in superior lawn performance with less water.

Unfortunately, this technology in its present state of flexibility and sensitivity does not always save water. In a community with strong drought management rules and a population educated in a lawn's capability to survive deficit irrigation, the controllers apply more water than desired or needed. To meet the needs of such a community, the controller would need to translate the weather data to an irrigation regime that reflects a landscape's drought survival capability rather than the water it needs to be lush. Improvements in irrigation controllers are expected, and then the weather-related automatic controllers will be beneficial as a water conservation technology.

Technology at many levels is a major part of water conservation now, and great opportunities for advances exist that will increase its importance in producing water from conservation activities.