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## Challenges In The Water Industry: Meeting Demand in the West

When homesteaders hit the Great Western Frontier in pursuit of fortune and prosperity, the decision of where to call home on the range was not taken with cowboy cavalier. Families had to plan well when setting up their farms, and the decisive factor centered on water. Communities were built around wells, rivers, and lakes back in a time when water shaped demographics. One-hundred and fifty years later, and the West is still an arid place and water a hot commodity. But whereas homesteaders had to cluster around available sources of water, today, Americans are setting their stake in the driest of regions while expecting, and getting, water in their taps. With demographics now determining supply, planning and water management have taken on an even more critical role in keeping up with our growing population, making water one of the more important challenges of our time.

### CHALLENGES

In order to illustrate the critical need for better water management, an appreciation of the challenges is required. Entire communities are sprouting in Nevada, California, and Arizona, among others, where infrastructure basics such as piping, electricity, and even a reliable source of water itself, do not yet exist. Consider also the following:

- The western and southern states are experiencing the greatest growth rates, with Nevada ranked as the fastest growing state in the country. Arizona and Colorado rank 2<sup>nd</sup> and 3<sup>rd</sup>, respectively.<sup>1</sup>
- By 2030, the populations of Arizona and Nevada are expected to double,<sup>2</sup> due to, among other things, a steady increase of migrating retirees from the “baby boom” generation.<sup>3</sup>
- There is a rapid depletion of the Colorado River with 5 of the 10 fastest-growing U.S. states drawing water from it including California, Arizona, and Nevada.<sup>4</sup>

<sup>1</sup> <http://www.physorg.com/news73070640.html>

<sup>2</sup> <http://www.physorg.com/news73070640.html>

<sup>3</sup> [http://www.associatedcontent.com/article/49231/water\\_shortages\\_may\\_affect\\_relocation.html](http://www.associatedcontent.com/article/49231/water_shortages_may_affect_relocation.html)

<sup>4</sup> [http://www.associatedcontent.com/article/49231/water\\_shortages\\_may\\_affect\\_relocation.html](http://www.associatedcontent.com/article/49231/water_shortages_may_affect_relocation.html)

- Ogallala aquifer, an underground reservoir stretching from North Dakota to Texas, supplies 1/5 of US irrigated land. This source is expected to be completely depleted within 25 years.<sup>5</sup>
- As of November 14, 2006, 10 U.S. states were affected by a level 4 “extreme” drought, including Arizona, Texas, Wyoming, and Minnesota. Many other central and western states, including Nevada and California, are experiencing abnormally dry conditions.<sup>6</sup>
- In 2025, water demand is expected to outstrip supply by over 50 percent.<sup>7</sup>

While the specific supply issues vary from state to state, one thing is certain, water on tap is not a given, but rather the result of careful planning and conservation.

### SOLUTIONS

The goal of meeting demand is certainly attainable and is a daily preoccupation of the water industry. Focusing on delivering viable services to various communities, the industry has developed a set of innovative solutions to supply water to growing populations in arid regions.

#### *Water Reuse*

Water reuse is one solution, and in understanding its significance, consider first the break-down of water usage. In Southern California, for example, roughly 70 percent of water is used for agriculture, 20 percent for golf courses, and 10 percent for businesses and homes.<sup>8</sup> While these proportions vary across the states, the principle is the same: the vast majority of water is used for agricultural and commercial ends. As such, water quality for these purposes does not need to be equal to drinking water, but can be reclaimed and recycled. Furthermore, wastewater, long since considered a problem and pollutant by cities and municipalities, can be treated and reused to meet the needs of our largest consumers: those in the agriculture and commercial industries. Increasing the amount of reclaimed water for agriculture and commercial consumers will significantly ease the strain on rivers, lakes, and aquifers that provide us with clean and safe drinking water.

Reclaimed water need not only be confined to wastewater; highly saline sources, such as ocean or deep ground water can also be treated. The process of water reuse can involve desalinization, where the salt content is removed, and membrane filtration, where contaminants are removed via a membrane process. Furthermore, these technologies are continuously being streamlined, becoming more cost effective and energy efficient. In a country where the average U.S. household of four uses 400 gallons of top quality water a day<sup>9</sup> and the per capita use is 14,500 gallons a day, there is a significant amount of water that can be reclaimed.

Until the safety and value of reclaimed wastewater is understood, people will balk at the idea of using it. But the idea is not a novel one. All of our water (including drinking), was at one point used for, or emitted by, something else and is part of a general cycle of rain, ground filtering, and evaporation. Examples of reclaimed water solutions include the Solaire and Tribeca Green buildings in Battery Park City, Manhattan. Utilizing a double piping system, they can supply clean water while recycling and delivering wastewater for a variety of purposes. Similar systems are nearing completion for two more high-rise residence towers. Another double piping system is used in Massachusetts for the 68,000 seat Gillette Stadium, home to the New England Patriots, as well as the 575,000 square foot Wrentham Mall. And in Arizona, reclaimed

<sup>5</sup> [http://www.associatedcontent.com/article/49231/water\\_shortages\\_may\\_affect\\_relocation.htm](http://www.associatedcontent.com/article/49231/water_shortages_may_affect_relocation.htm)

<sup>6</sup> <http://drought.unl.edu/dm/monitor.html>

<sup>7</sup> [http://www.associatedcontent.com/article/49231/water\\_shortages\\_may\\_affect\\_relocation.html?page=2](http://www.associatedcontent.com/article/49231/water_shortages_may_affect_relocation.html?page=2)

<sup>8</sup> Hasemyer, David. “Dispute springs up in desert.” *The San Diego Union-Tribune* 12 Nov. 2006: N-1

<sup>9</sup> <http://epa.gov/watersense/docs/indoor508.pdf>

water is used for fountains, park irrigation, and other common grounds.<sup>10</sup> As the western states continue to grow and expand, so will the solutions to its water supply issues.

### *Planning*

In addition to water reuse, planning is another important solution. The growing populations across the west have built entire communities without fully taking water supply into consideration.

Arizona demonstrates the value of planning and has therefore done better than other states in maintaining a steady water supply. Developing a sophisticated infrastructure system and working with water industry experts on planning, Arizona has not only developed a more efficient method for meeting demand, but has also developed a method for *anticipating* demand. By analyzing climate patterns it can provide water to its residents during droughts and thus avoid severe water shortages. In this sense, Arizona demonstrates that even when a state has a less than adequate natural supply of water, successful management is still possible.<sup>11</sup>

Smaller communities can also benefit from planning. The dozens, if not hundreds, of individual communities that have sprung up in the arid regions of the West and South West rely on their own water systems, to the detriment of water efficiency, cost-effectiveness, and quality. Often times, the solution is as simple as linking these small communities together to a common water system. By centralizing their services to a larger plant, people can benefit from lower costs, greater water conservation, and better service and quality.

### *Innovation*

A third and final solution involves innovation. Proper water management stems not simply from technology and planning but from linking opportunities together in ways that are innovative and effective. For example, leak detection technology, whereby an acoustic monitor attached to a pipe can “listen” to pipe sounds and transmit this information back to a service person, can be combined with meter reading technology so that both forms of information can be collected, transmitted, and processed at once, saving energy, time, and money.<sup>12</sup> Likewise, developments in solar energy can significantly reduce the energy needed to treat water and wastewater. In sunny states like Nevada, New Mexico, California, and Arizona, the incentives are even greater.

Arid states face many challenges in supplying their growing populations with water. But there are also an equal number of opportunities and solutions. This brings us back to the fastest growing state in the country: Nevada. Keenly aware that the issues in Nevada are representative of the entire region, the Applied Water Management Group of American Water recently opened an office there to pioneer innovative solutions that address ongoing and pressing needs in water supply. American Water is currently working with developers in the planning and design of efficient water management and hopes to ultimately help new residential developments, businesses, and even casinos employ water and energy conservation technology, including certification from the Leadership in Environmental Engineering and Design program (LEED). Water is, indeed, finding its way into the desert.

## CONCLUSION

Retiring baby-boomers are now replacing homesteaders in the west, even in places where water does not naturally flow, but the issues are the same. Only through careful planning and conservation will the demographic changes and climate patterns of the Western states be manageable. Water supply

<sup>10</sup> Projects just listed contracted to American Water.

<sup>11</sup> American Water serves 14 communities in AZ, whose populations total 225,000 people.

<sup>12</sup> Pioneered and employed by American Water.

management is an issue that affects us all. In the US, droughts are occurring in places that have historically had adequate water supplies, the population is growing, and the climate is changing. And yet effective solutions have been implemented in only a small percentage of American communities. Properly prioritized and valued, successful water management could be a reality for everyone.

