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Talk of the Town

Column: Can technology save us?

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Since 1863, Prescott has repeatedly outgrown its water supply. Each water shortage has been "solved" in the same way: by getting water from somewhere else. Now, area cities plan to import water from the Big Chino Valley at monumental expense, while posing an unacceptable threat to the flowing Verde River. The historical solution has run dry. There is no more "somewhere else." We need a new idea.

Perhaps technology can save us. The Arizona Department of Water Resources (ADWR) thinks so. Their 2014 report, "Arizona's Next Century: A Strategic Vision for Water Supply Sustainability," sees desalination, a technical solution, as the future.

Advanced water treatment technology typically combines reverse osmosis (RO) with various filtration and disinfection methods to make up a water purification system. All the RO-based systems operate similarly: After careful pre-filtration, high-pressure pumps squeeze non-potable water through special membranes, removing impurities to create fresh water.

Desalination is one particular application of RO used to extract fresh water from the sea. One fundamental problem with desalination of ocean water is the high cost of construction and operation, currently about \$2,000 per acre-foot (AF). Worse, we have a geography problem: Prescott isn't near an ocean! One solution would be to build the desalination plant on the Pacific coast, then give the water to California in trade for a share of their Colorado River water. This would require building a pipeline from the Colorado River to Prescott costing an additional \$2,000/AF.

Currently, area residents pay nothing for water and about \$2,000/AF for pumping, purification, distribution, and administration. So if desalination is our future, our water could cost \$6,000/AF. Your water bill would triple. Finally, financing the desalination and pipeline infrastructure would be very difficult and federal assistance seems unlikely.

Perhaps we could purify brackish groundwater, which contains far less salt than seawater. The costs would be lower because the salt content is lower - that's good. However, there are no significant brackish groundwater reserves nearby. We would need another expensive pipeline.

Let's try to think local. We already have a valuable water resource at hand - treated wastewater. What if we recycled our treated wastewater by recharging the aquifer? When water percolates through subsoil and rocks, natural purification occurs. The recharged water blends with natural groundwater; then the mixture is pumped and distributed as potable water. This is called indirect potable reuse (IPR).

Prescott now recharges about a third of their groundwater pumping, but it is not IPR. Prescott's recharge location near the airport has a poor hydrological connection to the Chino Valley well field. Recharged water won't reach the well field for centuries, so Chino Valley water levels continue to decline. Prescott receives recharge credits from ADWR, but these credits are not dedicated to safe yield or sustainability. Instead, they are used to support growth. Thus, Prescott's recharge effectively increases their capacity to pump

groundwater in Chino Valley. True IPR would use a well field near the recharge location and carefully monitor to assure water quality.

What if we used an RO system to purify our treated wastewater? Then, it could be blended directly into our potable water system. This is called direct potable reuse (DPR). Because the wastewater supply and the potable water distribution system are local, the costs would be more reasonable, roughly \$1,000/AF, an estimated 50 percent increase in water bills. There are abundant advantages. We retain local control of a sustainable water supply. Repeated recycling, like on the space station, means that we pump less groundwater and lessen the stress on the Verde River. This may seem far out, but both Big Spring and Wichita Falls in Texas have functioning DPR systems. The big challenge is to convince the public that the technology meets the highest standards of water quality and reliability.

Desalination of ocean or brackish water is not a viable solution for our area. Both DPR and IPR are potential solutions to assure our water future. Water conservation has tremendous unrealized and unappreciated potential. Importing water is a costly 19th century solution to a 21st century problem that will endanger the Verde River, diminish our quality-of-life, and harm our wildlife.

What do we do? It's a complex problem, and we do not yet have sufficient information to fully evaluate these alternatives. ADWR and our regional governments should give more consideration to living within our existing water resources. We should try to live without importing water.

Guy Carpenter will review national trends in potable water reuse on May 1. See www.cwagaz.org.

Gary Beverly is a Citizens Water Advocacy Group board member and a retired business owner working to protect the Verde River.

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