

Utilities

IMPORTANT ISSUES WATER UTILITIES FACE



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NO “SMART GRID” MOVEMENT FOR WATER UTILITIES, BUT CHALLENGES ARE JUST AS DAUNTING



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Water utilities around the world are not getting the attention electric utilities are receiving as a result of the “smart grid” movement engendered by concerns about global warming. Water utilities also are facing massive challenges, many of them attributable to some climate change already under way from long-time natural forces that may or may not have anything to do with the current warnings. Arid areas of the planet have become more arid for hundreds of years, and population growth is beginning to tax limited water supplies in many countries, including the United States. There is just so much freshwater, and supplies already are under strain.

Added to the supply issue is an aging infrastructure that in many parts of the world is far older than the infrastructure used to distribute electricity. Many of the water mains buried under city streets around the world are one hundred to several hundred years old. In the United States, the mains serving many of the major cities east of the Mississippi were built in the 19th century or earlier. In Europe and some other parts of the world, mains are much older than that.

That infrastructure is beginning to crumble at the same time supplies of freshwater, above and below ground, are being overtaxed. Water utilities are feeling the strain of increasingly being called upon to perform a task that is

increasingly difficult with facilities that are increasingly inadequate – keeping the water “on.” And to add to the concern, it should be remembered that while most people can survive indefinitely without electricity, they can survive only about three days without water.

Water utilities have been considerably overshadowed during the era of the smart grid. That is because they usually are not front of mind for politicians and others, and because, especially over the last few years, electricity supply has been much more prominent in governmental concerns. However, it’s important to remember that keeping the water supply to homes and businesses is scientifically complex (water has to be purified) and strategically important (we can’t live without water, and it has to be protected from terrorist and other threats).

A Litany of Serious Issues

Some of the major issues facing water utilities include:

- Water scarcity. The Earth appears a very blue planet from space, with two-thirds of the globe covered with water. However, most of that is salt water and can be used by humans only after expensive desalination. To be precise, 97.5% of all water on the Earth is salty. Only 2.5% is freshwater. Of the freshwater, 69.9% is locked up in glaciers and permanent

snow cover. That leaves only 31.1% of the 2.5% held in lakes, river storage, groundwater, swamp water, and permafrost. Or, put another way, only about .33% of all the freshwater on Earth is readily usable by human beings.

- Demand for water by humans will exceed the supply by 40% by 2030 if corrective action is not taken immediately.
- Only 20% of corporations have any plans at all for dealing with water issues despite the fact that water supply disruptions can disable industrial and manufacturing operations.
- Contaminated water supplies will require additional investment and operational costs for pretreatment.

The drivers behind these issues are many, varied, and increasingly serious, experts say. They include:

- Climate change (ongoing, historic, and the threat of more rapid change being postulated by many)
- Settlement patterns
- Population growth
- Industrialization
- Environmental policy
- Drought and desertification
- Pollution
- Agricultural expansion
- Hydro energy
- Unequal distribution around the world.

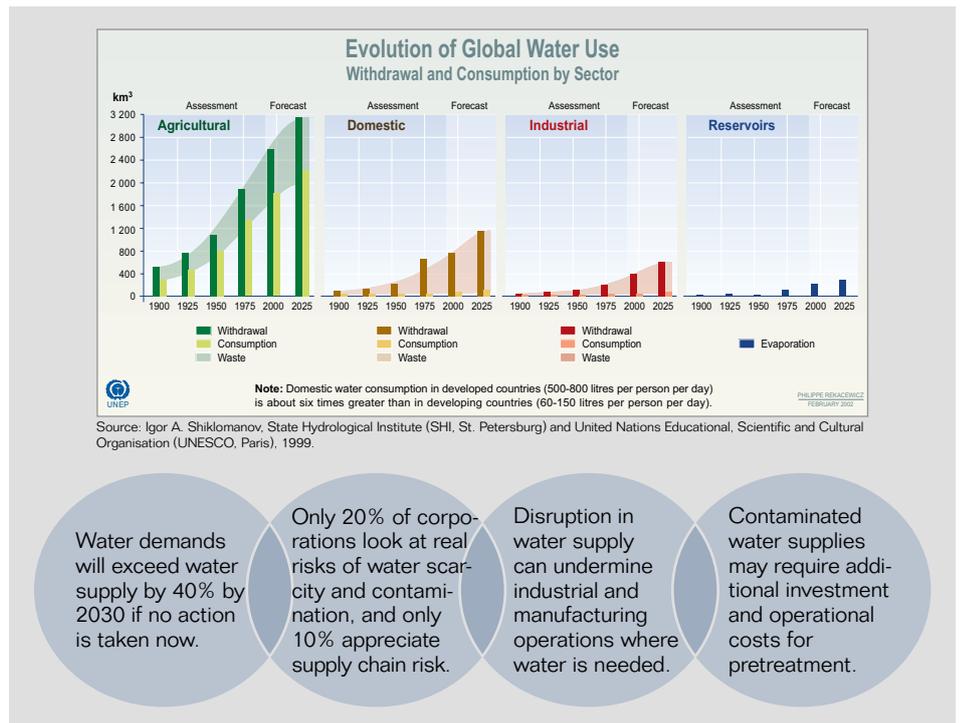


Figure 1: Water Supply Issues

Human and political elements, as well as natural phenomena, play important parts in existing and potential water shortages. In the western United States and Ethiopia, persistent droughts are major problems. In the Golan Heights, conflict and competition pose serious issues. In China and India, pollution and the lack of sanitation are dire. Obviously, all the supply issues are global in nature, as shown in Figure 1.

Governments and international organizations have not been blind to the growing water crisis. As a result, water utilities everywhere must deal with increasing policy and regulatory constraints. They are using a wide range of policy tools to reduce water use. These measures include:

- Long-term water resource and land-use planning and protection
- Water abstraction and use permitting, fees, quotas, taxes, and improved or increased metering
- Mandatory use of water-saving methods and technologies including reuse and recycling
- Development of additional supplies and use of alternative sources, such as rainwater instead of groundwater
- Mandatory water use disclosure and use labeling
- Designation of protected water abstraction zones
- Hydrographical basin and aquifer protection
- Classification of groundwater quality
- Prioritization of water use rights allocations
- Restrictions on construction and operating permits

Attention to water resources is increasing, and more stringent national standards already are in place in Australia, Bolivia, Brazil, China, Costa Rica, France, Germany, India, Korea, Poland, Saudi Arabia, South Africa, Spain, the United Kingdom, and elsewhere. However, overall options are relatively limited, as shown in Figure 2.

Problems Specific to Water Utilities

According to various industry sources in the United States, about 40% of all water valves and 10% of hydrant valves are inoperable, and about 9% of all distribution valves are in the wrong position. The city of Houston, facing this problem, began an extensive valve-testing program in 2008.

Leakage also is a major issue. Exactly how much water leaks from old pipes and systems more than 100 years old is not known in many cases. As one executive says, “Water utilities are going to have to start doing something soon, or they may become nonexistent. Many of them are just moving into the 20th century, particularly with regard to modern technology – a lot of them lack modern customer information systems, many of them are just beginning to allow online billing and payment.”

Like their electric and natural gas utility cousins, water utilities also face an aging workforce issue and difficulty in convincing newer generations to go to work for them. Therefore, a large retirement bubble seems imminent in the industry.

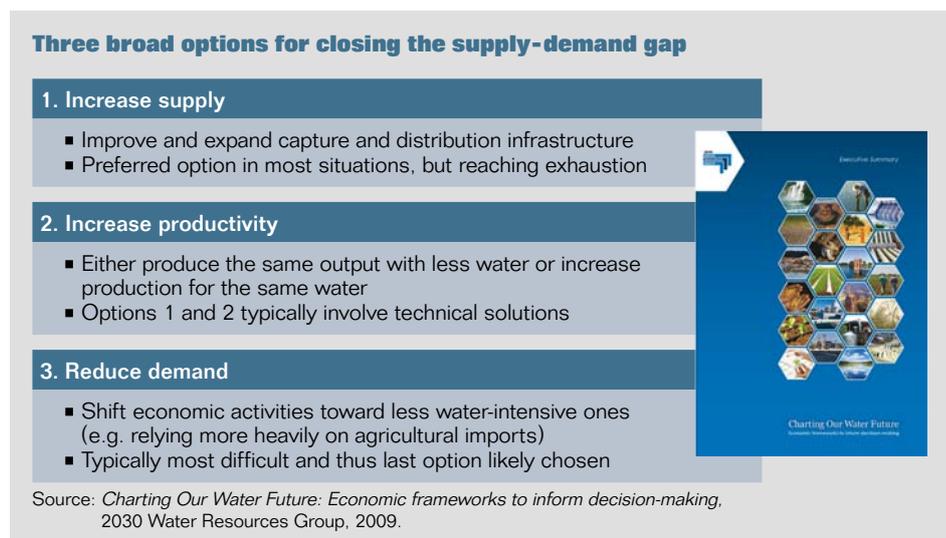


Figure 2: Three Options for Closing the Water Supply-Demand Gap

Also like other utilities, water companies – public and private – have not been immune to the global economic downturn. The economic dislocation has put pressure on system budgets at a time when they are facing the litany of problems and issues outlined above, as well as additional scrutiny from regulators and government officials.

In the United States, water utilities received only about \$2 billion from the American Recovery and Reinvestment Act of 2009 to deal with the infrastructure issues, compared to about \$8 billion given to electric utilities to build a smarter grid. Water utility executives estimate they will need about \$335 billion in capital investment over

the next 20 years just to keep the water flowing. Fifty percent of that is necessary for transmission and distribution of water, and 22% for improved treatment facilities, they say. The remainder would be used for security and other upgrades.

Human and political elements, as well as natural phenomena, play important parts in existing and potential water shortages.

“The vast majority of the need is not driven by regulatory concerns, but the basic need to provide potable water,” says Joanne Kelley, head of Industry Analytics, Utilities and Public Sector, Performance and Insight Optimization for SAP America Inc.



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Software Can Help

“Asset management is a key issue,” says Kelley. “Better software systems will enable water utilities to leverage existing infrastructure, including fleet management, applied pipe management, and full-cost asset depreciation.” This capability would enable water department executives and managers to better assess exactly where they are and where they need to go in the future.

Improved technology, such as GPS and automated mapping systems, would enable utility executives to have a better understanding of facilities and their needs. Potential failure sites in aged facilities could be located more readily and remediation prioritized within the constraints of limited resources.

“Integration of all their knowledge bases and systems from financial through facilities to human capital management would be a big improvement for water utilities facing these issues,” Kelley continues.

Water utilities also face major security challenges. These come from two different directions: cyber threats and physical threats. As utilities do adopt more technology, such systems must be adequately protected from intrusion. Many water purification and treatment facilities rely upon electric controls to dispense appropriate treatment chemicals in appropriate quantities and time frames. Penetration of these systems

by a malevolent threat could be a serious public disaster.

On the physical side, threats from terrorists or others with malevolent intent include dispersion of poisons or other foreign substances such as disease-bearing substances into drinking water supplies. This could represent a major crisis. Many public water supplies are not adequately protected from these threats.

Better software systems to track all these issues and help water managers and executives deal with them in an organized, effective manner are no longer luxuries, they are essentials. You can't manage what you can't measure. Countries around the world can no longer afford to let water utilities

SAP understands that water utility executives must have a good understanding of the state of their infrastructure.

be neglected and forgotten behind the smart grid rush. If steps aren't taken soon, a lot of people could be very thirsty. And in the final analysis, that is a greater threat than sitting in the dark for awhile. People have sat in the dark before, without serious harm. Living without potable water is another, very serious matter.

SAP ADDRESSES THE NEEDS OF THE WATER INDUSTRY

SAP has a long history addressing the needs of the water industry. More than 150 water utilities rely upon SAP® solutions to address their requirements in optimizing their asset operations; provide superior customer relationship and billing, financial, and human capital management functionality; address government regulatory and compliance needs; and enable enterprise-wide business intelligence.

SAP understands that water utility executives must have a good understanding of the state of their infrastructure. They need to know where all their assets are located so they can run tests, identify faulty hydrants and valves, and then fix or replace them. To make the right repair or replacement decisions, they have to know what their assets are worth in the first place. They must ensure they have skilled people who can perform the work. Finally, they must be able to track funded and unfunded regulatory mandates.

Today's water utilities are resource-constrained, to be sure, but technology can help them effectively allocate and utilize what they have. An efficient, sustainable enterprise resource planning (ERP) solution for water utilities will help them reduce operational expenses, comply with regulations, and manage risk. Moreover, it helps them reduce capital expenditures, improve workforce efficiency and productivity, and find the right talent to build a successful tomorrow.



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