The Case for Water Equity Investing 2010

Value and Opportunity in Any Economic Environment

BY STEVE MAXWELL AND MATT DICKERSON

SUMMIT

Introduction

As every investor knows only too well, the last two years have been an exceptionally difficult period in the global financial markets. With a credit crisis more serious than any seen in several generations, and the associated deep economic recession from which we still have not managed to extricate ourselves, equity valuations across all industrial sectors have fallen sharply – even with some recent recovery. At Summit Global Management, we believe that while these circumstances have undeniably caused widespread fear and uncertainty, they have also created an unprecedented opportunity for investors interested in the global water industry.

Not only do we still see strong fundamental drivers for sustainable growth and equity appreciation in global "hydrocommerce," investors have the opportunity today to invest in water companies at more attractive valuations than have been available for a number of years. Despite the negative short-term impact of the financial crisis, water equities are uniquely resistant to external economic cycles because of the decreasingly available supply and increasingly relentless demand for water. We believe water stocks represent an attractive alternative "store of value" in an uncertain world – a good place to save money for a rainy day.

The lure of water investing is not a new idea, but it is one that deserves fresh examination from the perspective of the revised business expectations and new economic environment to emerge from the wreckage of 2008. The intention of this document is not to promote a specific investment style or strategy, only to be a broad overview of issues relevant to the serious investor in water equities.

People new to the concept of water investing are encouraged to read *The Case for Water Equity Investing 2010* in its entirety in order to gain a complete understanding of the space, from its most fundamental aspects on up. Those already familiar with the essential thesis of water investing from our earlier work may find it more efficient to skip forward to Part II for updated metrics and a detailed review of emerging trends.

Please address comments and questions to:
Matthew J. Dickerson
Chief Marketing Officer
Summit Global Management, Inc.

858-546-1777 x20
investorservices@summitglobal.com

Part I: Water Investing Overview

The Essential Thesis of Water Investing

Water is the most essential life-sustaining substance on earth and the most critical industrial input to the world's economy. Demand for clean water has expanded unrelentingly as populations soar and societies modernize, and we now face crisis-level shortages for this most basic and necessary resource.

Yet, paradoxically, water remains absurdly undervalued. In many regions, utility prices come nowhere near the life-cycle costs of actually providing water, and are even less reflective of its true economic and social worth. But public outrage predictably results when local water rates are raised by even a few percentage points. This, despite the fact that most people happily buy bottled water (at a cost hundreds of times higher than tap water) and routinely pay much larger monthly bills for non-essentials such as cable television and cell phones. This fundamental disconnect, between water prices and the true cost and value of water, will gradually correct itself as supply constraints become more acute and the associated problems can no longer be avoided. The proverbial pump is therefore well-primed for a long-term appreciation in value.

But exactly how valuable is water? A truer accounting would reflect several underlying realities. First, water has no economic substitute, at any price – the only substance or commodity in the world of which this is true. Second, we can neither create nor destroy water, so there is essentially a fixed supply of water on the planet. Third, while we obviously use more water as the world population grows, we also use more water on a per capita basis as industrialization, urbanization, and standards of living advance. So demand increases exponentially rather than at a smooth, linear pace.

These undeniable fundamentals of supply and demand will only intensify over time, bringing the potentially devastating effects of the world water crisis into sharp relief. While the challenges certainly will be immense, equally as great are the long-term prospects for the industry that will meet our growing needs – as well as the opportunities for investors with the foresight and patience to position themselves ahead of the trend.

It is important to recognize that there is really no such thing as *the* water industry. Instead, there is a balkanized but inter-related collection of fundamentally quite different businesses – all of which have something to do with delivery of clean water, but cannot be accurately classified under any single economic sector. From the water utilities that collect, treat, and deliver potable water, to the myriad of technology companies involved in the treatment and analysis of water and wastewater, to the pipe, pump, and valve manufacturers that help move water from place to place – all these types of *hydrocommerce* enterprises, and more, are involved in meeting the growing demand for water with continuous, high-quality supplies.

What ultimately does unite these disparate businesses are the underlying drivers that create consistently growing sales and earnings almost irrespective of external financial and economic conditions. No matter how bad the economy gets, or how many expenses need to be cut, people still need water – not only to drink but to keep their living areas sanitary, grow their food, and power their turbines. This consistency is one of the most compelling aspects of water investing, providing the opportunity for non-cyclical, low-correlated returns on public equities that fall within the hydrocommerce universe.

While the gaping supply/demand disparity is clearly the fundamental problem – and greatest attraction – of the water business, a number of ongoing and emerging drivers further bolster the general thesis behind water investing. Around the globe, aging and dilapidated water and sewer infrastructure in developed nations is in dire need of repair, while new infrastructure must be built to meet the needs of growing populations in both developed and developing economies. By some estimates, these infrastructure needs in the U.S. alone will require capital expenditures of at least $500 billion over the next 20 years. To exacerbate this problem, there are significant human migrations underway, often into more arid regions or massive urban centers where water infrastructure is already woefully inadequate.

Industrial contamination of surface waters, accelerated depletion of non-renewable groundwater supplies, and the potentially devastating impacts of global climate change will only intensify and complicate the water scarcity issues afflicting the world. These critical concerns are receiving more and more attention in the mainstream media, and rising public distress is gradually translating into political and commercial action.

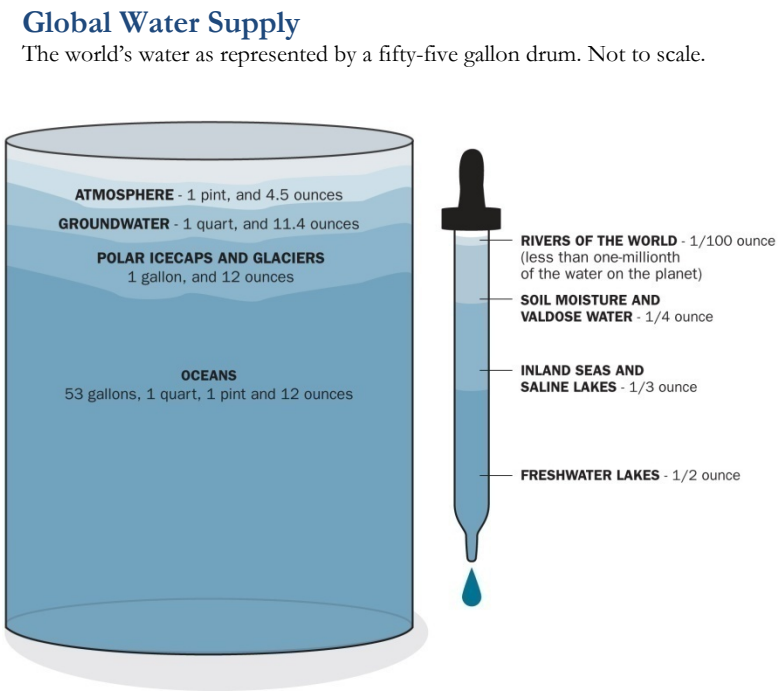
Governmental agencies, from the local to the federal and even international levels, are increasingly plunging into complex questions and policy issues surrounding water distribution and quality. Necessary regulatory and compliance requirements have increased sharply around the world, but they have also resulted in sharply escalating costs and complexities for local utilities and water providers. In harsh economic times where traditional financing options are uncertain, new investment paradigms from alternative sources will be essential to meet the rising needs.

The Underlying Drivers of Water Investing

No other industry rivals hydrocommerce in terms of strong, fundamental drivers capable of propelling future growth. Each of these underlying factors are worthy of detailed discussion, but are summarized briefly below to provide a basic foundation for further investment consideration.

The Basic Water Situation: Fixed Supply, Exploding Demand

- The available supply of fresh water to meet all human needs amounts to only about one half of one percent of all water on earth. Amazingly, surface rivers and lakes make up less than 1/100th of this already minute amount; the bulk of the world's fresh water is currently inaccessible within the polar icecaps.



- Fresh water supplies are being effectively destroyed at an alarming rate by pollution from modern industrial, agricultural, and sanitation practices.

- Groundwater supplies, by far the majority of available fresh water, are almost everywhere being "mined" beyond their natural rate of replenishment. In northern China the water table is dropping by up to 3 meters per year, while the critical Ogallala aquifer of the central U.S. has experienced declines exceeding 150 feet and has even dried-up in certain areas. Mexico City now has to pump water up more than 7,000 feet, and the government has resorted to running ads warning: "February 2010: The City May Run Out of Water."

- The potential impacts of global climate change will only intensify and complicate water supply issues. Shifting and more intense weather patterns, unpredictable precipitation levels, earlier snowmelt, and rising temperatures will wreak havoc with the existing storage and distribution infrastructure.

- Perhaps the most significant issue is simply the exploding demand for water, driven by the world's growing population. It took mankind around 10,000 years to reach a total population of 1 billion. One hundred fifty years later (1950) the population had doubled to 2 billion. In 2000, the global population stood at 6 billion people, and it is estimated to reach 8 billion by 2025. This exponential population growth and the ensuing industrial and agricultural expansion places an incessant, accelerating demand on our forever-fixed water supply.

- Not only are more people demanding more water, but as standards of living rise and industrialization advances, they are also demanding more of it on a per capita basis. In 1900, the global annual water use per capita was 350 cubic meters per year. In 2000, that number had grown to 633 cubic meters, inclusive of both direct uses as well as the water necessary for the production of agricultural and industrial goods.

- Global water usage increased six-fold during the 20th century, twice the rate of population. In the U.S. alone, water demand tripled in the past thirty years, while population growth has been just 50%.

- To feed the growing population, the world will need 55% more food by 2030. This translates into an increasing demand for irrigation, which already claims nearly 70% of all fresh water currently used on a global basis.

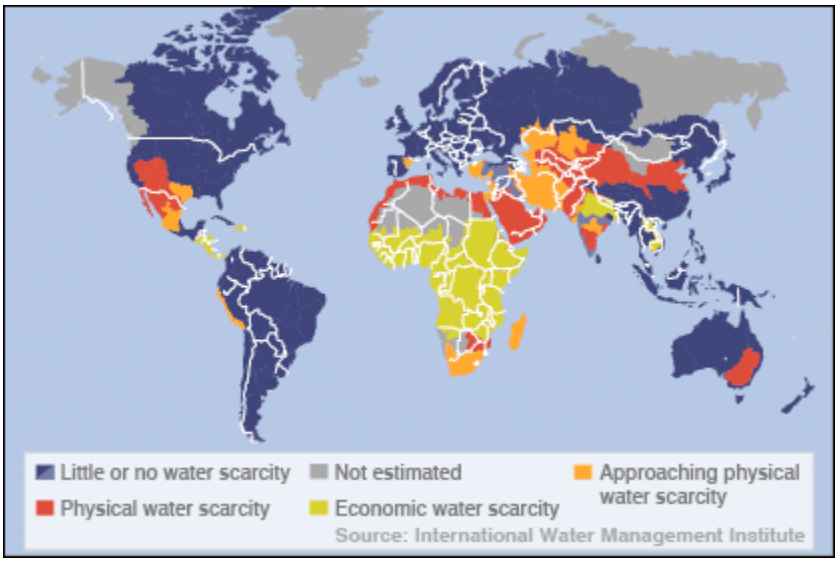
Geographic Imbalance Between Sources and Uses

- Water is not evenly distributed around the globe. Fewer than ten countries possess 60% of the world's available fresh water supply. China, for example, makes up 21% of the world's population, but possesses only 7% of the renewable water resources. Canada is the world's most water-rich country but has a relatively small population, while Africa is a water-stressed continent whose population doubles every 20 years.

- Half of humanity currently lives in towns and cities. This number is increasing as more and more people, particularly in less developed countries, migrate from rural areas into growing urban hubs in search of economic livelihood. By 2030, it is expected that nearly two-thirds of the world's population will live in these broad urban areas and a handful of mega-cities, resulting in dramatically increased water demand on already over-stressed or effectively non-existent infrastructure systems.

- As water resources become more scarce, tensions between competing users may intensify at local, national, and even international levels. Over 260 river basins are shared by two or more countries. In the absence of strong political institutions, pacts and agreements, changes within a basin can lead to trans-boundary tensions. When major projects proceed without regional collaboration, they can become a point of conflict that heightens geopolitical instability.

- Currently, 20% of the world's population (1.1 billion people) does not have reliable access to an improved supply of drinking water and some 2.6 billion do not have access to basic sanitation. By 2025, it is estimated that one-third of the world's population will not have adequate access to drinking water. By 2050, more than 4 billion people, nearly half the world's population, are expected to live in countries that are chronically short of water.



Aging and Insufficient Infrastructure

- Developed countries are struggling to maintain their aging infrastructure at a sustainable rate, while developing countries still need to complete the basic framework for water and wastewater systems.

- In the U.S. alone, the network of drinking water pipes extends almost a million miles – more than four times the length of the National Highway System. This aging infrastructure, much of which is more than 100 years old, has long exceeded its useful life and in many areas is in a state of utter disrepair. In some areas water loss exceeds 50% during distribution because of leakage. The American Water Works Association (AWWA) estimates that domestic water utilities will need to invest $330 billion over the next 20 years to replace aging pipes and treatment plants. New developments, security upgrades, advanced treatment methods, and other needs may raise that bill to $500 billion.

- In order to meet the United Nation's *Millennium Development Goals* – to "halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation" – an enormous investment in water and wastewater infrastructure will be necessary. China alone, in its recent 5-year plan, cited $128 billion in water infrastructure needs.

- To meet expected future needs, total spending on water infrastructure by developing countries must increase by a staggering 140% from the current level of approximately $75 billion annually to around $180 billion annually. $99 billion per year will be required just for the Asia and Pacific region.

- Climate change will likely increase the amount of money necessary for storing and distributing water, and innovative solutions must emerge as the magnitude of these looming expenditures becomes clearer. From underground aquifer recharge in place of expensive surface impoundments, to in-place rehabilitation of existing piping instead of outright replacement – expect more dollars to be spent in more creative ways.

Increasing Regulation and Heightened Awareness

- Key US legislation such as the Clean Water Act and the Safe Drinking Water Act are forging much tougher regulatory standards. Allowable contaminant levels continue to be lowered, and tougher enforcement seems likely under the new Obama administration. These trends contribute to new capital investment requirements and help drive the already strong demand for monitoring and treatment technologies and services.
- Most countries worldwide are moving in the direction of tougher and more complex regulatory regimes with respect to drinking water protection and wastewater treatment requirements, although some are only now beginning to enforce them. It is these regulations which fundamentally drive the day-to-day activities, spending levels, and commercial developments in the water industry.

- Popular media are granting historically high levels of attention to water resource issues, and this coverage will only inflate as the real problems worsen. Heightened public awareness greatly helps spur regulatory reforms, increase spending, and encourage better policymaking at the highest levels.

- The financial and business worlds are also rapidly coming up the learning curve on the economic impact of water. Companies that provide products or services tangential to the core water industry are looking at ways of becoming more involved. Industries whose existence depends on clean water supplies – sectors like semiconductor, food and beverage, and pharmaceutical – are increasingly realizing their true dependence on clean water and the business risks to which they may be exposed. Hence, large corporations are becoming far more involved on both the supply and demand sides of the clean water business, and the financial sector is becoming better-prepared to fund these new needs and opportunities.

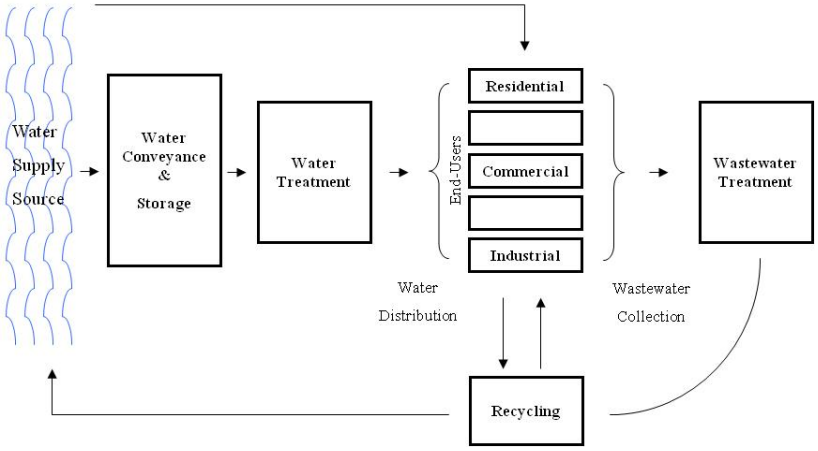
Part II: 2010 Update – Industry Performance and Trends

The Investible Water Equity Universe

The global water industry is enormous, the world's third biggest in terms of embedded capital behind only oil & gas and electrical power. However, it remains ill-defined and poorly understood by the general investing public, when compared to the more traditional and widely-followed sectors of the global economy. In fact, the water "industry" is not properly an industry at all, rather a wide spectrum of companies spanning diverse industrial sectors. A more suitable term is "hydrocommerce", denoting the full continuum of companies involved in the distribution of clean water for economic and social benefit.

Hydrocommerce may be more explicitly characterized as those companies which provide products and services enabling the flow of usable water from (1) initial raw supply sources, through (2) collection and treatment, to (3) distribution among the various types of end-users, and finally through (4) wastewater treatment and disposal (see below). The global market for these products and services is now estimated to be near $500 billion per year.

The water industry comprises companies providing products and services toward the collection, conveyance, treatment, and monitoring/analysis of water and wastewater for residential, commercial, industrial, and agricultural uses.



Summit Global Management monitors a proprietary universe of publicly traded hydrocommerce companies, built and screened over the past three decades and currently numbering 394 names. It is a truly global business, with equities traded on several exchanges around the world. Although the U.S. is the largest single water market – estimated at around $120 billion per year – only about one-quarter of Summit's water universe is U.S.-based.

Investible opportunities are emerging rapidly in other worldwide markets – both developed (Western Europe, Pacific Rim) and rapidly developing (BRIC, Middle East). At the time of our last report in January 2007, Summit's tracked universe numbered just 319 rather than 394 companies. All growth in the interim came from outside the U.S., either through the addition of new companies in existing markets or the inclusion of entirely new, rapidly maturing markets in the group.

Summit Water Universe – August 2009

Regional Breakdown of Water-Themed Companies

Region		Market Cap	# of Companies
Asia & Pacific Rim	$	191,202,852,374	167
Europe & Africa	$	248,469,288,728	96
Latin America & Canada	$	24,914,070,294	29
United States	$	157,966,225,604	102
Total	$	622,552,437,000	394

Data Source: Bloomberg.

Summit's universe does not include such well-known names as General Electric, United Technologies, Dow Chemical, Siemens, BASF, or Mitsubishi Heavy Industries. Although these companies have water divisions (some quite large), they do not represent a significant percentage of their respective companies' revenues and therefore are not material to equity valuation. Nor does the universe include consumer products companies such as Coca-Cola or Nestle, as the impact of their water bottling operations are influenced more by the vagaries of consumer taste and marketing rather than the solid fundamentals of large-scale water distribution.

As described in more detail below, Summit Global Management divides the water investment landscape into two key sectors – (1) the water utilities themselves, which actually provide drinking water and wastewater services to end-users, and (2) the vast array of supporting companies that provide the technologies, services, and products that the utilities need in order to continue operating each and every day.

Water Utilities – The Primary Suppliers

Water utilities are considered an industrial stalwart by the investment community, and rightly so. Water is very much a localized resource, unlike electricity or natural gas that can be widely distributed, so local water provision is one of the world's few true natural monopolies. Their business is simple – to provide an uninterrupted supply of clean water and dependable wastewater services to an ever-growing and never-satiated demographic. But this rather dull business model, plus the fact that water has no economic substitute, has created an enduring industry that is unequaled in long-term performance and relatively unaffected by cyclical market conditions.

This fundamental strength and consistency has historically translated well to the equity performance of publicly traded water utilities. The table at the right compares the performance of U.S water utilities to broader-market indices over five-year periods for the past 19 years, and reveals the steady equity growth of the utilities regardless of wider economic and stock trends. The reason for this is no mystery – when times get tough, we may all cut back on fancy restaurants, new cars, and other discretionary items, but we generally continue to use the same amount of water. We really have no choice. So the utilities generally produce and sell the same amount of water, and thus generate a reliable revenue stream – a revenue stream that, in fact, inevitably grows as the result of periodic regulatory rate increases. It is often said that what financial markets hate most is uncertainty, so this predictability may go long way in explaining the outperformance of water utility equities throughout the years.

U.S. Water Utilities Performance

Comparing Returns of U.S. Water Utility Stocks Against Major U.S. Indices

	5-Year Period Annualized Returns				Total Return
	1989 - 1993†	1993 - 1998	1998 - 2003	2003 - 2008	1989 - 2008†
Water Utility Stocks*	14.78%	18.51%	12.07%	6.36%	796.91%
Dow Jones Indus. Avg	15.44%	22.28%	4.55%	-1.12%	401.17%
S&P 500 Index	14.54%	24.05%	-0.57%	-2.19%	282.92%
Nasdaq Composite Index	15.28%	23.47%	-1.45%	-3.95%	272.45%

Data 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.

Indeed, compared with almost any other industry, water utilities have a more compelling business model in terms of persistent demand and consistent earnings. This, in turn, leads to another hallmark of the water utility business – regular dividend increases. In our opinion these are perhaps the best indicator of the quality and stability of any enterprise, and also underline regularity of the cash-flow generated by these businesses. For example, the largest U.S. investor-owned utility, Aqua America (WTR), has paid a dividend for more than 60 years consecutively and has increased it 19 times in the last 18 years. We believe payments like these are a major contributor the long-term performance of utility equities, and also tend to reduce market volatility for these shares in the meantime.

International Water Utilities Outperform the U.S.

Comparative Global Water Utility Performance: 12/31/03 – 12/31/08 (in USD)

Utility Name	Country	Total Return	Annual Return
SJW CORP	U.S.	126.61%	17.78%
CALIFORNIA WATER SERVICE	U.S.	99.58%	14.82%
AMERICAN STATES WATER	U.S.	52.85%	8.86%
AQUA AMERICA INC	U.S.	38.43%	6.72%
CONNECTICUT WATER SVC	U.S.	1.34%	0.27%
***Average – U.S. Utilities**		**63.76%**	**9.69%**
GUANGDONG INVESTMENT	HONG KONG	129.16%	18.04%
PENNON GROUP PLC	BRITAIN	122.51%	17.35%
CIA SANEAMENTO BASICO	BRAZIL	78.16%	12.24%
SEVERN TRENT PLC	BRITAIN	60.55%	9.93%
AGUAS DE BARCELONA	SPAIN	59.65%	9.81%
Average – Intl. Utilities		**90.00%**	**13.47%**

Data Source: Bloomberg. All returns are with dividends reinvested.
*Top five largest publicly traded U.S. water utility stocks during the periods 12/31/03 – 12/31/08.

Although many non-U.S. water utilities lack comparatively long histories as publicly traded entities, initial evidence suggests investor appetite is strong for the same solid business fundamentals regardless of location (see previous page). However, despite their recent stock outperformance, most non-U.S. utilities still typically trade at much lower P/E levels than their U.S. counterparts. This suggests there may remain room for further equity appreciation among those overseas utilities that can continue posting strong financial results, and the basic principles of supply and demand make this a likely scenario.

Industry observers understand well the stable, non-cyclical operations of water utilities, an aspect which has become obvious during the financial crisis of the past two years. Recently, analyst Ryan Connors of Boenning & Scattergood said: *"In our view, recent estimate revision trends clearly underscore the sector's relative immunity to the deteriorating macro environment. Indeed, over the last six months, as analysts have slashed 2009 estimates for a wide range of companies touching nearly every corner of the economy, earnings expectations for investor-owned water utilities are largely unchanged and in some cases even higher than they were six months ago."*

Water Industrials – Essential Providers of Products, Services, and Solutions

Although water utilities have attractive fundamentals from an investment perspective, they represent only a small portion of the overall water investment theme. Of the Summit-defined hydrocommerce universe of 394 companies, only 12% are water utilities. The vast majority are those enterprises that feed the supply chain for water and wastewater utilities – either (1) basic water industrial stocks: pump, pipe, and valve manufacturers, filtration and treatment companies, testing equipment and instrumentation providers; or (2) service businesses: design-engineering and construction firms, operations, service and maintenance companies, and analytical testing laboratories.

Every water utility, whether owned by a municipality or private investors, must buy the products and services necessary to provide consistent water supplies in a regulatory-compliant manner. By law, they cannot defer maintenance or suspend capital spending due to prevailing economic conditions. Every water utility is hence a steady customer of water industrial companies, so these companies in turn profit from the consistent buying patterns – and share many of the same revenue stability and recession-resistant characteristics of the water utilities themselves.

Since Summit began tracking its water universe some 30 years ago, we have found that companies that sell primarily to water utilities have a much more persistent, predictable, and stable business profile than similar companies who might be selling into more cyclical industries. As a result, these businesses have tended to outperform other industrial sectors with respect to equity growth. The adjacent table demonstrates the returns delivered by 10 of the most prominent water industrial stocks, as compared to other industrial sectors for the past 19 years.

U.S. Water Industrials Performance

Comparing Returns of U.S. Water Industrial Stocks Against U.S. Industrial Sectors

	5-Year Period Annualized Returns				Total Return
	1989 - 1993†	1993 - 1998	1998 - 2003	2003 - 2008	1989 - 2008†
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 Idx	8.53%	35.04%	0.14%	-0.73%	505.55%
S&P 500 Cons Staples Idx	13.39%	24.30%	-0.17%	4.42%	504.29%
S&P 500 Info Tech Index	8.90%	40.65%	-6.32%	-5.77%	315.27%
S&P 500 Industrials Idx	11.65%	19.06%	3.38%	-1.63%	304.60%
S&P 500 Financials Index	12.64%	27.09%	5.91%	-12.48%	265.35%
S&P 500 Utilities Index	10.52%	12.11%	-2.57%	8.28%	245.66%
S&P 500 Cons Discret Idx	14.25%	18.64%	1.50%	-6.19%	213.69%
S&P 500 Materials Index	8.82%	8.38%	7.37%	-1.25%	181.18%

Data Source: Bloomberg. All returns are with dividends reinvested.
*Equally-weighted list from current universe of the 10 largest publicly traded U.S. water industrial stocks in 1989.
†4-year and 19-year periods due to limitations in Bloomberg pricing history.

Put simply, a valve maker selling to water utilities is likely to have a stronger, more enduring business than a valve maker selling to the oil or aircraft industry. There is a pronounced "trickle-down" effect in the water industry, not only with respect to consistency of demand, but also with respect to revenues and resulting equity performance. Many of these industrial companies sell into various end markets, but to the extent that they are more focused on water-related clientele, they tend to have a more consistent and predictable workflow and revenue. Summit is therefore

very careful to include in its hydrocommerce universe only those product and service providers that demonstrate a high degree of "water content" and a commitment to that segment of their business.

Veolia Environment is an excellent case study for the water industrial business, as their extensive global water operations provide an instructive proxy for the entire hydrocommerce sector. In the first quarter of 2009, Veolia's water division revenues were up 8.4% globally, 16.7% in the United States, and 20.0% in China. EBITDA rose across the board. This, in comparison to the lackluster results and troubled prospects of almost every other market sector that has fallen victim to the global economic crisis. Historically such favorable earnings comparisons have tended to cause water stocks to decouple from declining markets and establish an ascent that is well-grounded in solid fundamentals.

Industrial companies also benefit from additional direct purchase orders from other end-users such as agricultural concerns and thermoelectric providers. Given the strong demand drivers outlined earlier, these markets may account for accelerated future growth beyond the industrials' steady if not particularly exciting "razor blade" business with water utilities. In addition, much like the utilities, many segments of the water industrial sector tend to be highly localized and fragmented, offering fertile prospects for the benefits of consolidation. Indeed, by one estimate there were 244 water industry acquisitions worth over $49 billion from 1998 to 2008. Despite these investment characteristics, hydrocommerce industrials have yet to become a widely followed economic market sector and are consequently still under-recognized by the larger names on Wall Street.

Current Trends Shaping Investment Opportunities

The issues below are key drivers to a number of critical trends and developments in the water industry – trends which are shaping the landscape for current and future investment opportunities.

Conservation and Efficiency

More efficient and more sustainable use of our existing water resources is increasingly viewed as essentially a new "source" of water – i.e., reducing demand increases supply. Better conservation and utilization practices are perhaps the best and most immediate opportunities we have to extend the overall availability of water, instead of the huge energy and infrastructure costs inherent in large-scale desalinization or dam projects. Despite increasing attention during the last several years, there are still easy improvements to be made in terms of more efficient conservation, use, and re-use of our water resources.

Several years of significant droughts across the western United States, Australia, and much of Asia have dramatically illustrated just how much water we waste. Conversely, they have also demonstrated how much water we can save, once we are forced to confront the issue. In some regards, droughts may be a good thing – just like $4 gasoline was a good thing – in that they force us to pay attention and get smarter about conservation, re-use, recycling, and allocation.

The area most in need of efficiency improvement is agricultural irrigation. Almost 80% of our total water usage in more arid regions goes to agricultural irrigation, and almost half of our food supply now comes from artificially irrigated lands. More efficient water application, better drainage systems, and increasing use of reclaimed wastewater for agricultural irrigation should all be important policy objectives, and can collectively add-up to constitute an important new "source" of water.

Efficiency measures are the "low-hanging fruit" of our compounding water supply issues, and will be the beneficiary of the most immediate, intelligent investment spending in favor of grand water supply projects. Water companies in the areas of infrastructure rehabilitation, metering, wastewater recycling, and agricultural efficiency should be well-situated to see their business opportunities grow as a result.

Recycling and Re-use

Indirect water "re-use" remains one of the most robust sectors of hydrocommerce, while direct water "recycling" initiatives, from the individual residence to the large municipality or major industrial installation, are rapidly gathering momentum. The distinction between these two terms is critical. *Indirect* re-use of treated wastewater – i.e., after it has been treated, discharged into and then withdrawn again from a river, or pumped into and then back out of an underground aquifer – has been practiced one way or another since

the dawn of civilization. Today, for example, within certain major river systems in the United States, water is used and re-used in this fashion up to 20 times as it travels to the sea – the discharged water from one wastewater treatment plant essentially comprising the raw water intake at a primary drinking water plant a few miles downstream. Indeed, as a result of 40 years of steady progress under the Clean Water Act, the treated effluent from wastewater treatment plants is often cleaner than the supposedly "natural" rivers and streams into which it flows.

What generates considerably more controversy is the *direct* recycling of water – without the intervening and supposedly purifying effect of "nature" and the hydrologic cycle. Although direct recycling of wastewater has been feasible for years, any widespread utilization for household purposes still seems to be a long ways in the future – but this is due to social rather than technological reasons. Putting a "black box" on the outside of a home to treat sewage and recycle it directly back into the tap (often referred to as "toilet to tap" in the popular media) is clearly suspicious and unacceptable to most people. Scare stories in the press tend to reinforce this reticence, even though from a technological perspective it is fairly straightforward to recycle wastewater to drinking water standards. Today, such methods are only commercially practiced in very few, very arid locations around the world, but it can be confidently projected that direct recycling will increase in the future out of sheer necessity.

There is one critical statistic to consider when evaluating the potential impact of recycling as a means of extending our water resources, a factor which will eventually make direct measures much more feasible on a wide scale. *Only a tiny percentage of our primary water supply is actually used for drinking.* Out of the roughly 130 gallons of water per capita per day that the United States currently treats to drinking water standards, most individuals drink less than a gallon a day. Even if we also consider the proportion of our water that we cook and clean with – which we might also wish to be treated to high quality standards – it is still a small percentage of our total water consumption. The lion's share is used for flushing toilets, watering lawns, washing cars, etc. – applications where the water does not really need to be treated to highly exacting drinking water standards. In other words, much of our current consumption could be recovered and treated for a variety of other secondary uses *without anyone ever having to drink directly "recycled" wastewater*. Hence, even if only incremental gains could be made in terms of *non-potable* water re-use, overall water availability concerns could be substantially impacted.

Residential Water Consumption

As the general public has become more aware and concerned about water, individual consumer preferences and demands are becoming more significant factors in the business. The most critical consideration here is the growing concern among consumers, particularly the more affluent, that ordinary tap water may not be that safe to drink. Remarkably, the Metropolitan Water District of Southern California reported several years ago that almost *two-thirds* of its customers no longer thought it advisable to drink the water coming out of their taps. Primarily because utilities have not effectively marketed the true value of their product – and partly because *real* quality problems do occasionally occur – many consumers now believe they need to either buy bottled water or further treat the tap water coming into their homes. Right or wrong, this is a key driver behind several important trends in the water business.

The tap water quality issue is becoming a great controversy between the water utility industry – the 55,000 agencies providing drinking water, most of which are municipally or government-owned – and the residential treatment companies. The former group suggests that public tap water is truly one of the great economic bargains of all time. The latter group – which includes POE/POU (point of entry/point of use) equipment manufacturers as well as bottled water suppliers – cautions that the only way you can *really* ever be sure your water is safe is to treat it within the confines of your own home or drink it out of a pre-packaged bottle. Although the ultimate outcome of this debate is still in question, the shorter-term effect has clearly been to strengthen the markets both for bottled water and for POE/POU home treatment products. In addition, new markets are beginning to emerge in areas such as residential water monitoring and testing services.

Technological Solutions

Incremental technological advance is ubiquitous across the water industry. Thousands of technology developers are actively working on developing and commercializing better "mousetraps," and there is a steady march of innovation in many different sectors. Perhaps the most significant and well-known example is the improved efficiency of reverse osmosis, one of the primary technologies behind seawater desalination and water/wastewater recycling. The rapidly declining cost and increasing efficiency of reverse osmosis, despite its high energy costs, has made membrane treatment of raw water and desalination of seawater economically feasible in many parts of the world today where it would not have been just decades ago. Likewise, rapid advances in water testing and analysis are helping us become more efficient in our water usage, but are also exposing new problems which we must find new ways of dealing with.

A look at the agenda for any water technology conference quickly suggests the breadth of technological approaches being applied to water treatment. Beyond the more widely known techniques such as membrane filtration, UV radiation, chlorination, ion exchange, chemical treatment, flocculation and settling, there is a bewildering array of newer and developing technologies – such things as electro-coagulation, sonication, cavitation, demineralization, ozonation, electro-deionization, biocidal disinfection, electrodialysis reversal, multi-stage bubble aeration, and various alternative chemical treatments. All manner of new nanotechnology treatment businesses have been developed and financed over the past few years.

Innovations are occurring not just in terms of new equipment and better hardware, but also in terms of improved approaches, systems, and the enhanced application and combination of existing technologies. For example, we are seeing consistent advances in the application of existing agricultural irrigation technologies – an end-use where small percentage gains can free up massive new "sources" of water for alternative municipal or industrial uses, particularly in arid regions. Historical irrigation practices have been notoriously inefficient – for example, simple flooding is often employed when far less moisture is sufficient to sustain the crop. Advances in soil moisture monitoring, remotely controlled center pivot systems, and the application of reduced water flows at the optimal times of day are all contributing to more efficient irrigation.

The application of all of these improving technologies can help solve many of the world's water problems and challenges. But the real solution to the problem in many areas, particularly around the less developed parts of the world, is not technology as much as it is money. Indeed, many observers of the global water crisis believe that simpler and "lower tech" approaches – sand filtration or enhanced natural wetland treatment, rather than much more expensive reverse osmosis and the like – will for many applications be more logical, easier to implement, and cheaper.

There is an old adage: "what you cannot measure, you cannot manage." This certainly applies to today's complex water industry, as the ability to monitor and track – and more importantly, to understand the implications of – the physical and chemical composition of water is becoming more and more important. Our water treatment, storage and distribution infrastructure increasingly depends upon a plethora of monitoring data and analytical information in order to function efficiently. As a more savvy public demands better information about their drinking water, as more comprehensive regulatory controls evolve, and as new contaminant effects and the potential for harmful interactions are better understood, it seems certain that testing and monitoring requirements will only continue to grow – making this sector of the business an attractive investment opportunity.

Consolidation in the Public Sector

A drawback of the water utility sector, from an investor's perspective, is that there are few publicly traded companies in which to invest. In the U.S., almost 90% of the population is served by municipally-owned and operated utility districts or government agencies, as opposed to private or investor-owned entities. There are only 11 remaining publicly traded water utilities in the country. The relative percentage of private utility ownership is higher in many other countries – particularly France, the United Kingdom, and other western European countries.

Discussions about industry consolidation usually occurs within the context of the private sector – private companies merging with or buying each other in the commercial sector of the business. However, with the efficiencies and economies of scale that benefit larger water and wastewater operations, it seems

increasingly possible, indeed necessary, that consolidation within the municipal utility business will begin to occur as well. As observers are increasingly pointing out, it just makes too much sense for it *not* to happen.

Water and wastewater treatment are both very capital-intensive businesses, and there is no doubt that scale can convey distinct operating, technical, and financial advantages. Yet, the municipal side of the business is primarily made up of very small local players – almost 85% of all municipal drinking water systems serve less than 3,300 people. As regulatory requirements continue to pile up, and as the business becomes more technologically complex and expensive to run, it seems logical that some of these smaller utility operations would find a way to combine forces and take advantage of potential scale efficiencies.

Trying to combine or "merge" municipally or governmentally-owned systems is difficult financially, and is obviously fraught with a whole range of sensitive political and fiscal challenges. Nonetheless, many industry observers believe that we must figure out some politically workable and acceptable means of consolidating small and local water municipal utilities. The alternative, they say, will simply be increasing non-compliance with key regulations as these small utilities will no longer be able to keep up in an increasingly complex business environment.

Privatization and Outsourcing

The privatization, outsourcing, and employment of private capital in public water projects remains a very controversial set of issues. Any discussion at the local level involving private sector involvement in water provision can be potentially and sometimes shockingly divisive. The current lingo of "public-private partnerships" must truly become the operating philosophy in order for any such ventures to be successful – but even this approach is subject to great controversy.

In the United States, just more than 10% of the population is provided water by private organizations of one sort or another – publicly owned systems that are either *operated* by private contractors or systems that are actually *owned* by private companies. Privatization of water systems began to spread in the early 1990s, but the highly publicized misfortunes of several high-visibility privatization projects – notably the experiences of United Water in Atlanta – combined with an active and growing opposition movement, have forced a reassessment. As might be expected, the popular press tends to put a negative slant on this issue.

In many parts of the world, the private operation of drinking water systems is taken for granted, and in fact is the operational norm. The French, and more recently the British, are the world's major players in terms of private water management and operation. More than 45% of the population in Western Europe is now served by private operators, with rapid growth occurring in the Mediterranean and North African regions. It seems quite ironic that the United States, which many like to consider the home of free enterprise and democratic capitalism, has such a resistance to private water systems, while in European countries that are portrayed as marginally socialist, private water systems are common and widely accepted.

An early driver of the water privatization movement was the desire to improve productivity and efficiency in municipal agencies – organizations that are sometimes viewed as bloated and sleepy. It is worth noting that, after a decade or more living under the "threat" of privatization, many public agencies and utilities have made substantial progress in terms of undertaking needed productivity improvements and cost reductions. One way or another, water and wastewater agencies are gradually becoming more competitive and efficient.

Despite the concerns of labor organizations and various public interest groups, the urgency of infrastructure needs and the political difficulties of increasing taxes or fees make it likely that privatization – under various names – will become a more important factor in the water business. The British publication *Global Water Intelligence* reports that about 10% of the world's population is currently served by private operators, a figure that is expected to grow to 16% by 2015. Although the growth rate of outsourcing has slowed a bit over the last few years, the fundamental drivers behind privatization and consolidation – huge capital needs, technological and operational synergies, limited public funds, and a widespread aversion to higher taxation – remain strong. At the same time, it is clear that private operators are going to be judged by a very demanding and critical public.

Stimulus Spending

Despite estimates that the United States will need to invest as much as $500 billion over the next 20 years to repair and upgrade its aging and dilapidated water infrastructure, various government stimulus packages, including the $787 billion American Recovery and Reinvestment Act, have earmarked at most just $10 billion for various water projects. While this spending will provide a discernible benefit to various hydrocommerce businesses over the short term, it obviously falls woefully short of addressing the true scope of the water-related issues facing many American cities.

If, as has been lately reported, President Obama approves a second round of stimulus spending in 2010, we can only hope significantly more money will be allocated to this most vital of American industries. Besides the clear advantages imparted to the public welfare, Scott Paul of the Alliance for American Manufacturing estimates that 19,759 jobs are created for every $1 billion invested in water infrastructure – representing the biggest bang-for-the-buck in terms of job creation out of any of the spending initiatives contemplated yet.

In the meantime, water investors can take solace in the fact that they should be well protected against one of the most likely effects of massive government spending – inflation. A recent UBS Investment Research report stated that they *"have consistently seen supply-demand issues surrounding both food and water as potential long-term inflationary functions… The conclusion of this is that drinking water will likely come with an increasing price tag in the future. At some stage we would argue that explicit inclusion in CPI indices could be the norm."*

Virtual Water in Agriculture

Emerging hand-in-hand with the deepening water crises is an increased focus on the concept of "virtual" water – a measure of the water necessary to produce a given commodity or product. Although we rarely think about it, nearly every physical good traded in global economic commerce requires some amount of water in its production: 1300 liters to grow one kilogram of wheat, 15,000 liters for the feed and processing that goes into one kilogram of beef, 400,000 liters for the production of a typical passenger car, etc.

As we have noted, the provision of water and wastewater services to human populations centers is one of the world's biggest businesses, but even this undertaking is referred to as "small" water as compared to the "big" water users from agriculture and industry. Indeed, agriculture accounts for 70% of all water use globally and up to 95% in several developing countries, making it by far the single most important variable in the water supply/demand equation.

As a result, unfortunately, unchecked population growth and improving global diets put double the pressure on tight water supplies, through both direct uses as well as indirect use in agricultural production. According to the United Nations, by 2020 water use will need to increase by 40% to support the food requirements of a worldwide population that will grow from 6.7 billion people to 7.5 billion people. Adding to the problem, most population growth is occurring in exactly those regions with the most precarious water resources – China alone has 21% of the world's population but only 7% of the renewable water resources, for a per capita reserve of only ¼ the global average.

New water-use paradigms will need to emerge to address the twin threats of exponential demand and dislocated supplies. In fact, we have already started to alter our behavior, however unintentionally, via a global trade in virtual water – the movement of commodities from water-rich to water-scarce regions now represents more than 300 cubic km of water per year, or almost 5% of the water used in global agricultural production annually. Put simply, China cannot import water directly from Canada, so they import Saskatchewan wheat instead. Plenty of investment opportunities await those who are able to position themselves at the crossroads of the virtual water trade, particularly in China, India, and other populous Asian nations that are relentlessly converting farmland to industrial uses and depend on shrinking Himalayan glaciers, depleted aquifers, and grossly polluted waterways for their irrigation needs.

But this virtual trade alone will not be enough to deal with the stark ramifications of the water crisis. The United States, for instance, was still a net water exporter in 2008 by virtue of exporting $115 billion of agricultural products while importing only $80 billion, but this balance is expected to permanently tip the other direction in the near future. There simply is not enough arable land and untapped water supplies to

continue this game of global musical chairs indefinitely. We will also need to squeeze "more crop per drop" from our available resources, which means plenty of investment dollars allocated to areas such as irrigation technology, fertilizer, and bio-engineering.

Regardless of these efforts, the ultimate solution to our looming agricultural needs will likely involve the introduction of common-sense pricing mechanisms for our water use. Today, government subsidies and counter-productive water laws encourage wasteful irrigation practices – California farmers, for example, are perversely incentivized to grow thirsty crops such as cotton and rice in an unsuitably arid climate in order to avoid losing their allocation of cheap water through non-use. Rational pricing of water, reflecting its increasing value in alternatives to agriculture, may lead to higher costs at the supermarket but would also ensure we are utilizing our most essential resource as efficiently and productively as possible. Physical, as opposed to virtual, water markets such as we now see in the Murray Darling basin of Australia may begin to emerge in other arid regions over the long-term to address this concern.

The Water/Energy Nexus

A July 2009 study done by the U.S. General Accounting Office (GAO) confirmed what water industry veterans have long known: "water and energy are inexorably linked, mutually dependant, and each affects the other's availability. Energy is needed to pump, treat, and transport water, and large quantities of water are needed to support the development of energy." After closely examining the interdependence of water and energy in the areas of biofuel production, thermoelectric power, and oil shale extraction, the GAO concluded (with typical understatement) that the task of ensuring adequate supplies of both resources in the next century will be "particularly difficult." The serious investor in either water or energy, particularly those involved in the emerging "clean-tech" field, would therefore be well-advised to be acutely aware of the potential domino effect that developments in either industry will have on the other.

On the water supply side of the equation, the American Council for an Energy-Efficient Economy estimates that water and wastewater treatment facilities account for 35% of energy used in municipalities, at a cost of $6.5 billion per year. If, as anticipated, the cost of energy production increases as the result of rising input costs and "green" policy initiatives, so too will the costs of water/wastewater provision. Seawater desalinization, seen by many as the silver bullet to our growing water supply problems, uses an estimated 5 to 26 times the amount of energy as traditional water processing, as of now making it a viable large-scale solution for only exceptionally arid and energy-rich regions such as the Middle East. Investments in areas such as of energy recovery technology and localized water recycling are more rational medium-term solutions, barring the sudden emergence of a game-changing energy source.

The metrics on the energy supply side of the equation are even more eye-popping. Thermoelectric power plants, which require large quantities of water for cooling and steam-driven turbines, account for 39% of total U.S. freshwater withdrawals (though much of that is not consumed to extinction, rather put back into river systems after use). The National Energy Policy Development Group reports that at least one new plant will need to be constructed each week for the next 25 years to keep up with anticipated electricity demand – and adequate water supplies will be needed for every one of them.

Renewable biofuels, a centerpiece to the U.S. Department of Energy's plans for energy independence, are likewise completely dependent upon water supplies that simply do not exist at this point. According to the California Water Education Foundation, California's goal of producing 1 billion gallons of ethanol per year will require 2.5 trillion gallons of water – more than all the water from the Sacramento River Delta that currently goes to Southern California and Central Valley farmers combined. This, in a state which is already facing severe droughts and consumer water rationing. The outlook for U.S. oil shale production, another DOE pet project, is equally bleak. As much as 378,000 acre-feet of water could be required annually to support oil shale development in Colorado, more than the Denver Metro area uses each year.

The water/energy nexus has an even more powerful stranglehold on future economic development in other parts of the world – the long-term growth of populous, quickly industrializing areas such as India and China is utterly dependent upon a effective resolution to the dilemma. But despite the clear interconnectedness, the energy and water sectors rarely coordinate action. This will necessarily change, and investable opportunities will emerge as a result.

A Surge of Investment Interest

As the widespread recognition of water problems has increased, hundreds of strategic and financial buyers have swarmed into the water industry in an attempt to establish a foot-hold. First and foremost, this has included a large array of industrial consolidators and strategic buyers looking to expand existing water businesses, or to establish a platform in an industry which they believe is certain to show long-term growth.

Despite the economic uncertainties of the past year, the total amount of capital sitting in private equity funds remains near its all-time peak, so PE managers still find themselves with huge amounts of capital that they need to invest quickly. As other popular investment opportunities have faded, the enduring economics of hydrocommerce have been the catalyst for a head-long rush by private equity into the water equipment industry over the past several years. Venture-type investments in smaller and newer start-up companies have also been widespread.

Although the market for initial public offerings has not been as active as one might expect over the past few years, there have been a few new water companies coming on to the public markets. Recent IPOs have included American Water Works (the largest investor-owned utility in the U.S., which was publicly traded prior to its acquisition several years ago by RWE), Cascal Inc., Energy Recovery, Inc., Heckmann Corporation, and Polypore. In addition, several existing public companies successfully completed secondary stock offerings, including PureCycle, Layne Christenson, and Clean Harbors. Finally, there were also numerous private financial placements and underwritings in companies such as Miox, Purfresh, NanoH2O, and Seven Seas.

The global economic crisis will undoubtedly impact the volume and rate of investment going into hydrocommerce in the near term. But the investment side of the industry has certainly evolved over the last 25 years, and the changes are virtually all positive. Given the compelling, recession-resistant business model, combined with the urgency of water challenges across the globe, Summit believes that the outlook for water stocks today is much better than it was 25 years ago, or even 5 years ago. Hydrocommerce will undoubtedly remain one of the world's most vital industries, and will continue to offer some of the best risk/reward characteristics to the intelligent long-term investor.