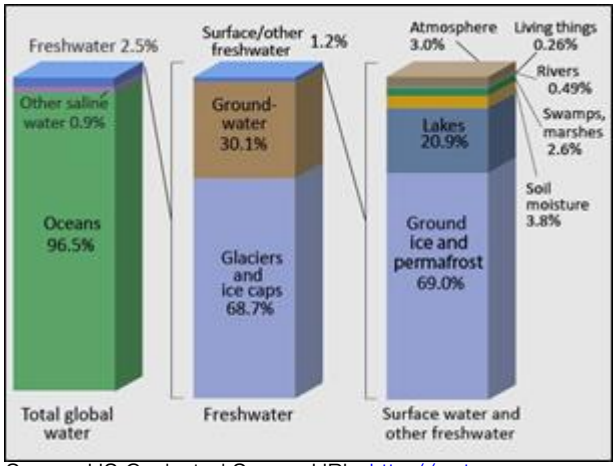
Clean water and water infrastructure: A 21st century challenge?

Dear Reader,

Water is the most fundamental ingredient for our daily life and is irreplaceable for drinking, cooking or bathing. Farms in many regions cannot grow crops without irrigation. Governments, hospitals, restaurants, hotels and other commercial establishments are not able to operate without access to clean water. Moreover, many industries such as food, manufacturing or nuclear facilities are not able to operate without water, because it is a critical component of finished products, or it is used for industrial processes or for cooling purposes. Drinking-water systems collect spring water from rivers and lakes, remove pollutants and distribute safe water. Wastewater systems collect used water and sewage, remove contaminants and return clean water back into the rivers and lakes for future use. However, fact is that much of the water infrastructure is old and in need of replacement. Failures in water infrastructure can result in water disruptions, impediments to emergency response and damage to other types of essential infrastructure. In extreme situations caused by failing infrastructure or drought, water shortages may result in unsanitary conditions, increasing the likelihood of public health issues.

Fig. 1: Distribution of earth's water



Source: US Geological Survey, URL: http://water.usgs.gov/edu/earthwherewater.html, 25.06.2014.

This challenge brings us to the next topic: According to the United Nations, water scarcity is one of the most important issues globally: Around 1.2 billion people, or almost one-fifth of the world's population, live in areas of physical scarcity. Another 1.6 billion people, or almost one quarter of the world's population, face economic water shortage, where countries lack the necessary infrastructure to take water from rivers and aquifers[1]. Fig. 1 shows that almost all of Earth's water is saline and is located in the oceans. Freshwater accounts for only 2.5% of global water supply, most of which is locked in the two polar ice caps. Ground water, a critical source of potable water, makes up about 30% of freshwater resources. Surface/other freshwater such as lakes, rivers, wetlands and different water bearing soil types account for

[1] Source: United Nations, URL: http://www.un.org/waterforlifedecade/scarcity.shtml, 18.6.2014.

only 1.2% of freshwater[2]. Nevertheless, humans rely on these sources more than any other, especially under the assumption of a rising world population. Current projections by the United Nations show a continued increase in population in the near future with a steady decline in population growth rate. Global population is expected to reach between 8.3 and 10.9 billion by 2050[3]. As a consequence the demand for freshwater will continue to rise. Under the assumption of a status quo of the current water infrastructure, these demand challenges are going to have tremendous consequences due to increasing water scarcity, aging water infrastructure and water quality issues, just to name a few. Therefore we think the water and waste water sector must address the underlying structural challenges to create innovative solutions in the field of water treatment as well as water infrastructure.

Supply and demand challenges of water

In theory, there is enough freshwater on the planet on a sustainable basis. However, in practice water is not distributed evenly across the globe and faces some of the toughest challenges of any natural resource or commodity: On the supply side, the world is facing a combination of insufficient freshwater, uneven distribution, widely varying quality, water losses and adverse impact from climate change. Combined with the fact that in the past water supply has failed to keep pace with the rising world population, we believe chronic shortages in many regions around the world will only accelerate. On the demand side, agriculture is the largest single user of freshwater in the world, accounting for 70% of total water use. Industry and energy are the second largest consumers while residential users make up the rest. According to United Nations Environment Programme (UNEP), demand will overshoot water supply by 40% by 2030 and close to half of the world population will be living in water stressed areas[4]. Furthermore, under the joint pressure of population growth and changes in dietary habits, feedstock consumption is going to increase in most regions of the world. It is expected that by 2050 an additional billion tonne of cereals and 200 million tonnes of meat will need to be produced annually to satisfy growing food demand[5]. It is not unrealistic to believe that water is set to become a scarcer commodity than oil.

Water treatment

Water treatment covers the processes used to make water more acceptable for a desired end-use, such as drinking water, usage or re-usage by industry, in irrigation or return to the natural environment. Globally millions of tons of sewage, industrial and agricultural waste are discharged into the world's waterways every day. This market is barely tapped, with insufficient wastewater treatment around the world. For instance, wastewater reuse stands at only 2.41% of all water withdrawals worldwide. The estimate of total global water reuse is less than the water used each day by US toilets at home. The goal needs to be to move to best-practice levels of water reuse of

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[2] Source: US Geological Survey, URL: http://water.usgs.gov/edu/earthwherewater.html, 18.6.2014.

[3] Source: UN (2013): World Population Prospects, the 2012 Revision – "Low variant" and "High variant", database, June 15th 2013, URL: http://esa.un.org/wpp/unpp/panel_population.htm, 19.6.2014.

[4] Source: UNEP (2011): Water: Investing in natural capital, p. 127, fig. 7 and fig. 8, URL: http://www.unep.org/greeneconomy/Portals/88/documents/ger/ger_final_dec_2011/4.0-WAT-Water.pdf, 18.6.2014.

[5] Source: FAO (2012): Coping with water scarcity: An action framework for agriculture and food security, FAO water reports, p. 14, URL: http://www.fao.org/docrep/016/i3015e/i3015e.pdf, 18.6.2014.
Let's assume in 2050 the world population will grow to 9 billion people. As a consequence the feedstock consumption will rise by about 60% and therefore agricultural water consumption needs to increase significantly. Just think about the following fact: To produce one apple, 70 litres of water is necessary, for 150gr of beef steak 2025 litres is needed and one slice of bread requires 40 litres of water (source: United Nations (2013): Water for food factsheet, May 17th 2013, URL: http://www.unwater.org/publications/publications-detail/en/c/204292/, 19.6.2014.

up to 70%, which is the case for Israel[6].

The main drivers of water treatment are the rapid growth of urban areas and new drinking standards in Europe and North America. In 2009 the American Society of Civil Engineers produced a report on drinking water and wastewater infrastructure standards in the US, awarding the lowest grade possible[7]. The Environmental Protection Agency (EPA) estimates that if spending for capital investments, operations and maintenance remains at current levels, the potential funding gap for clean and drinking water would be annually USD 26 billion just for addressing water infrastructure shortcomings in the US[8].

Water infrastructure

Water and sanitation infrastructure is sorely lacking in many emerging markets and water losses are a considerable problem around the globe. Crumbling and incomplete infrastructure is the primary cause of this. Investing in water infrastructure includes pipes, valves as well as meters. To improve the water loss rates, the complete network of water distribution is critical.

The entire water infrastructure market generates revenues of USD 360 billion per year and is growing at a compounded growth rate of 6%. There are lower but stable growth rates for the highly fragmented utilities sector. Around 90% of the water utility companies are not listed, many of them being government-owned. The prospects for the water utilities are very different between developed markets, which are focused on maintenance and improving efficiency and emerging markets, which are focused on building the infrastructure as such. The World Economic Forum (WEF) estimates that USD 1'300 billion needs to be invested annually to replace and maintain water infrastructure globally[9]. Water services are more capital intensive than other utilities, requiring twice the capital of electric utilities with the same annual operating expenses. With growing financial needs, along with a decline in public investments in water and the lack of private investment being directed to this sector, new strategies need to be found to make much-needed investments. We therefore believe a fine balance is needed between economic incentives to invest, and to fulfil the basic needs of the population, so that the funding gap can be bridged.

To conclude

Solutions within the field of water treatment are going to benefit from the above mentioned structural growth trends in areas such as wastewater, industrial treatment, desalination, water analysis as well as quality, testing, inspection and certification. In water infrastructure solutions, we think a number of companies are well placed to benefit from this theme such as pipes, pumps, leak

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[6] Source: United Nations (2013): Rising Reuse of Wastewater in Forecast but World Lacks Data on "Massive Potential Resource", Sept. 9th 2013, URL: http://unu.edu/media-relations/releases/rising-reuse-of-wastewater-in-forecast-but-world-lacks-data.html, 18.6.2014.

[7] Source: ASCE (2011): Failure to act, the economic impact of current investment trends in water and wastewater treatment infrastructure, p. iii, URL: http://www.asce.org/uploadedFiles/Infrastructure/Failure_to_Act/_ASCE%20WATER%20REPORT%20FINAL.pdf, 18.6.2014.

[8] Source: EPA (2007): Innovation and Research for Water Infrastructure for the 21st Century, Research Plan, p. 1, footnote 2, URL: http://nepis.epa.gov/Adobe/PDF/P100ECPB.pdf, 18.6.2014.

[9] Source: World Economic Forum (2013): The Green Investment Report, The ways and means to unlock private finance for green growth, p. 7, URL: http://www3.weforum.org/docs/WEF_GreenInvestment_Report_2013.pdf 18.6.2014.

detection and smart metering technology.
For long-term oriented investors we believe this environmental protection theme is very appealing and is still early in its attractive secular growth cycle. We think investments in this area will increase going forward due to its global urgency to update or install the water infrastructure. As a consequence, we are shareholders of leading companies in the field of water analysis, diagnostics and leak detection.

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Service
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