

Brennan Investment Partners LLC: Investing in Global Water Equities 2009 & Beyond

A Dynamic and Profitable Theme in Any Economy – William S. Brennan, President & CIO

Water: A Global Growth Sector

The global water sector, which is estimated to be a \$700 billion market, remains at the forefront of industrial, geopolitical, and social agendas because of worsening supply and demand imbalances at regional and national levels and the heightened mega trend catalysts of water scarcity, quality, and safety issues. Worldwide, approximately 1.1 billion people lack access to clean drinking water, according to the United Nations. The U.N. estimates that by 2030, as many as four billion people will not have enough water for their basic needs – sanitation, cooking, and drinking. Even in the United States, a neglected infrastructure, that has fallen decades behind in repairs, combined with regional droughts, is creating water shortages and escalating water prices.

The Case for Water Investing

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| <ul style="list-style-type: none">▪ No economic substitute▪ Low correlation to the market▪ Growing commodity scarcity – absurdly undervalued▪ Most critical industrial input to the world's economy▪ Fundamental disconnect between water prices and the true cost of water | <ul style="list-style-type: none">▪ Supply / Demand imbalance▪ Impending, significant escalation in water prices▪ Dire need for revamped stormwater management and wastewater treatment systems▪ Worldwide need for higher quality drinking water |
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We believe the current investment cycle presents one of the best historical opportunities to enter the water market due to the global water sector's defensive long-term growth potential. While growth multiples vary within subsectors of the water business due to the position of each in the spending cycle, the past several years have created attractive entry points for a wide variety of companies that participate in the hydro commerce cycle.

William S. Brennan

President & Chief Investment Officer

Brennan Investment Partners LLC

690 Lee Road

Wayne, PA 19087

610-727-6828 Direct

610-727-6905 Fax

wbrennan@brennaninvestment.com

www.brennaninvestment.com

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Performance of the indices assumes the reinvestment of all dividends and income. Indices are not available for direct investment. The S&P 500 Index is an unmanaged index generally considered to be representative of the large-cap segment of the market. The MSCI World Index is a free float-adjusted market capitalization index that is designed to measure global developed market equity performance. As of June 2009 the index consisted of the following 23 developed market country indices: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, the United Kingdom, and the United States. The Russell 2000® Index is an unmanaged index generally considered to be representative of the small-cap segment of the market. It measures the performance of the 2,000 smallest companies in the Russell 3000® Index. The Russell 2000 Index represents approximately 10% of the total market capitalization of the Russell 3000 Index. The NASDAQ Composite is a market-value weighted index of all common stocks listed on NASDAQ. The Dow Jones Industrial Composite is the most widely used indicator of the overall condition of the stock market, a price-weighted average of 30 actively traded blue chip stocks, primarily industrials.

I. Water as “the Economic Backbone”

Water – Infrastructure and Much More

Global water issues have combined to form a “perfect storm” to drive huge growth in what is often called “hydro commerce.” “Hydro commerce” represents actual spending on water infrastructure, in addition to industries that are reliant on water in order to survive and be sustainable. Governments of both developed and developing countries have recognized that an adequate supply of clean water is closely tied to GDP growth and sustainability. We estimate that over 550 companies comprise this global industry with a market capitalization of over \$2 trillion. It is a not widely known fact that the water services industry is the third-largest in the world, just behind oil and electricity. It is made up of companies that collect, treat, deliver, and dispose of water and waste water. A compelling reason water has become a viable investment is the fact that, unlike other commodities, there is no substitute for water. Demand for water is inelastic, meaning it is not affected by inflation, recession, or consumer tastes. Water is essential to human life, and always will be.

Global Water Infrastructure Snapshot	
Industry Size (\$ Billions)	\$600-700
Publicly Traded Water Companies	550+
Aggregate Market Capitalization	\$2 Trillion
Developed Country Growth Rates	6 – 10%
Emerging Market Growth Rates	15%

The global demand for water – the life-sustaining natural resource that has no substitute – continues to escalate at an unsustainable rate, fueled by population growth and improved living standards, especially in emerging countries and by industrial expansion in areas such as China, the Gulf States, and India. The world’s fresh water supply is rapidly shrinking due to pollution, draining of underground aquifers, and climate change with an acceleration of all three over the last 30 years. As a result, we expect to see a sustained focus and investment in the global water sector and its various ancillary industries that rely on water for many years to come.

The water infrastructure market is composed of numerous distinct subsectors, including the equipment and services sector for pumps, valves, motors, pipes, membranes and filtration, desalination, drinking (potable) water, wastewater, industrial water treatment, infrastructure, automation, instrument and testing, and consulting and engineering services.

Water Subsectors consists of companies that provide treatment, distribution, and disposal of various forms of water used for residential, commercial, and industrial use.

Water Subsectors	2009 Revenues (USD)	
	US	Global
Utilities	\$27 Billion	\$325 Billion
Treatment	\$24 Billion	\$125 Billion
Industrial treatment	\$22 Billion	\$70 Billion
Infrastructure	\$12 Billion	\$30 Billion
Valves	\$8 Billion	\$35 Billion
Filtration	\$12 Billion	\$25 Billion
Pumps	\$5 Billion	\$25 Billion
Other equipment	\$24 Billion	\$58 Billion
Total	\$134 Billion	\$693 Billion

Industries that rely on water in order to achieve sustainability include hydroelectric, nuclear, agriculture, solar, oil and gas, timber, transportation, pharmaceuticals, metals and mining, and waste management. The investable universe increases daily as more industries and companies are realizing that water use and availability may change drastically and are taking the necessary steps to ensure proper management of this most precious resource. Global water infrastructure has continually suffered from under-investment, even though global spending in the space has tripled since 2004, with the U.S. and China accounting for 50% of global water spending.

II. Growth Outlook

The US has an estimated backlog of between \$300 billion – \$1 trillion in water infrastructure replacement and upgrade requirements that should drive an annual rate of 6% – 8% spending growth. Europe has similar growth potential. These levels are slightly above expected long-term GDP growth. Including stimulus activity, the growth rate for water spending is expected to approach 10% in 2010. Developing countries, especially China and India, should continue to see a 10% – 15% plus growth rate as they build out new, basic water and wastewater systems in order to remain competitive from a GDP standpoint.

Water Utilities and Water Industrials Stocks have outperformed a broad range of indices over the last 20 years, while exhibiting a relatively low correlation to the market.

Sector / Index	1989 – 1993 [^]	1993 – 1998	1998 – 2003	2003 – 2008	1989 – 2008 [^]
Water Utility Stocks	14.78%	18.51%	6.36%	6.36%	796.91%
Water Industrial Stocks	18.02%	16.09%	9.38%	7.25%	751.84%
S&P 500 Energy Index	6.85%	16.60%	6.56%	13.43%	625.82%
S&P 500 Health Care Index	8.53%	35.04%	.14%	-0.73%	505.55%
DJIA	15.44%	22.28%	4.55%	-1.12%	401.17%
S&P 500	14.54%	24.05%	-0.57%	-2.19%	282.92%
S&P 500 Financial Index	12.64%	27.09%	5.91%	-12.48%	265.38%
NASDAQ Composite	15.28%	23.47%	-1.45%	-3.95%	272.45%

Source: Bloomberg. All returns are with dividends reinvested.

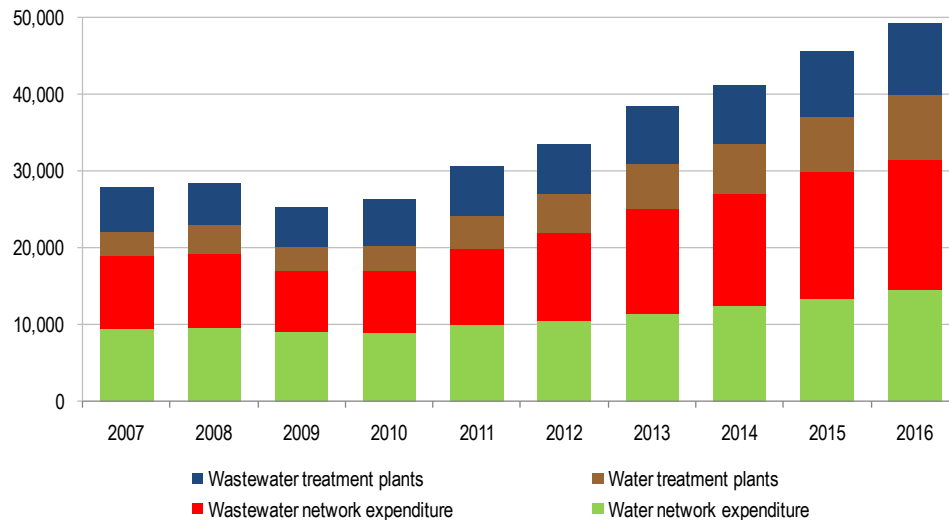
* Equally weighted list of all publicly traded U.S. water utility stocks that existed throughout 1989 – 2008.

[^] 4 year and 19 year periods due to limitations in Bloomberg pricing history.

Key Themes for Water Investing

- Water Infrastructure.** According to the American Society of Civil Engineers, water infrastructure in the U.S. will need over \$1 trillion in repairs by 2025. Older water systems are very inefficient and many lose up to 30% of their water due to cracked and leaking piping.
- Water Conservation.** A study of the approximately 30% of U.S. homes that have water meters leads experts to believe that unmetered homes are less likely to conserve water. Climate change and water shortages are forcing water utilities to move toward 100% metering. New automated meter reading (AMR) systems can reduce labor costs and even notify customers of leaks. Well water and groundwater sources will also be metered in the future.
- Filtration and Purification.** Water treatment plants and desalination plants use filters and membranes to process water and remove contaminants. Membrane companies can reduce costs, be a substitute for chemicals, and help water utilities meet the standards set by the recent EPA water purity regulations.
- Water Efficient Irrigation.** Historically, farmers have irrigated their crops through flooding by using ditches and dikes. This primitive method can result in up to 50% water loss from evaporation and leakage. Modern irrigation systems can supply water more directly to crops, with losses as low as 2%.

ESTIMATED U.S. WATER EXPENDITURES: 2007 – 2016 (in millions)



- **Water Utilities.** These companies provide clean, safe water to customers in the community they serve. Risk-averse investors are drawn to water utilities, as they enjoy a virtually exclusive franchise, and these stocks typically pay a dividend.
- **Desalination.** Many of the causes of the global water crisis have pushed the rapid growth of desalination projects to over 14,000 year-to-date. This number is estimated to grow to 60,000 over the next seven years.
- **Water Rights.** In the Western United States and Australia, water has always been scarce and disputes over water rights are frequent. As with water utilities, there exists strong franchise value in securing regional water rights.
- **Legislation.** Legislation is developing that alters the way in which countries are managing and protecting rivers, water bodies, and access to water. Governments in developed and developing countries alike are setting more stringent standards for water conservation and water quality. The EPA now requires US water utilities to test for 93 known contaminants and China recently introduced 71 new water quality standards. These types of regulations indicate that water management is a national resource security issue and that there is a legislated impetus to improve water quality.

III. The Perfect Storm – Causes of the Global Water Crisis

1. Falling Aquifers Due to Over-pumping

- Global governments have failed to control the amount of water pumped from underground aquifers through lack of regulatory oversight or ignorance of water replenishment issues. As a result, water tables are falling in every country, including the three countries that produce most of the world's grain: China, India, and the United States. 70% of all fresh water is used for crop irrigation, so further aquifer depletion could drive food shortages, widespread famine, and starvation.
- According to a World Bank report, drillers near Beijing, China are now forced to drill water wells over 1000 meters deep to reach remaining aquifers as shallow sources have vanished. The World Bank is forecasting "catastrophic consequences for future generations." China's Minister of Water Resources recently stated, "The price of China's economic boom is being paid in water." Two-thirds of China's larger cities don't have adequate water supplies. Half of China's cities have severely polluted ground water.
- China, India, Pakistan, Iran, Saudi Arabia, Israel, and Mexico are facing severe water shortages according to the World Bank.

2. Climate Change

- Climate change is impacting global water resources in three ways that are having enormous impacts on how people live and grow food – reduced snow pack in mountains, rising sea levels, and droughts.
- Reduced snow pack in mountains – as temperatures rise, snow packs decline, reducing spring snow melts in areas within the watershed, and leaving less water for human use. According to British water expert Nicholas Stern, "The glaciers on the Himalayas are retreating, and they are the sponge that holds the water back. We're facing the risk of extreme run-off. A few hundred square miles of the Himalayas are the sources for all the major rivers of Asia – the Ganges, the Yellow river, the Yangtze – where 3 billion people live, representing 50% of the world's population."
- The United States faces a similar crisis, with most of the Western states dependent on snow pack accumulations in the Sierra Nevada, Cascade, and Rocky Mountain ranges. With reduced spring snowmelt water, less water is available for domestic, industrial, and agricultural use, affecting millions in that region.
- Rising sea levels – because half of the world's population now lives within a few miles of the shoreline, a modest rise in the sea level may cause massive flooding in low-lying coastal areas throughout the world, such as Bangladesh, Florida, and many island nations. Saltwater intrusion of groundwater supplies in Florida and other coastal areas is already commonplace, resulting in water unsuitable for drinking or agriculture. This effect is driving a need to build desalination plants in coastal communities throughout the world in order to provide drinking water.
- Droughts – the effects of extreme droughts are already clear in the American Southeast and Southwest, in the form of threatened agriculture and substantially higher water costs. Potential solutions being considered by water suppliers to cope with growing water scarcity include increasing storage capacity, extreme conservation methods, rainwater harvesting, and water recycling.

3. Overpopulation

- Global populations are projected to increase by over 3 billion people in the next several decades. Most of this growth is projected to occur in countries with arid or semi-arid climates, where water is already scarce. Compounding the problem, populations are growing at an unsustainable rate due to government and religious resistance to family planning.
- Some of the countries that are outgrowing their water supply, such as Saudi Arabia, have oil reserves that allow them to fund the construction of large desalination plants to cope with water shortages. Poorer countries such as Sudan, Chad, Yemen, Afghanistan, and others, may find their only solutions are in water recycling and water-efficient irrigation. In dry desert areas, armed water conflicts are escalating.

4. Pollution of Water Resources

- Years of uncontrolled discharge of pollutants such as xenobiotics, industrial chemicals, herbicides, pesticides, and untreated sewage have made much of the world's drinking water reserves unsafe to drink. In China, for example, only half of the larger cities and virtually none of the smaller towns, have sewage treatment facilities. Factories discharge waste chemicals directly into rivers and lakes, all of which results in half of China's population drinking contaminated water.



5. Inadequate Infrastructure

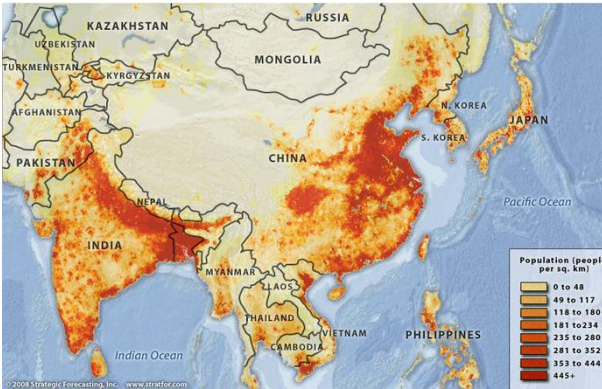
- The consequences of deferred infrastructure maintenance are becoming more apparent. As much as 70% of 700,000 miles of aging drinking water pipes and 800,000 miles of waste water pipes in the United States alone may need replacing, at a cost estimated by the American Water Works Association at over \$600 billion over the next few decades.
- Crop irrigation is facing a similar crisis as water demand exceeds supply. Current methods rely on traditional "flood" irrigation, with high water losses due to leakage and evaporation. More water efficient methods, such as overhead and drip irrigation, cut water waste by 30% to 50%, resulting in higher crop yields and less stress on water resources.

SNAPSHOT: The Present State of America's Water Systems		
Drinking Water	Waste Water	Water Pipes
<ul style="list-style-type: none"> 53,000 water facilities for public drinking water Received a D- grade from the American Society of Civil Engineers in 2009 Opportunity: Publicly held operators will acquire smaller municipal utilities 	<ul style="list-style-type: none"> 16,000 treatment plants Received a D- grade from the American Society of Civil Engineers in 2009 Sewer overflows discharge \$850 billion gallons of contaminated water per year Opportunity: Water utilities will "Upgrade and Build", using new technologies and equipment, as well as services – In 2000, the estimated amount to build new, and update, existing wastewater treatment plants, sewer maintenance / construction, and combined sewer overflow corrections, was \$57.2, \$67.9, and \$50.6 billion, respectively 	<ul style="list-style-type: none"> Almost 2 million miles of drinking and waste water pipes Estimated that greater than 60% of pipes will be beyond their intended lifespan by 2010 U.S. pipes experience 30% leakage rates on average, wasting 7 billion gallons of clean drinking water each day Opportunity: Replacement is inevitable – next generation replacement pipe will have leak monitoring / energy recovery built in place

IV. ISSUES – 2009 and Beyond

China – An Emerging and Thirsty Economy

Population Density Map of Asia



- China plans to invest US \$128 billion in water related projects through 2010 (water trails only the military complex in capital expenditures in China).
- 60% of China's cities suffer water shortages.
- 50% of China's cities lack wastewater treatment centers. The Yangtze River absorbs nearly half of the country's wastewater (almost entirely untreated).
- China is acquiring agriculture land in Southern Africa as government policy will allocate less water to agriculture and more to industrial and energy requirements in-country.
- Investment will continue to increase as policy makers recognize that inadequate water infrastructure will curb economic growth.

Agriculture

- Water is essential for the production of food – 70% of water usage on a daily basis globally can be attributed to agricultural activities.
- In the U.S., irrigation accounts for 31% and 37% of total water use and total freshwater use, respectively. Irrigation includes water applied by irrigation systems used in agricultural and horticultural practices (according to the USGS).
- Irrigation, which accounts for 40% of all crops grown in the world today, has emerged as the primary means to supplement natural rainfall.
- In the last 100 years, irrigated agriculture expanded globally by 480% and it is projected to increase another 20% by 2030 in developing countries.
- Water replenishment has dropped off, resulting in falling groundwater levels and reduced river flow throughout the world, especially in China and the Middle East.
- Agriculture has led to extensive water pollution by introducing contaminants such as fertilizers, animal manure, and pesticides that typically end up in rivers that flow to retention basins such as the Gulf of Mexico or the Chesapeake Bay.
- Regions and countries are actively switching to crops that are less water intensive (i.e. alfalfa to almonds).

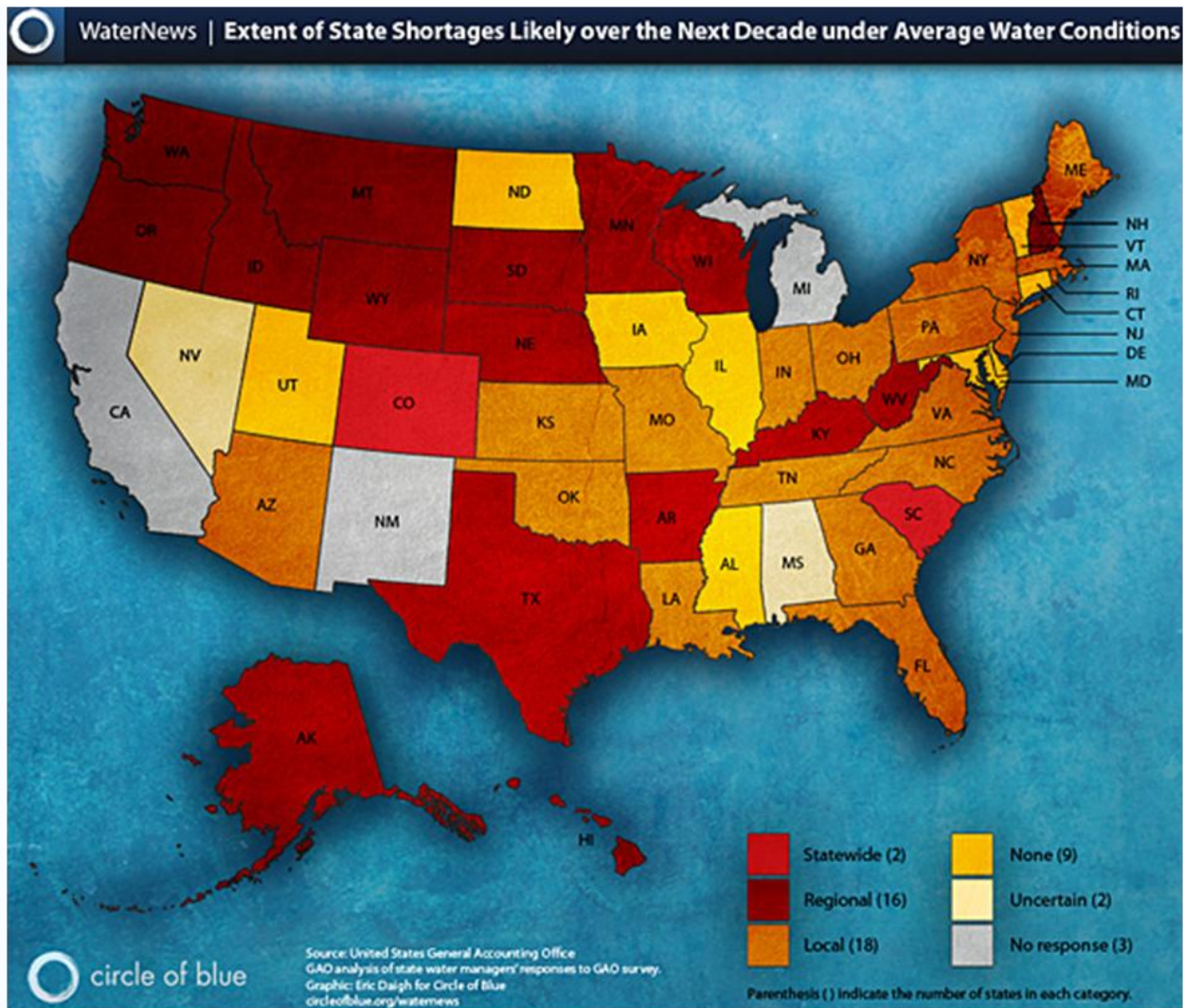
Water Use in Food and Staple Manufacturing Production

Product	Water Content (gal)
1 glass of beer	20
1 glass of milk	53
1 cup of coffee	37
1 slice of bread	11
1 apple	18
1 cotton t-shirt	528
1 glass of apple juice	50
1 egg	36
1 hamburger	634
1 pair of leather shoes	2,114

*More water is typically used in the **production** process of a beverage than in the actual beverage itself.*

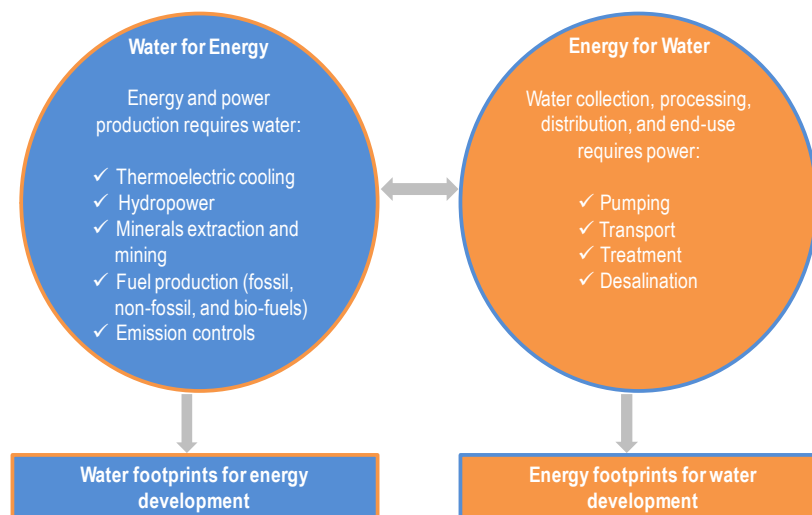
Droughts

- The Southeastern and Southwestern United States just experienced the second summer of significant droughts; droughts so severe that Georgia officials declared a state of emergency late last year and have tried to annex parts of Tennessee for water rights.
- The Department of Agriculture and the National Oceanographic and Atmospheric Administration notes in its latest assessment that one-third of the continental United States is suffering abnormally dry or drought conditions.
- A nuclear reactor in Alabama had to shut down briefly last summer when cooling water ran low.
- Many parts of California experienced their driest years on record in 2007 and 2009. Lake Mead, the largest reservoir in the Western United States, is at 43% of capacity, and some estimates show it may run dry by 2021 if current trends continue.
- Large areas of Australia are suffering through a crippling drought, and 400 of China's 600+ cities lack adequate water supply for future growth.
- The tripling of demand coupled with the effects of climate change account for the growing water deficit. In short, the world is headed into a future where clean water will no longer be something everyone can take for granted.



The Energy and Water Nexus

- Large amounts of water are needed to produce energy at power plants and significant energy is used to treat and transport water to consumers.
- Now, more than ever, the American West is realizing the entwined nature of energy production and water delivery. Moving water from source to end usage takes a significant amount of power. Power plants, especially nuclear and hydroelectric sites, require water to cool and create the energy.
- Thermoelectric cooling, hydropower, minerals extraction and mining, fuel production in the form of non-fossil and bio-fuels, as well as emission controls, all require significant amounts of water in processing.
- Water collection, processing, distribution, and end-use requires power for pumping, transporting, treatment, and desalination of water.
- Regarding desalination – the more salt in the water, the more energy required to remove the salt by breaking the more highly concentrated ionic bonds.
- The push for low-carbon energy alternatives in the form of solar power plants could further compromise already limited water resources in the Southwest United States. Solar power plants generate energy by using a system of mirrors to heat water into vapor.



Source: Based on DHI 2008.

V. Conclusion

The \$700 billion global water market is growing faster than the global economy, in which companies are expected to average earnings growth of 7% per year against 10% per year for companies in the water space. Recently, the chairman of one of the largest asset management firms in the U.S. stated, "I happen to think that water will be a productive place to invest in the future, though my guess is that it will be complex, too, given political considerations."

Although politics have and always will be intertwined with water, we believe the investment future for water is now. Water is the basis for everything – life, manufacturing, GDP, healthcare, etc. It is the backbone of every economy. Lack of water leads to economic chaos, disease, inadequate food supply, and potentially, wars, in regions where a shared resource is coveted by a neighboring country. Presently, 260 rivers are shared by 145 countries, most without an adequate water sharing agreement in place. The U.S. and Europe have only had the luxury of a modern water system for less than 150 years. As developed countries' water infrastructure crumbles, the emerging world is clamoring for clean water and is doing everything in its collective power to efficiently use what always has been our most critical commodity and natural resource.

A \$1 trillion water industry is developing globally with no slowdown in growth in sight. The majority of the approximately \$25 billion invested in water equities by institutional investors comes from Europe, the Middle East, and Asia, where investors already recognize the fundamental role of water in the world economy. Historically, public water securities have been characterized by high relative performance and low relative market volatility. The importance of water as a resource makes it more than a "sector play". Water issues are so pervasive and significant that water investing merits prime consideration for investors.