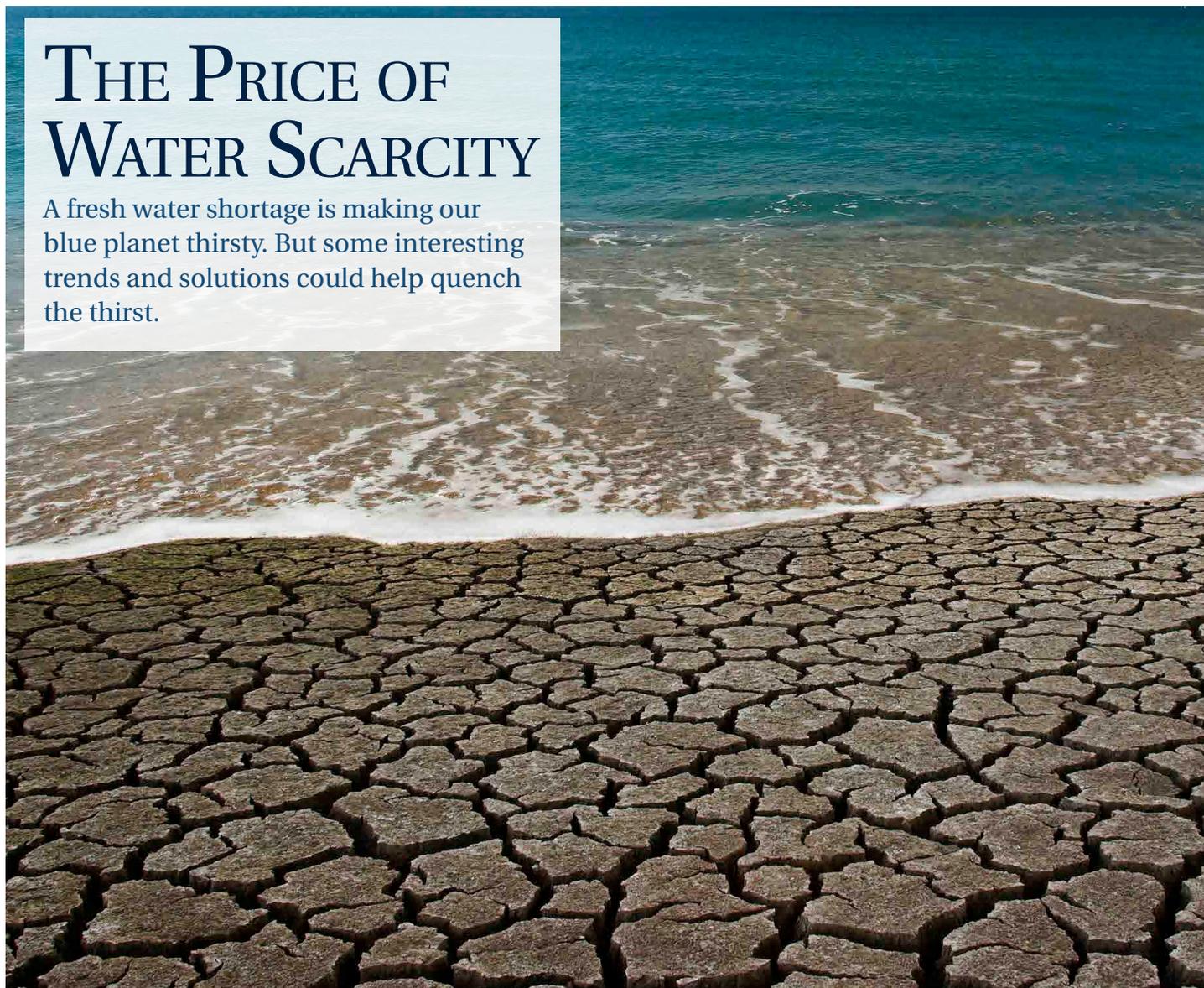


# GLOBAL INSIGHT

## SPECIAL REPORT

### THE PRICE OF WATER SCARCITY

A fresh water shortage is making our blue planet thirsty. But some interesting trends and solutions could help quench the thirst.



All values in U.S. dollars and priced as of May 22, 2015, market close, EST, unless otherwise noted.  
For Important and Required Non-U.S. Analyst Disclosures, see page 15.



RBC Wealth Management



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# THE PRICE OF WATER SCARCITY

## An Interview with Deane Dray

The fresh water crisis touches our entire blue planet. From drought in California to the unavailability of clean, secure fresh water in many developing regions, urgent water issues are spilling over. But while this is a global crisis, it is critical to approach solutions locally. In our new special report we look at this fragile resource and how investors should approach water trends.

**R**BC Capital Markets, LLC Equity Research Analyst Deane Dray brings a unique insight to the complex issues around fresh water. In 20 years as a capital markets industrial sector analyst, he has consistently ranked among the best of peers in terms of stock selection and earnings forecasting accuracy. In that pursuit, he has developed an understanding of and commitment to water issues that transcends investing. Deane has put his skills and values into action serving on the Advisory Board to the United Nations Environment Programme Finance Initiative on water issues. He is a member of the American Water Works Association and has presented to water sector symposiums at the United Nations, World Bank in Washington, D.C., and numerous World Water Week conferences in Stockholm. For many years, he has hosted investor conferences in New York and London. Deane graduated with honors from Brown University and received an M.B.A. from New York University.

We are pleased to share Deane's insights on the subject of water in the following interview.

**Q. Deane, your deep understanding of current and emerging industrial technologies as well as end markets has encouraged many world organizations to tap your expertise as they search for good solutions to what appear to be a mounting set of urgent problems. While the California drought has captured headlines in the U.S., there are even more challenging concerns elsewhere in the world. Water is a renewable resource, but there seem to be many issues at play.**

**A.** Of course. Many water issues center around conservation, reuse, and new sources of fresh water. Fresh water, including glacial packs, is only placed at 2.5% of total global water. And within this, fresh water lakes and rivers are estimated to represent only 0.3% of total fresh water. We essentially have the same amount of water on earth that we had a billion years ago. The problem gets bigger because in so many parts of the world, fresh water needs do not line up with availability. We will touch on several areas of Asia and North America that highlight the issues that are increasingly faced through much of both the developing and developed world. While California's challenges are currently highlighted, the analysis is applicable to so many regions of the world where water scarcity is a growing issue.

## Q. Could you give some perspective on California's water issues?

**A.** We have all seen this crisis unfolding with California residents now in their fourth year of a drought. You are starting to see some politicians making change. Governor Jerry Brown very recently called for domestic water restrictions cutting domestic use by 25%. This brings focus to what the best remedies are for the shortage. More focus is good.

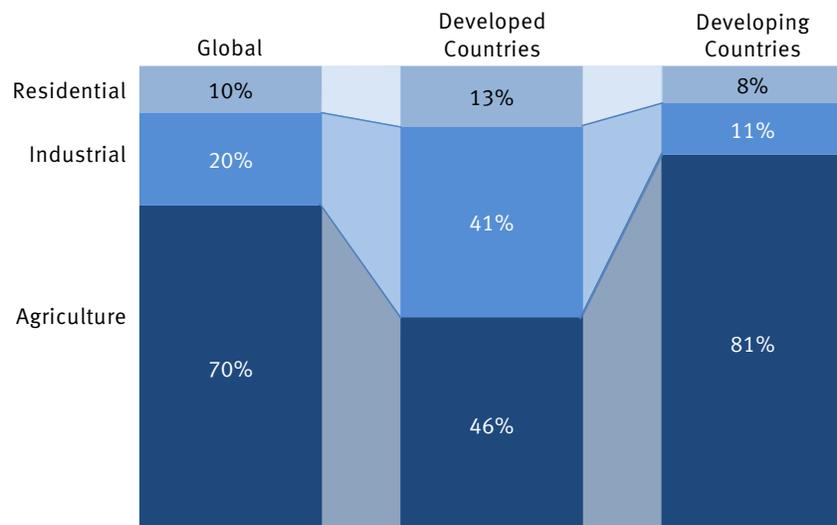
The whole California situation is so representative of the global water picture. We talk globally in terms of a water sector and water issues, but at the end of the day, water is always a very local issue. There are unique situations in California that make this especially tough.

Here you have California, one of the richest states in the union with some of the most populated regions—23 million people living just in Southern California. There are legal jurisdictions pertaining to water rights unique to California as to who actually owns the water. I'll start with the fact that the state gets the majority of its water from the Colorado River. West of the Mississippi River, everything is dictated by water rights; that is the first issue. The Colorado River is jointly owned by seven states. That's different from east of the Mississippi where water is considered a public good with riparian water rights determining how water is allocated.

As a second issue, there is the California farmer. In the northern region, this group consumes 80% of all water used within the state. I find the lack of thought over really efficient use of water in agriculture discouraging. The state allows big acreage devoted to growing water intensive crops like rice. Globally, water dedicated to agriculture is 70%. In developed markets such as Europe and the balance of the U.S., Ag use is typically much lower—around 45%. California's water use for agriculture is just out of scale.

Rice is among the most water-dependent crops because you're flooding fields with water. The fact that you are capable of flooding fields doesn't mean that you should do it. The state legislature has to take a hard look at optimization and

Global Profiles of Water Demand



Source - United Nations

addressing where the limits of water rights might be challenged. Climate change and longer-term climate cycles—about which there is a lot of debate—figure in these considerations. But with the state now in a fourth year of drought and with low snowfall in the important snowpack regions, resource use decisions need to be made. This means finding a balance between the water rights of a few thousand farmers and 23 million people in Southern California.

## Q. Are there potential solutions?

**A.** Let's hit three—conservation, reuse, and desalination.

Conservation is the right initial focus, but bear in mind consumer/household use of water represents only 14% of state demand—small compared with farmers. The current strategy makes consumers pay a big relative price. I applaud any conservation efforts because consuming less extends the resource.

Reuse is a second long-term objective; it is just in its earliest stages in the U.S. There is a “yuck factor” in play. People just seem to get very squeamish about reusing what was once waste water. Many municipalities in California actually have rules against it. Once water is treated at a waste water plant, it's either pumped into the ground, dumped into a river, or pumped into the ocean.

The mentality that treated water should just be dumped back into the environment really needs to change. And some smaller California communities are beginning to embrace water reuse, one of the cheapest sources of new water supply.

### Our Top 10 Trends to Watch in Water

Top Trends	Key Companies Levered to Trends
Desalination Systems	IDE Technologies, Hyflux, Suez, Veolia, Doosan Heavy, Pentair, Energy Recovery, Flowserve, SPX, Abengoa
Water Reuse	Pall, Ecolab, GE, Evoqua Water Technologies, Pentair, Hyflux
Produced Water / Fracking	Nuverra Environmental, Oasys Water, Key Energy Services, Basic Energy Services, Complete Product Services
Membranes Displacing Chemicals	Dow FilmTec, Pall, Pentair, 3M, Koch, GE, Evoqua Water Technologies, Toray
California Water Crisis Beneficiaries	Xylem, Pentair, Pall, GE, Roper
Ballast Water Treatment	Danaher, Calgon Carbon, N.E.I. Treatment, Evoqua Water Technologies, Xylem
Forward Osmosis	Modern Water, Oasys Water, Hydration Technology Innovations, QuantumSphere
Chinese Competitors in Water	Nanfeng Pump, Shanghai Industrial, Beijing Capital, Beijing Enterprises Water, China Everbright, China Water Affairs, Chongqing Water, Guangdong, Sound Global, Tianjin Capital, Sincor
Water Efficiency Products	Roper, Badger Meter, Itron, Danaher, Aegion Corp, Geberit, Falcon Waterfree Technologies, SPX, IDEX
Smart Water Networks	Xylem, Pentair, Danaher, IBM, Cisco

Source - RBC Capital Markets, Company reports

Desalination is a relatively mature technology and there are more than 17,000 desal plants operating in the world. These are the systems take the salt out of seawater to make fresh water for consumer and commercial purposes. Technology

People pay a multiple for their phone and cable bills of what they pay for water.

improvements have made membranes used in the desalination process even more efficient. A large desalination plant is finally being built in Carlsbad, California, which could make the city drought-proof. There are another 15–17 desalination plants being planned in California. These facilities could go a long way to reduce drought impact for the state. Environmental concerns have slowed approvals. Sensitivity to placement of water intakes and remnant brine outflows have been factors. While the policy process is slow, large-scale potential is in sight.

So, water allocation imbalances and slow action on these three sources for new water supply leave the state putting pressure on the 14% represented by domestic use. This takes us to financing water. You would think supply and demand would be at play with this restricted and limited water resource. With growing demand, wouldn't you expect to see an increased price for water?

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### **Q. I assume that we are going to be disappointed.**

**A.** Yes. There are federal, state, and municipal water price schedules and a large government subsidy that goes in to water pricing. Frankly, people pay a multiple for their phone and cable bills of what they pay for water. I saw recently that the average monthly water bill for a residence in Long Beach, California, is less than \$50. On average, California residents pay about one-fifth the price for water paid in Switzerland and one-seventh the amount paid in Denmark. These countries have a heck of a lot more water available per person than California has. What is the incentive to conserve when this is such an underpriced commodity?

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### **Q. What are the broader implications here?**

**A.** Treated water needs to be subject to tighter controls with respect to water tests and test parameters. The system integrity requires more assurances that water is indeed being treated and tested to appropriate standards. A first requirement is membranes. Only a small percentage of water treatment plants in the U.S. actually use treatment where water is filtered through these porous membranes. It's really high engineering content for these big membranes.

A second technology is testing; there will likely be more and better testing to confirm that treated water meets specifications. Public confidence is critical.

Another set of technologies revolves around desalination. As this market expands, opportunities will expand for manufacturers of high-pressure pumps, valves, controls, and membranes that define these plants. As more plants are built, greater demand for the technology-rich equipment follows.

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### **Q. How do you approach the water theme as an investor?**

**A.** Investors frequently ask me how to invest in the water sector. It may be a bit startling to them, but I respond that there is no such thing as a water sector. And I let that thought sink in for a moment. Then I explain that the water sector is really an aggregate of at least 15 different end-markets that address either component products or services related to water in some way. The reality is that there's a separate water market related to pumps, valves, control systems, water tests, meters, water utilities, and then you can talk about desalination and irrigation as separate markets.

# The Price of Water Scarcity

We think investors should be focusing on areas that are higher up the technology scale.

Market Composition of the Water Sector by Key Subsectors

Water Subsector	Mkt Value (\$B)	Growth	Subsector Profiles
Pumps	\$34	+LSD	The pump market is mature, but fragmented, and together with Valves plays an integral role in flow control.
Valves	\$45	+LSD	Used to control direction, pressure, and rate of flow. Valve size, shape, and performance dependent on use.
Water Test	\$7	4%–6%	Includes analytical systems, instrumentation, and reagents used for water quality and safety analysis.
Water & Wastewater Treatment	\$165	+MSD	This market involves the treatment of water throughout its cycle.
Industrial Water Treatment	\$65	5%–6%	Treating industrial wastewater helps prevent corrosion, contamination, and buildup of harmful deposits.
Residential Water Treatment	\$12	+MSD–HSD	Treated water reduces harmful contaminants prior to consumption, and protects home plumbing/appliances.
Produced Water	\$8	+MSD	This market is driven by expansion of land-based natural gas drilling and hydraulic fracturing.
Filtration	\$28	+LSD	Includes a diverse set of equipment and consumables. This market is driven mainly by product innovation.
Ballast Water	\$5	+20%	Process of stopping/limiting the introduction/spread of aquatic nuisance species through discharged ballast water.
Infrastructure	\$45	+LSD	This market is made up of a wide collection of water systems and equipment used to maintain, build, or repair.
Automation Systems	\$10	+MSD–HSD	Strict water quality standards and rising operating costs are key growth drivers for process control equipment.
Water Meters	\$3	+MSD	The U.S. market is dominated by a handful of leaders in metering; next battleground is smart metering networks.
Desalination	\$10	+10%	Desalination removes salt from seawater as a source of fresh water supply.
Engineering & Consulting	\$20	+MSD	E&C captures various services across the water spectrum including wastewater, desalination, and water reuse.
Irrigation	\$8	+MSD	Food prices, federal subsidies and conservation are key drivers, potentially offset by soft nonresi construction.
<b>Global Water Sector</b>	<b>\$450</b>	<b>4%–6%</b>	

Note: LSD is low-single-digit; MSD is mid-single-digit; HSD is high-single-digit.  
 Our estimated \$450B Global Water Sector size excludes overlap between the Filtration and Residential Water Treatment Markets  
 Source - RBC Capital Markets estimates

If we aggregate these products and services, you start getting to a number of \$450B in annual product and services revenue that comprise a global water sector. Hearing this and recognizing the potential for future growth, people quickly conclude that they need to seek out investments in the sector.

We are always cautioning investors to be mindful that owning a water-related company doesn't necessarily make for a good investment. You need to understand exactly how it fits into the water continuum. We steer people away from thinking about this as a big, homogeneous water market because it is not. We think investors should be focusing on areas that are higher up the technology scale. Frankly, we're not that interested in low-tech, commodity businesses-like pipes—they're perhaps the most obvious example of the lowest portion of water products on a technology scale. That really is just plumbing. At the higher end is the engineering and knowhow that goes into building a desalination plant or the technology that is integrated into

# The Price of Water Scarcity

water test measurement where contaminants are measured in a sensitivity of parts per trillion. That's where you get differentiated businesses. Pardon the pun, but you look for moats that can defend a business in the form of technology, patents, and differentiated knowhow in water treatment. The investment theme is not broad; rather the focus is always on the higher end of water technology. This includes membrane filtration including nanofiltration, pressure vessels that drive the system, and ultraviolet (UV) filtration. UV can be thought of as disinfecting water by putting it over a tanning bed. It provides an alternative to using chlorine. You will also see a number of products that use real-time sensors to fine-tune water treatment equipment—another offshoot of the “Internet of Things.”

## Key Players in the Water Sector Today

Water Technology	Key Companies	RBC Capital Markets Comments
Desalination	Hyflux (600.SI) IDE (private)	84% of sales in China and Middle East Global builder of desal plants; based in Israel
UV	Danaher (DHR) Xylem (XYL) Calgon Carbon (CCC)	Trojan is No. 1 in ultraviolet (UV) disinfection systems WEDECO UV disinfection is No. 2 No. 3 player with UV disinfection and oxidation systems
Filtration	Pall (PLL) Pentair (PNR) Dow (DOW)	Last independent filtration company Acquired CPT, advanced material science and manufacturing Dow's Filmtec is a leader in RO filtration
Test	Danaher (DHR) Xylem (XYL) Thermo (TMO)	No. 1 in worldwide test, 5x larger than No. 2 competitor Market consolidator in field, lab, and hydrology Leader in niche ion chromatography
Service	Suez (SZE) Veolia (VE)	Two largest competitors with wide global reach
Produced Water / Fracking	Nuverra Environmental (NES) Oasys Water (private)	Early-mover advantage in delivering/treating "fracking" water
Industrial Water Treatment	Ecolab (ECL) General Electric (GE) Danaher (DHR)	Acquired No. 1 market share Nalco in 2011 No. 2 in industrial and institutional markets Built out industrial water treatment w/ ChemTreat acquisition
Residential	Pentair (PNR) Watts (WTS) Mueller Water (MWA)	80% interest in residential joint venture with GE Water quality, conservation, and flow control products Water metering and measurement products for resi/comm
Meters	Roper (ROP) Badger Meter (BMI)	Neptune has estimated 36% share of U.S. market Roughly 25% share, but larger portion of total sales
Water Utilities	American Water Works (AWK) Aqua America (WTR)	Largest public U.S. water utility; serves 15 million people 200 acqs. in past 10 years; now serves 3 million people
Automation	Emerson (EMR) Rockwell (ROK) Honeywell (HON) ABB (ABB)	Leaders in process systems automation for water utilities
Water Rights	PICO Holdings, Inc. (PICO) Pure Cycle Corp (PCYO)	Owns ground water rights throughout Southwest U.S. Owns rights to water around Denver, CO
Irrigation	Valmont (VMI) Lindsey (LNN)	Global leader in mechanized irrigation systems Self-propelled center pivot and lateral move irrigation sys
Valves	Pentair (PNR)	Water and environmental systems
Pumps	Xylem (XYL) Flowserve (FLS) Pentair (PNR)	No. 1 worldwide, particularly strong in municipal No. 2 worldwide Supplier of large-scale muni pumps
E&C	Tetra Tech (TTEK) MWH Global (private)	Expertise in water infrastructure
Pipes	Mueller Water (MWA) Aegion (AEGN) Advanced Drainage (WMS)	Leader in transmission/distribution of drinking/waste water Leader in cured-in place pipe and pipeline system rehab Supplier of pipes and water management products

Source - RBC Capital Markets, Company reports

The example that everyone should look at is the technology and service integration that Singapore has done.

Sensors drive cost efficiency. Aeration blowers represent the second-largest cost component of a treatment plant because of electricity usage. Sensors measure oxygen content in the processed water so aeration is not overused. Smart water meters represent another excellent example of technology driving cost efficiency.

## **Q. Can you point to some water management successes?**

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**A.** By far, the example that everyone should look at is the technology and service integration that Singapore has done. The city defines the big global trend toward urbanization and population growth in coastal cities. These coastal cities are typically in water-stressed regions. Part of the work that I've done with the United Nations focuses on these trends. In Singapore, "necessity is the mother of invention" when it comes to water management. If you look at the city from a geological standpoint, Singapore has zero natural sources of water. You are not going to find a river, there's not a brook, there's not a swamp, and there's not a lake. They don't exist naturally there. So technically, no one should ever be able to live on Singapore. For many years, the city piped in water from Malaysia. The exciting development is that beginning more than 15 years ago, Singapore started to change everything about their water management to develop one of the biggest water reuse systems in the world. We think this should be an example for communities in California.

Singapore now treats and stores all of their waste water instead of dumping it into the ocean. They created man-made lakes to hold treated water. This water is treated again for use as drinking water. They have built large-scale desalination systems that basically make the city drought-proof and lower the reliance on piping water from Malaysia. And they have lots of point-of-use treatment systems at both homes and businesses. There is an overall awareness throughout Singapore that treats water as a precious resource.

## **Q. Any examples in Europe?**

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**A.** The ones that I mentioned before, Switzerland and Denmark, and the latter in particular. Denmark has plentiful water resources, but the people are so judicious in how they manage those resources. They use market pricing for water. And again, it's seven times the price that an average community in the U.S. pays. If you build a home in Denmark, one of the biggest expenses beyond physical construction is the price you must pay to connect to city drinking and sewer lines. There is just this overall awareness about reuse, about conservation, about using pricing that does not include big government subsidies. Longer term, this should serve Denmark well and should be an example for other cities and nations. You'll see many in Switzerland thinking about these issues in the same way.

On the negative side, you look at deferred water infrastructure maintenance and its costs. London is one of the worst cities in the world with respect to old, leaking water pipes. The city loses up to 30% of all its treated water as it passes through pipes and is lost through leaks.

It will take the U.S. an estimated 800 years to complete the upgrade cycle.

## Q. It sounds as if you're discussing the U.S. as well.

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**A.** Yes, this is a broader issue, but the developed markets of the U.S. and in Europe are only updating and upgrading the water system with band-aids. In the New York metro area, there's a daily traffic report commenting on a broken water main somewhere. The infrastructure is being forced well beyond its economic life because it's not being updated.

These underground pipes can be 70, 80, or 100 years old. They've passed their economic life and are beginning to crumble. So there's just a patchwork of short-term fixes. Looking at the U.S. alone, the dollar estimates for the backlog of water projects the EPA concludes need to get done range from \$300B to \$1T.

If you compare this with what is actually being spent annually on upgrading the water infrastructure systems, it will take the U.S. an estimated 800 years to complete the cycle. I know that's an absurd number, but it just shows perspective on the drawn out re-investment. When I tell people in London or Europe, they all kind of chuckle about how foolish the U.S. infrastructure deferral is. But I say, "Oh, in Europe that same math is 1,000 years." This is also true in the U.K. So, that's part of the water issue. Infrastructure upgrades are needed, but funding is not set up. In the U.S. in particular, water is chronically underpriced, and utilities just don't have funds to keep pace with required upgrades.

## Q. Is any technology emerging that is catching your attention?

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**A.** There are a few I find fascinating. Desalination comes in at least three forms. The first one is called thermal desalination and that's been around since the Roman Empire. All you need to do is boil sea water, capture the vapor, and when that condenses you have fresh water. There are places in the Middle East that routinely do this for fresh water. They have ample cheap energy and will use it for thermal desalination.

The last 15 years or more have seen efficiency improvements in reverse osmosis desalination, where you're forcing water through these highly engineered membranes. And that is becoming a more-efficient form of creating fresh water.

There's now a third technology that, over the last few years, has been changing from an interesting science experiment to a commercially viable, scalable solution. This is forward osmosis. While there's still a lot more R&D that needs to be done, there are companies which have been able to scale this technology with commercialized applications.

Forward osmosis is based on the same technology and principles by which a tree is able to take water and effectively, in a natural process, pump that water to the highest branches. There are no pumps in the tree. It's all a chemical draw that pulls the water molecules higher and higher. And that same technology can be used in a desalination application using a membrane and a chemical draw solution located on the other side of the membrane from the untreated water. The draw pulls the water molecules across the membrane without any pumps. So it's a very, very low energy process.

The only big piece of energy use comes after those water molecules have been drawn through the membrane to the other side. You then need to evaporate the chemical

There are still new water markets developing.

draw, which is typically a form of alcohol. That is boiled off, which uses energy. If you go to big R&D centers in universities today, such as at Cal Tech and MIT, you're seeing lots of focus on forward osmosis. There are a handful of companies beginning to commercialize this. It's great to see that there can be some technology solutions introduced that will have a role longer-term in water treatment.

## **Q. How should investors think about opportunities in water-related themes?**

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**A.** Just to emphasize, there is this natural allure of water as an investable mega trend. We're always cautioning investors to focus on the higher end of water technology. That's where you'll see better margins, better returns, and more proprietary technology.

I find it fascinating that there are still new water markets developing. One worth highlighting that we have written about is ballast water treatment. We're close to having an international treaty signed on this new law. Big cargo ships that enter U.S. ports are now required to have onboard water treatment systems for their ballast water. The issue you have comes from big ships that load up their cargo in ports like Singapore. They will stack containers on the top decks and then take on tens of thousands of gallons of water in their ballast as a way to stabilize the ship which would otherwise be top-heavy. So, they take on this ballast water, sail into the U.S. port, empty their cargo, and then historically have just purged tens of thousands of gallons out of their ballast holds into the harbor.

This has been going on for years. Foreign species of fish, shellfish, and bacteria have been introduced into harbors around the world producing ecological shock. You have influxes of zebra mussels in the U.S. The East River in New York is an example: zebra mussels clog water pipes and eat away at piers. The Great Lakes have experienced an influx of Asian carp that have few natural predators.

So, in the last couple of years, a brand new water market has been created to retrofit all ocean vessels with onboard water treatment. Estimates are as high as a \$30B market. If you had asked me about this three or four years ago, it wouldn't have been on anyone's radar screen. Now there is a race to develop the best commercial systems.

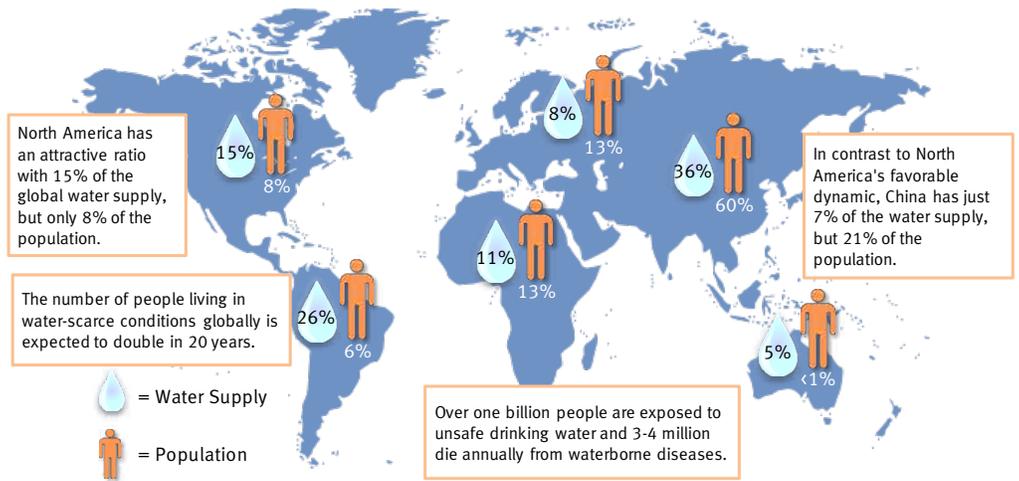
## **Q. You've assessed and contributed to water resource strategic thinking for a long time. What appeals to you about RBC's commitment to the [Blue Water Project](#)?**

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**A.** Water resource management is fascinating to me. Water is one of the enduring megatrends. It matters today. It is going to matter next year and in 10 years. As far as you look out, there is going to be a focus on water quality and scarcity.

We have had the same, finite amount of water for millions of years. There is a growing awareness of the stewardship that is required to take care of this resource. Whether at the local level, or in looking for macro solutions, this issue is going to matter for a long, long time. That's why the RBC Blue Water Project matters at both at smaller-scale levels and in macro solutions. So I really applaud the vision and effort and I'm glad to be a part of it.

## Global Water Supply vs. Population Imbalance



Source - United Nations

### Q. Deane, let's talk about you for a minute. What got you so involved in water issues?

**A.** I get asked this question a lot. My “day job” is as a sell-side analyst at RBC covering the multi-industry and electrical equipment sector. How does someone who covers big industrial stocks such as GE, 3M, Honeywell, and so forth get to be an expert in the water sector? More than 10 years ago, there was a big M&A push that saw over half of my coverage companies begin buying up big water businesses. We wrote reports about the water sector, which really hadn't been done before, and we hosted big water conferences. As our expertise grew, I was asked to make presentations to organizations such as the World Bank and at World Water Week and Singapore Water Week.

Then I received an invitation to present at the United Nations on water scarcity and quality as well as on longer-term supply/demand and balances in water. After one of my U.N. presentations, a call came asking if I was interested in joining an advisory board to the United Nations on water. So, I've done that now for six or seven years.

Water is an interesting sub-sector focus of my professional work. This has all come full circle because issues today in California bring everything we do in water into focus. We have knowledge and analytical capability in water rights, use in agriculture, alternative supply sources, whether conservation, reuse or desalination. It is important to investors today and will be in 10 years. It will remain a principal focus of our work.

### Q. How do you see the importance of water developing within an Environmental and Social Governance (ESG) framework?

**A.** It is an important part of water discussion that prompts a lot of questions. There is a growing part of the U.S. investor base that cares about environmental and social governance policies. If anything, that interest is even larger in Europe. Water can fall under both environmental and governance categories.

In many cases, you're seeing big focus by governments and NGOs to change irrigation practices.

We're hearing more from ESG investors. They want to know which industries have water risks. It may be questions about a bottler, or water bottling, or a beverage company such as Coca-Cola or Pepsi. This may include how growth could be at risk in regions facing water scarcity issues. Same thing on big semiconductor companies such as Intel that are big users of water. They have to be mindful whether plentiful sources of fresh water are available where they're going to build the next plant. Then they have to be able to treat to the standards of ultra-pure water for their own processes. So, there are measurable risks that come into play.

Another recent development in ESG thinking, which I think is fascinating, is that industries are going to be held to standards for their water footprint. Most people are more conversant with carbon footprints, but there is this whole notion developing around standards of water efficiency. How much water do they use per unit of output? This is part of the work I've done with the United Nations, to develop a framework for industries to measure the efficient use of water.

Interestingly, GE, for the first time late last year, voluntarily included a data point both in the annual report and a subsequent presentation of how much water they use. I think companies are going to have to be doing this on a go-forward basis and ESG work is at the forefront of this. We welcome that level of scrutiny.

## **Q. Water management always seems to lead back to agriculture.**

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**A.** Yes, back to the 80% of water allocated to California agriculture that receives far less scrutiny than the 14% for residential use. Water technology applied to agriculture begins in the area of irrigation. You're seeing some newer technologies based on applications of micro-filtration. In many cases, you're seeing big focus by governments and NGOs (non-government organizations) to change irrigation practices.

## **Q. Will water become a traded commodity?**

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**A.** I'm often asked that question. This idea has been considered time and time again. And yet, despite its appeal from a practical economics standpoint, it's never really gotten much traction. I made this point earlier, that water is always a local issue. It is either scarce where you need it the most, or it is oversupplied—meaning flood—where you don't want it. The reality is that it's very expensive to pipe water, more expensive than to pipe oil. Intuitively, that always surprises people because you think of oil as this big, heavy, viscous liquid. But think of an oil spill on an ocean; the oil slides right to the top. From a viscosity standpoint, sea water is more viscous than oil. So, barging and piping water over long distances is simply not economical. It's very, very inefficient.

## **Q. Lastly, could you share some investment ideas with us?**

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**A.** A couple of names jump out within our coverage. We have an Outperform rating on Pentair. Pentair has 36% of total revenue (\$7.0B total in 2014) exposed to water. It is also a leader in residential and commercial pool equipment, but I don't consider pools as part of the global water sector. Pentair tends to be on the higher end of water technology. It is involved in membrane filtration and pressure vessels found in desalination systems and membranes for nanofiltration.

## Multi-Industry Companies Most Levered to Water

Company	Water Exposure	% of Revenues
Xylem	Pumps, water treatment, valves	90%
Pentair	Pumps, flow control, filtration	36%
HD Supply	Distributes water & wastewater products	26%
Roper Industries	Water meters and pumps	16%
Danaher	Water test, UV treatment, industrial	11%
IDEX	Pumps, flow control, dose metering	8%
Flowserve	Pumps and pump systems, flow control	4%
Emerson	Process management for utilities	2%
3M	Cuno water filtration, pipe-relining	2%
SPX Corp	Industrial flow process pumps and filtration	2%
General Electric	Desalination, industrial water treatment	1%
Other Niche Water Exposures		
Honeywell	Automation and controls	
Illinois Tool Works	Pipe-relining	
Grainger	Pumps and plumbing supplies for residential	
WESCO	Electrical supplies to water & wastewater treatment	

Source - RBC Capital Markets, Company reports

Another company that we follow that is high on the water technology scale and high in total water exposure (90%) is Xylem. Perhaps three-quarters of this business relates to water pumps that can be seen as something of a commodity, but the 25% that we get very excited about represents its businesses in ultraviolet filtration. Shining UV light is a way to disinfect water as an alternative to chlorine. Xylem is the second-largest competitor in that space. It also has a fast-growing water test business.

We get questions about the “Internet of Things.” Xylem is beginning to build out automation in water treatment. Xylem has a number of products that use real-time sensors in the treatment process at a water plant. These give direct feedback to, as example, their aeration blowers to obtain desired oxygen content so you are minimizing electricity use in the aeration process.

A third company I’ll highlight is Roper. The company is a world leader in smart water meters and about 16% of total sales are in this market. Think about a community in California that is being required to restrict water consumption by 25%. Many of these communities don’t have real-time integrated smart water meters. We expect to see a higher demand for products that Roper makes. The smart meter product is called Neptune. We also have an Outperform rating on Roper.

**Deane, we thank you for a great discussion. A valuable perspective. Enjoy Blue Water Day.**

## Deane M. Dray, CFA, RBC Capital Markets Equity Research

Deane M. Dray, Managing Director, joined RBC Capital Markets in September 2014. He is the senior analyst covering the Multi-Industry & Electrical Equipment sector. Prior to joining RBC Capital Markets, Deane worked at Citi Global Research for four years where he was also the global sector head of Industrials research. He also worked at Goldman Sachs for 11 years as a senior analyst covering the Multi-Industry sector. Deane began his Wall Street career at Lehman Brothers. He has consistently ranked among the top industrials analysts in the annual rankings for stock picking and earnings estimate accuracy. The global water sector has been a key focus for Deane as part of his coverage of the Industrials. He has published extensively on the water sector and has hosted annual water investment conferences in New York and London. Deane is a member of the Advisory Board to the United Nations Environmental Program Finance Initiative (UNEP FI) on water issues and a member of American Water Works Association (AWWA). He has made several presentations on the water sector to symposiums at the United Nations, World Bank in Washington, D.C., World Water Week in Stockholm, and Singapore Water Week.

Deane received an M.B.A. from the New York University and graduated with honors from Brown University. He is a Chartered Financial Analyst.

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			Count	Percent
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